



# Answers

## Pupil Book 6A

### Unit 1, Week 1: Number - Number and place value

#### Lesson 1: 7-digit numbers

- Challenge 1**
- $300\ 000 + 60\ 000 + 7\ 000 + 900 + 10 + 2$
  - $200\ 000 + 5\ 000 + 900 + 30 + 6$
  - $600\ 000 + 10\ 000 + 7\ 000 + 400 + 80 + 3$
  - $500\ 000 + 50\ 000 + 8\ 000 + 100 + 60 + 5$
  - $900\ 000 + 20\ 000 + 6\ 000 + 800 + 10 + 5$
  - $700\ 000 + 80\ 000 + 3\ 000 + 400 + 2$
  - $800\ 000 + 30\ 000 + 3\ 000 + 600 + 30 + 9$
  - $900\ 000 + 70\ 000 + 200 + 70 + 5$
  - $800\ 000 + 60\ 000 + 2\ 000 + 200 + 6$

2 Answers will vary.

- Challenge 2**
- $4\ 000\ 000 + 800\ 000 + 70\ 000 + 2\ 000 + 100 + 20 + 8$
  - $1\ 000\ 000 + 600\ 000 + 30\ 000 + 1\ 000 + 100 + 90 + 7$
  - $5\ 000\ 000 + 500\ 000 + 2\ 000 + 400 + 70 + 2$
  - $2\ 000\ 000 + 300\ 000 + 70\ 000 + 8\ 000 + 200 + 7$
  - $7\ 000\ 000 + 900\ 000 + 20\ 000 + 7\ 000 + 800 + 2$
  - $5\ 000\ 000 + 40\ 000 + 7\ 000 + 100 + 50 + 5$
  - $7\ 000\ 000 + 800\ 000 + 20\ 000 + 5\ 000 + 800 + 30 + 1$
  - $9\ 000\ 000 + 700\ 000 + 70\ 000 + 7\ 000 + 200 + 20 + 2$

2 Answers will vary.

3 Answers will vary.

**Challenge 3** Answers will vary.

#### Lesson 2: 7-digit ordering

- Challenge 1**
- 402392    419386    453927  
463297    487397
  - 719235    760383    773227  
783297    785297
  - 234297    237251    271297  
279385    285268
  - 650286    651375    658295  
658296    659286
  - 305047    305286    305575  
305773    305816
  - 561386    562286    591486  
594386    596287
  - 837083    837187    837393  
839382    839486
  - 993261    993325    993365  
996100    996262
  - 312 135    315 888    324 751  
340 794    348 546

- 96 104    107 356    137 790  
150 281    161 171

- 562 350    f 640 590  
403 500    g 714 330  
608 384    h 268 010  
200 000    i 692 450  
725 440    j 511 480

**Challenge 2** 1 Answers will vary.

- 5 478 301  
1 208 270  
4 832 298  
8 289 600  
4 295 001  
3 200 000  
8 497 210  
2 638 891  
3 432 730  
5 299 306  
7 684 320  
10 000 000

**Challenge 3** 1 Answers will vary.

2 Answers will vary.

3 Answers will vary.

#### Lesson 3: Rounding 7-digit numbers

- Challenge 1** 1, 2
- 265 892  
265 890  
265 800  
265 000
  - 487 371  
487 370  
487 300  
487 000
  - 306 385  
306 380  
306 300  
306 600
  - 725 247  
725 240  
725 200  
725 000
  - 846 794  
846 790  
846 700  
846 000
  - 532 766  
532 760  
532 700  
532 000
  - 921 653  
921 650  
921 600  
921 000

- 798 518  
798 510  
798 500  
798 000
- 642 380  
642 390  
642 300  
642 000

**Challenge 2** 1, 2

- 3 973 729  
3 973 720  
3 973 700  
3 973 000
- 4 538 255  
4 538 250  
4 538 200  
4 538 000
- 7 315 837  
7 315 830  
7 315 800  
7 315 000
- 5 724 619  
5 724 610  
5 724 600  
5 724 000
- 6 838 711  
6 838 710  
6 838 700  
6 838 000
- 8 526 584  
8 526 580  
8 526 500  
8 526 000
- 4 652 176  
4 652 170  
4 652 100  
4 652 000
- 6 237 453  
6 237 450  
6 237 400  
6 237 000

3 Answers will vary.

**Challenge 3** 1, 2

- 5 506 922  
5 500 000  
5 500 000  
5 000 000
- 2 267 253  
2 260 000  
2 200 000  
2 000 000
- 1 919 182  
1 910 000  
1 900 000  
1 000 000

- d** 8 483 029  
 8 480 000      8 490 000  
 8 400 000      8 500 000  
 8 000 000      9 000 000
- e** 6 217 026  
 6 210 000      6 220 000  
 6 200 000      6 300 000  
 6 000 000      7 000 000
- f** 3 430 572  
 3 430 000      3 440 000  
 3 400 000      3 500 000  
 3 000 000      4 000 000
- g** 7 536 765  
 7 530 000      7 540 000  
 7 500 000      7 600 000  
 7 000 000      8 000 000
- h** 4 706 962  
 4 700 000      4 710 000  
 4 700 000      4 800 000  
 4 000 000      5 000 000

- iii 8 000 000  
 0 000 008  
 0 000 080  
 0 000 800  
 0 008 000  
 0 080 000  
 0 800 000  
 8 888 888

- d** Answers will vary.  
**e** Answers will vary.  
**f i** By 10 each time  
**ii** By 10 each time  
**iii** Answers will vary

- Challenge 3**  
**a** 1 710 511  
**b** Yes.  
**c** Answers will vary.

**Unit 1, Week 2: Number – Addition and subtraction**

**Lesson 1: Adding mentally**

- Challenge 1**  
**a i** 383 154      iii 418 154  
**ii** 377 004  
**b a** 603 727      c 609 147  
**b** 634 147  
**c a** 574 743      c 569 373  
**b** 585 743  
**d a** 757 962      c 751 322  
**b** 796 862  
**e a** 863 684      c 913 774  
**b** 868 374  
**f i** 946 927      iii 938 507  
**ii** 1 004 927

- Challenge 2**  
**1 a i** 2 447 590  
**i** 2 687 590  
**ii** 2 388 130  
**b i** 1 249 472  
**ii** 1 211 572  
**iii** 1 706 472  
**c i** 4 518 590  
**ii** 5 117 640  
**iii** 4 521 640  
**d i** 4 265 413  
**ii** 3 872 613  
**iii** 3 866 243  
**e i** 6 732 444  
**ii** 7 431 604  
**iii** 6 735 404  
**f i** 5 150 855  
**ii** 5 545 355  
**iii** 5 146 055

- 2** 800 000 + 40 000 → 840 000 +  
 150 000 → 990 000 + 500 000 →  
 1 490 000 + 400 200 → 1 890 200 +  
 600 000 → 2 490 200 + 99 000 →  
 2 589 200 + 700 → 2 589 900 +  
 50 000 → 2 639 900 + 830 →  
 2 640 730

- Challenge 3**  
**1 a** 500 000      f 3 786 543  
**b** 600 000      g 5 412 440  
**c** 800 000      h 5 681 502  
**d** 300 000      i 2 691 532  
**e** 600 000      j 682 365

**Lesson 2: Subtracting mentally**

- Challenge 1**  
**a i** 244 386      iii 217 386  
**ii** 248 156  
**b i** 563 115      iii 558 845  
**ii** 518 845  
**c i** 674 378      iii 680 738  
**ii** 654 378  
**d i** 460 722      iii 463 072  
**ii** 428 822  
**e i** 753 653      iii 713 233  
**ii** 748 038  
**f i** 855 352      iii 848 812  
**ii** 817 912

- Challenge 2**  
**1 i** 3 713 282      iii 3 763 042  
**ii** 3 563 282  
**b i** 4 709 295      iii 4 338 295  
**ii** 4 733 495  
**c i** 6 286 964      iii 6 279 674  
**ii** 5 887 674  
**d i** 6 990 217      iii 7 590 007  
**ii** 7 589 017  
**e i** 5 492 991      iii 5 488 951  
**ii** 4 793 751  
**f i** 8 666 302      iii 8 691 052  
**ii** 8 690 102

- 2** 4 500 000 – 80 000 → 4 420 000 –  
 700 → 4 419 300 – 5000 → 4 414 300 –  
 300 000 → 4 114 300 – 9000 →  
 4 105 300 – 8500 → 4096 800 –  
 500 000 → 3 596 800 – 1 000 000 →  
 2 596 800 – 6 → 2 596 794

- Challenge 3**  
**1 a** 500 000      d 600 000  
**b** 500 000      e 1 000 000  
**c** 36 000      f 600 000

- 2** Answers will vary.  
**3** Answers will vary.

**Lesson 3: Adding and subtracting decimals**

- Challenge 1**  
**a** 63.2      j 24.2  
**b** 62.3      k 18.2  
**c** 85.2      l 53.8  
**d** 101.6      m 27.6  
**e** 118.2      n 59.7  
**f** 118.2      o 36.8  
**g** 112.1      p 23.9  
**h** 117.3      q 26.7  
**i** 143.7      r 23.8

**Lesson 4: Changing digits**

- Challenge 1**  
**a** 427 358      273 584      735 842  
 358 427  
**b** 555 555

- c i** 800 000      ii 200 000  
 8      2  
 80      20  
 800      200  
 8 000      2 000  
 80 000      20 000  
 888 888      222 222

- iii** 300 000  
 3  
 30  
 300  
 3 000  
 30 000  
 333 333

**d** Answers will vary.

- Challenge 2**  
**a** 9 458 462      4 584 629  
 5 846 294      8 462 945  
 4 629 458

- b i** 6 000 000      ii 6 666 666  
 0 000 006  
 0 000 060  
 0 000 600  
 0 006 000  
 0 060 000  
 0 600 000

- c i** 9 000 000      ii 5 000 000  
 0 000 009      0 000 005  
 0 000 090      0 000 050  
 0 000 900      0 000 500  
 0 009 000      0 005 000  
 0 090 000      0 050 000  
 0 900 000      0 500 000  
 9 999 999      5 555 555

- Challenge 2**
- 1 a 92.77                    i 26.79  
 b 92.11                    j 16.65  
 c 115.76                  k 16.21  
 d 129.99                  l 58.89  
 e 141.07                  m 48.78  
 f 183.38                  n 44.88  
 g 166.05                  o 38.34  
 h 158.03                  p 50.67
- 2 a 9.16                    d 8.66  
 b 9.29                    e 70  
 c 15.05                  f 99

- Challenge 3**
- a 15.68 2.39 22.05 3.15  
 b 5.28 10.77 7.53 centre number 22.18  
 c 8.45 4.05 7.68 13.03  
 d 10.86 13.17 13.36 centre number 40.33

**Lesson 4: Museum problems**

- Challenge 1**
- a 276 760                    d £2808  
 b 1526                    e 5786  
 c 11 690

- Challenge 2**
- 1 a 1 090 359  
 b £17 021.34  
 c £293 200 each  
 d £2  
 e £147 693 each

2 Answers will vary.

- Challenge 3**
- a 1 676 780 adults  
 1 275 992 senior citizens  
 700 008 children  
 b i £73 803  
 ii £7825  
 iii £66 422.70  
 c £360 000  
 d £1.51

**Unit 1, Week 3: Geometry - Properties of shapes**

**Lesson 1: Building 3-D shapes**

- Challenge 1**
- 1 a 6 rectangles, or 4 rectangles and 2 squares  
 b 2 triangles and 3 rectangles  
 c 6 squares

2 A 7                    B 7                    C 7

- Challenge 2**
- 1 A 5                    B 6                    C 9

2 A 12                  B 8                    C 27

**Challenge 3**

1 Answers will vary.

2 a

Shape	Number of cubes in tower	Number of cubes added	Total number of cubes
A	4	4	8 (2 × 2 × 2)
B	10	17	27 (3 × 3 × 3)
C	20	44	64 (4 × 4 × 4)

b 125 cubes

**Lesson 2: Nets of open and closed cubes**



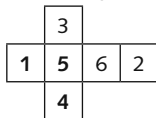
**Challenge 2** Only L does not make a cube.

**Challenge 3** Open

**Lesson 3: Nets of a cube and a cuboid**

**Challenge 1** Open

**Challenge 2** 1 Numbering of dice net:



2 Open

**Challenge 3** Open

**Lesson 4: Nets for 3-D shapes with triangular faces**

**Challenge 1** Open

**Challenge 2** 1 Open

**Challenge 3** 1 Open  
 2 Octahedron

**Unit 2, Week 1: Number - Multiplication and division**

**Lesson 1: Multiplying ThHTO × O**

- Challenge 1**
- 1 450  
 54  
 2700  
 720  
 6300  
 810  
 360  
 10880  
 18  
 990

- 2 2800  
 350  
 49  
 4200  
 56  
 2100  
 7200  
 560  
 7700  
 84

- 3 36  
 4200  
 540  
 72  
 480  
 300  
 2400  
 3600  
 720  
 660

- Challenge 2**
- 1 a 2184                    f 10 152  
 b 3072                    g 22 032  
 c 1060                    h 3125  
 d 6144                    i 3672  
 e 7290

2 Answers will vary.

**Challenge 3**

a 
$$\begin{array}{r} 4\ 3\ 6\ 8 \\ \times \quad 5 \\ \hline 2\ 1\ 8\ 4\ 0 \end{array}$$
 or 
$$\begin{array}{r} 4\ 3\ 8\ 8 \\ \times \quad 5 \\ \hline 2\ 1\ 9\ 4\ 0 \end{array}$$

b 
$$\begin{array}{r} 6\ 7\ 6\ 7 \\ \times \quad 7 \\ \hline 4\ 7\ 3\ 6\ 9 \end{array}$$

c 
$$\begin{array}{r} 7\ 5\ 0\ 6 \\ \times \quad 9 \\ \hline 6\ 7\ 5\ 5\ 4 \end{array}$$

d 
$$\begin{array}{r} 8\ 2\ 0\ 1 \\ \times \quad 4 \\ \hline 3\ 2\ 8\ 0\ 4 \end{array}$$

e 
$$\begin{array}{r} 4\ 5\ 3\ 8 \\ \times \quad 6 \\ \hline 2\ 7\ 2\ 2\ 8 \end{array}$$

f 
$$\begin{array}{r} 8\ 4\ 6\ 1 \\ \times \quad 7 \\ \hline 5\ 9\ 2\ 2\ 7 \end{array}$$

**Lesson 2: Multiplication TO × TO using the expanded written method**

- Challenge 1**
- 1 a 24                    c 240  
 b 2400
- 2 a 72                    c 7200  
 b 720
- 3 a 28                    c 2800  
 b 280
- 4 a 48                    c 4800  
 b 480
- 5 a 64                    c 640  
 b 6400
- 6 a 270                    c 2700  
 b 27
- 7 a 30                    c 3000  
 b 300
- 8 a 56                    c 5600  
 b 5600

**Challenge 2** 1, 2 Answers will vary.

- Challenge 3**
- a  $73 \times 49 = 3577$
  - b  $94 \times 73 = 6862$
  - c  $43 \times 97 = 4171$
  - d  $86 \times 54 = 4644$
  - e  $68 \times 45 = 3060$
  - f  $58 \times 64 = 3712$

**Lesson 3: Multiplication TO  $\times$  TO using the formal written method**

- Challenge 1**
- |        |     |
|--------|-----|
| 1 a 63 | g 9 |
| b 7    | h 9 |
| c 48   | i 4 |
| d 12   | j 7 |
| e 12   | k 4 |
| f 6    | l 6 |

- 2 a 420      g 240  
 b 4000      h 4500  
 c 480      i 5400  
 d 630      j 1600  
 e 720      k 4200  
 f 560      l 1200

- Challenge 2**
- |        |        |
|--------|--------|
| a 1890 | i 5852 |
| b 4624 | j 1664 |
| c 5092 | k 2886 |
| d 1862 | l 4032 |
| e 2223 | m 3025 |
| f 5063 | n 3640 |
| g 3672 | o 1458 |
| h 5046 |        |

- Challenge 3**
- 1 a  $27 \times 33 = 891$
  - b  $26 \times 84 = 2184$
  - c  $36 \times 68 = 2448$
  - d  $38 \times 49 = 1862$
  - e  $56 \times 56 = 3136$
  - f  $43 \times 47 = 2021$
  - g  $29 \times 71 = 2059$
  - h  $35 \times 23 = 805$  or  $35 \times 25 = 875$

2 Answers will vary.

**Lesson 4: Solving word problems (1)**

- Challenge 1**
- |            |            |
|------------|------------|
| a $\times$ | g $\times$ |
| b $\times$ | h $+$      |
| c $-$      | i $-$      |
| d $-$      | j $\div$   |
| e $\div$   | k $\div$   |
| f $\times$ | l $\div$   |

- Challenge 2**
- a £288
  - b £88
  - c £220.50
  - d £1344
  - e £936
  - f £246
  - g £24 255
  - h Answers will vary.

- Challenge 3**
- 1 a 2 globes
  - b one telephone and one box of paints
  - c Kettle £44.10  
 Globe £34.20  
 Set of 6 novels £32.40  
 Box of paints £25.20  
 Telephone £50.40  
 Tennis racquet £35.10

2 Answers will vary

**Unit 2, Week 2: Number - fractions**

**Lesson 1: Fractions, factors and multiples (1)**

- Challenge 1**
- |                   |                  |
|-------------------|------------------|
| 1 a $\frac{2}{5}$ | i $\frac{1}{3}$  |
| b $\frac{2}{5}$   | j $\frac{7}{8}$  |
| c $\frac{3}{4}$   | k $\frac{2}{3}$  |
| d $\frac{1}{2}$   | l $\frac{4}{7}$  |
| e $\frac{2}{5}$   | m $\frac{4}{5}$  |
| f $\frac{1}{3}$   | n $\frac{9}{11}$ |
| g $\frac{2}{3}$   | o $\frac{2}{3}$  |
| h $\frac{1}{4}$   | p $\frac{5}{7}$  |

2 Answers will vary.

- Challenge 2**
- 1 Open
  - 2 Answers will vary.
- Challenge 3**
- 1 Answers will vary.
  - 2 Answers will vary.
  - 3 Answers will vary.

**Lesson 2: Ordering fractions**

- Challenge 1**
- |                   |                |                |                 |                 |                |
|-------------------|----------------|----------------|-----------------|-----------------|----------------|
| 1 a $\frac{2}{3}$ | $\frac{9}{12}$ | $\frac{5}{6}$  | g $\frac{1}{2}$ | $\frac{4}{7}$   | $\frac{2}{3}$  |
| b $\frac{1}{2}$   | $\frac{5}{8}$  | $\frac{3}{4}$  | h $\frac{1}{4}$ | $\frac{2}{5}$   | $\frac{4}{10}$ |
| c $\frac{1}{3}$   | $\frac{5}{9}$  | $\frac{4}{6}$  | i $\frac{3}{4}$ | $\frac{13}{16}$ | $\frac{7}{8}$  |
| d $\frac{2}{12}$  | $\frac{1}{4}$  | $\frac{3}{8}$  | j $\frac{1}{4}$ | $\frac{2}{6}$   | $\frac{3}{8}$  |
| e $\frac{1}{2}$   | $\frac{3}{5}$  | $\frac{6}{10}$ | k $\frac{3}{5}$ | $\frac{7}{10}$  | $\frac{3}{4}$  |
| f $\frac{7}{12}$  | $\frac{2}{3}$  | $\frac{3}{4}$  | l $\frac{1}{4}$ | $\frac{1}{3}$   | $\frac{4}{9}$  |

2 Answers will vary.

- Challenge 2**
- 1 Answers will vary.
  - 2 a  $\frac{4}{8}$     $\frac{3}{5}$     $\frac{6}{10}$       f  $\frac{5}{14}$     $\frac{1}{2}$     $\frac{4}{7}$
  - b  $\frac{2}{5}$     $\frac{2}{3}$     $\frac{7}{9}$       g  $\frac{7}{12}$     $\frac{3}{4}$     $\frac{5}{6}$
  - c  $\frac{1}{2}$     $\frac{4}{7}$     $\frac{2}{3}$       h  $\frac{4}{14}$     $\frac{2}{4}$     $\frac{4}{7}$
  - d  $\frac{3}{12}$     $\frac{2}{6}$     $\frac{4}{9}$       i  $\frac{3}{8}$     $\frac{3}{4}$     $\frac{5}{6}$
  - e  $\frac{2}{10}$     $\frac{4}{15}$     $\frac{3}{5}$
  - 3 a  $\frac{5}{4}$     $\frac{12}{8}$     $\frac{8}{5}$       f  $\frac{20}{14}$     $\frac{12}{7}$     $\frac{7}{4}$
  - b  $\frac{7}{6}$     $\frac{4}{3}$     $\frac{13}{9}$       g  $\frac{15}{12}$     $\frac{4}{3}$     $\frac{9}{6}$
  - c  $\frac{10}{8}$     $\frac{10}{7}$     $\frac{3}{2}$       h  $\frac{18}{14}$     $\frac{9}{6}$     $\frac{11}{7}$
  - d  $\frac{10}{9}$     $\frac{7}{6}$     $\frac{15}{12}$       i  $\frac{14}{6}$     $\frac{8}{3}$     $\frac{11}{4}$
  - e  $\frac{18}{15}$     $\frac{12}{9}$     $\frac{14}{5}$

- Challenge 3**
- 1 a, b, c, d Answers will vary.

**Lesson 3: Adding fractions**

- Challenge 1**
- |                     |                     |
|---------------------|---------------------|
| 1 a $10\frac{3}{5}$ | f 8                 |
| b $12\frac{3}{4}$   | g $14\frac{6}{7}$   |
| c $10\frac{7}{8}$   | h 15                |
| d $13\frac{8}{9}$   | i $9\frac{8}{12}$   |
| e $8\frac{9}{10}$   | j $15\frac{10}{11}$ |
- 2 a  $\frac{6}{4} = 1\frac{2}{4}$       f  $\frac{10}{7} = 1\frac{3}{7}$   
 b  $\frac{7}{5} = 1\frac{2}{5}$       g  $\frac{14}{10} = 1\frac{4}{10}$   
 c  $\frac{9}{7} = 1\frac{2}{7}$       h  $\frac{14}{11} = 1\frac{3}{11}$   
 d  $\frac{10}{8} = 1\frac{2}{8}$       i  $\frac{13}{12} = 1\frac{1}{12}$   
 e  $\frac{14}{9} = 1\frac{5}{9}$

- Challenge 2**
- |                     |                    |
|---------------------|--------------------|
| 1 a $10\frac{2}{5}$ | f $15\frac{1}{2}$  |
| b $7\frac{3}{8}$    | g 10               |
| c $15\frac{1}{3}$   | h $14\frac{3}{7}$  |
| d $13\frac{1}{9}$   | i $17\frac{1}{12}$ |
| e $15\frac{2}{10}$  | j $11\frac{4}{13}$ |

2 Answers will vary.

3 Answers will vary.

- Challenge 3**
- |                  |                   |
|------------------|-------------------|
| 1 a 3            | f $2\frac{4}{6}$  |
| b $1\frac{5}{8}$ | g $2\frac{7}{10}$ |
| c $3\frac{2}{4}$ | h 4               |
| d 3              | i $4\frac{1}{4}$  |
| e 4              | j $2\frac{5}{12}$ |

2 Answers will vary.

3 Answers will vary.

**Lesson 4: Subtracting fractions**

- Challenge 1**
- |                    |                  |
|--------------------|------------------|
| 1 a $1\frac{1}{5}$ | f 1              |
| b $1\frac{1}{4}$   | g $\frac{5}{9}$  |
| c $\frac{4}{6}$    | h $\frac{1}{2}$  |
| d $1\frac{2}{7}$   | i $\frac{6}{8}$  |
| e $1\frac{1}{4}$   | j $\frac{6}{11}$ |

- 2 a  $5\frac{2}{8}$       f  $4\frac{1}{6}$   
 b  $3\frac{3}{7}$       g  $4\frac{5}{9}$   
 c  $5\frac{2}{4}$       h 2  
 d  $1\frac{5}{10}$       i  $2\frac{2}{12}$   
 e  $7\frac{1}{5}$       j  $\frac{4}{10}$

- Challenge 2**
- |                    |                   |
|--------------------|-------------------|
| 1 a $2\frac{5}{7}$ | f $5\frac{7}{9}$  |
| b $4\frac{3}{5}$   | g 4               |
| c $2\frac{4}{8}$   | h $3\frac{4}{6}$  |
| d $3\frac{3}{6}$   | i $4\frac{7}{12}$ |
| e $2\frac{2}{3}$   | j $7\frac{7}{8}$  |

- 2 a  $4\frac{5}{12}$  f  $7\frac{5}{14}$   
 b  $3\frac{5}{12}$  g  $7\frac{4}{9}$   
 c  $6\frac{8}{15}$  h  $7\frac{7}{20}$   
 d  $7\frac{1}{2}$  i  $5\frac{11}{21}$   
 e  $7\frac{1}{20}$  j  $9\frac{5}{36}$

Challenge 3 1 Answers will vary.

- 2 a  $8\frac{2}{5}$  g  $4\frac{7}{15}$   
 b  $4\frac{7}{20}$  h  $7\frac{4}{21}$   
 c  $5\frac{11}{18}$  i  $6\frac{1}{10}$   
 d  $7\frac{1}{2}$  j  $13\frac{21}{45}$   
 e  $8\frac{1}{12}$  k  $2\frac{23}{24}$   
 f  $5\frac{19}{21}$  l  $4\frac{2}{15}$

3 Answers will vary.

### Unit 2, Week 3: Geometry - Position and direction

#### Lesson 1: Using coordinates to locate shapes

Challenge 1 1 A (-1, 3), B (5, 3), C (-3, 2), D (3, 2), E (-5, 0)

2 Answers will vary.

Challenge 2 1 a Rustean Rovers

Coordinates of shot	(-2, 4)	(-5, 6)	(3, 4)	(-4, 1)	(2, 2)
Result	Miss	Goal	Miss	Goal	Miss

#### Ashwell United

Coordinates of shot	(3, 5)	(-6, 1)	(-1, 2)	(3, 4)	(-3, 3)
Result	Goal	Goal	Goal	Miss	Goal

b Ashwell United

- 2 a A (-3, 2), B (3, 2), C (3, -4), D (-3, -4)  
 b E (-2, 4), F (3, -1), G (1, -3), H (-4, 2)  
 c K (-3, 2), L (3, 3), M (2, -1), N (-4, -2)

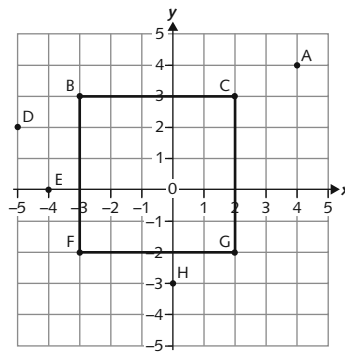
3 U (-1, -1)

Challenge 3 1 a A (-1, 3), B (5, 3), G (5, -3), F (-1, -3)  
 b A (-1, 3), B (5, 3), D (3, 2), C (-3, 2), F (-1, -3)  
 c A (-1, 3), F (-1, -3), E (-5, 0)

2 Answers will vary.

#### Lesson 2: Plotting shapes in the four quadrants

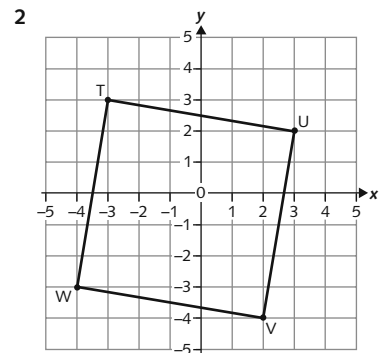
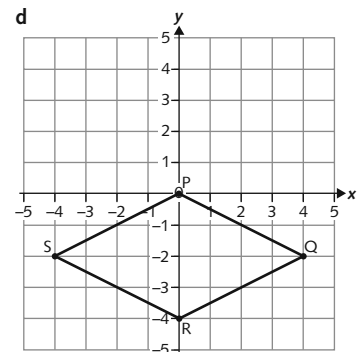
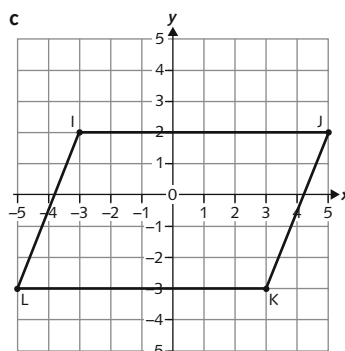
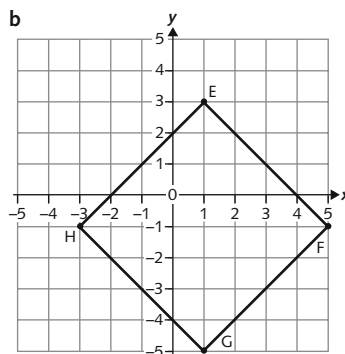
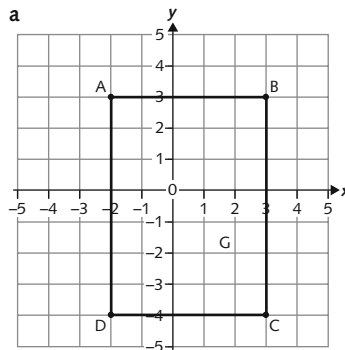
Challenge 1 1



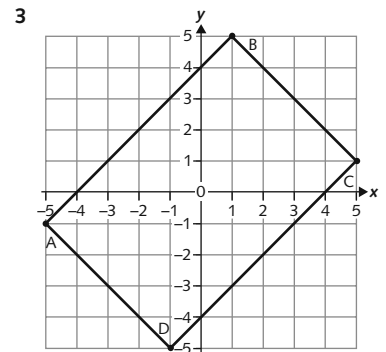
- 2 a B, D d E  
 b F e H  
 c G

3 See 1

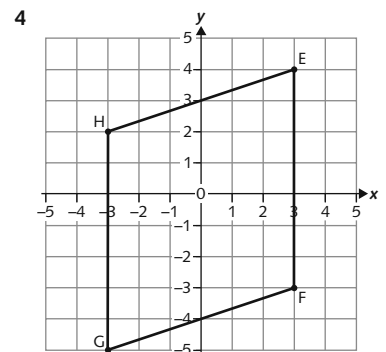
Challenge 2 1 a



W (-4, -3)

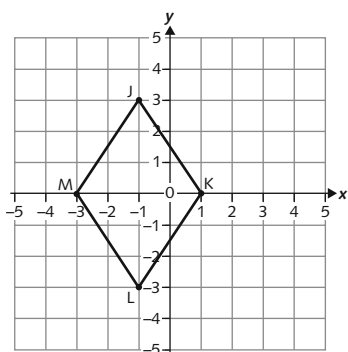


D (-1, -5)



H (-3, 2)

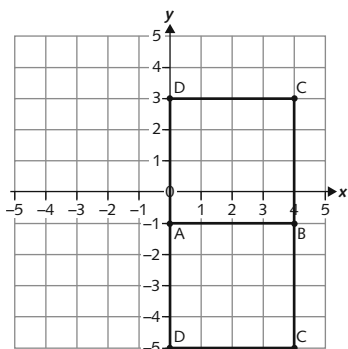
5



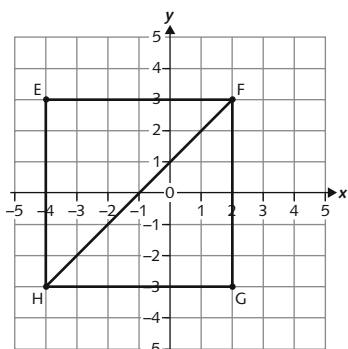
M (-3, 0)

Challenge 3

1 C (4, 3), D (0, 3) or C (4, -5), D (0, -5)



2 E (-4, 3), G (2, -3)



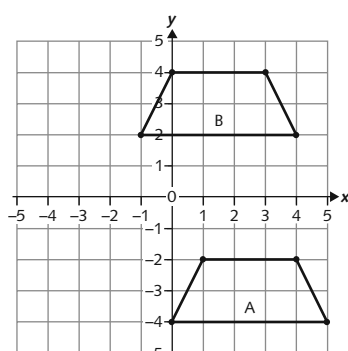
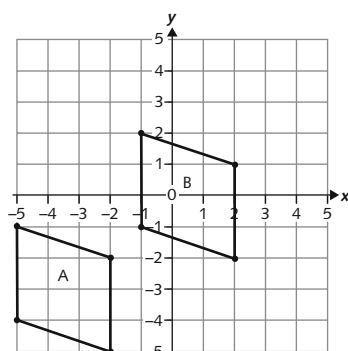
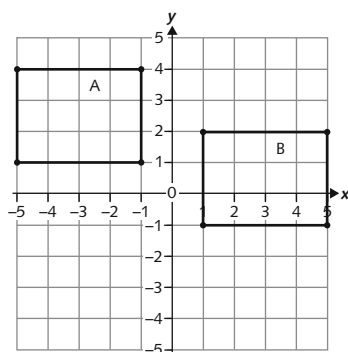
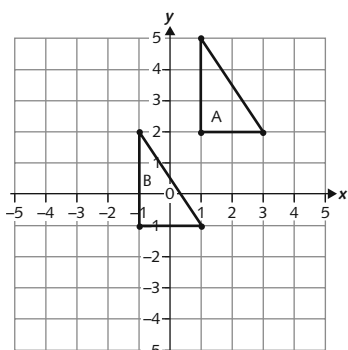
Lesson 3: Using coordinates to translate shapes

Challenge 1

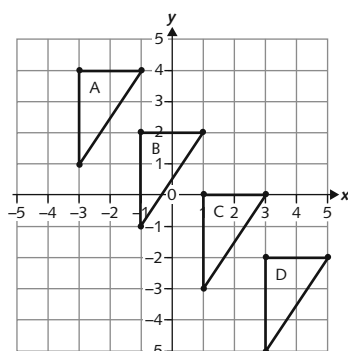
- Grid 1: 5 squares left, 4 squares down
- Grid 2: 3 squares right, 2 squares down
- Grid 3: 8 squares right, 5 squares up
- Grid 4: 4 squares left, 5 squares up

Challenge 2

1

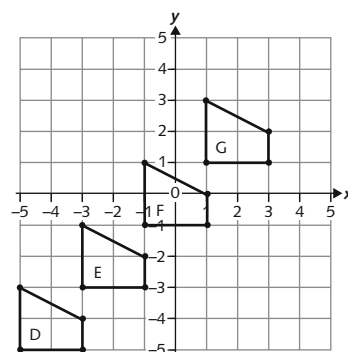


2



Shape	x-coordinate	y-coordinate
A	-3	4
B	-1	2
C	1	0
D	3	-2

3



Shape	x-coordinate	y-coordinate
D	-5	-3
E	-3	-1
F	-1	1
G	1	3

Challenge 3

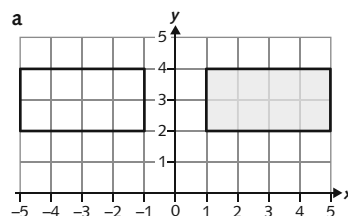
1, 2, 3 Open

Lesson 4: Using coordinates to reflect shapes

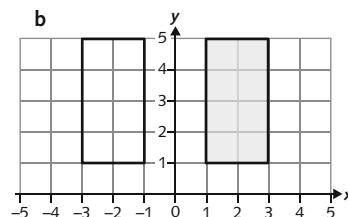
Challenge 1

1 B (1, 3) B' (-1, 3)  
C (3, 5) C' (-3, 5)  
D (4, 2) D' (-4, 2)

2 a



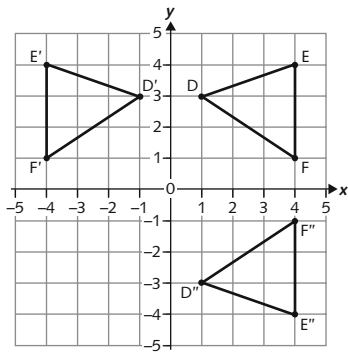
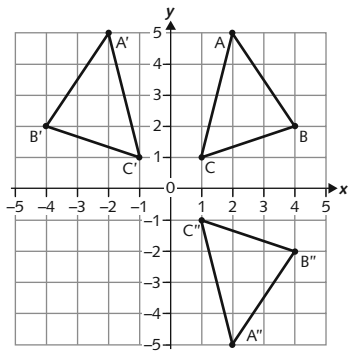
b



1 B (3, 3)

B' (3, -3)  
C (4, 1) C' (4, -1)  
D (0, 4) D' (0, -4)  
E (-2, 3) E' (-2, -3)  
F (-3, 2) F' (-3, -2)  
G (-4, 5) G' (-4, -5)

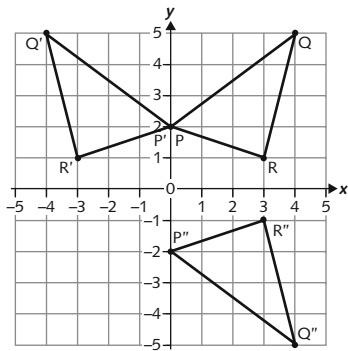
2



- A (2, 5), A' (-2, 5), A'' (2, -5)  
 B (4, 2), B' (-4, 2), B'' (4, -2)  
 C (1, 1), C' (-1, 1), C'' (1, -1)  
 D (1, 3), D' (-1, 3), D'' (1, -3)  
 E (4, 4), E' (-4, 4), E'' (4, -4)  
 F (4, 1), F' (-4, 1), F'' (4, -1)

Challenge 3

a



- a P' (0, 2), Q' (-4, 5), R' (-3, 1)  
 b P'' (0, -2), Q'' (4, -5), R'' (3, -1)

### Unit 3, Week 1: Number - Addition and subtraction

#### Lesson 1: Written addition

Challenge 1

- a 515 889      f 860 982  
 b 763 255      g 978 242  
 c 1 035 190    h 896 215  
 d 935 382      i 928 071  
 e 773 192      j 1 002 233

Challenge 2

- 1 a 4 991 637      h 9 763 654  
 b 5 036 687      i 3 579 346  
 c 7 783 806      j 4 570 125  
 d 6 846 453      k 1 428 434  
 e 8 098 546      l 5 124 582  
 f 8 949 335      m 6 442 122  
 g 9 428 083      n 7 694 322

2 Answers will vary.  
 Highest: 18 843 995

3 Answers will vary.  
 Lowest: 6 004 487

Challenge 3

- 1 a 3 135 999      e 8 196 803  
 b 4 292 693      f 5 798 935  
 c 2 864 338      g 9 992 821  
 d 6 024 989      h 3 296 642  
 2 a 1 931 476      f 2 126 365  
 b 1 892 329      g 2 079 623  
 c 2 248 125      h 1 356 098  
 d 1 958 988      i 7 497 596  
 e 2 731 320      j 2 069 539

#### Lesson 2: Written subtraction

Challenge 1

- 1 a 291 754      f 451 526  
 b 234 158      g 283 671  
 c 324 577      h 357 171  
 d 144 515      i 117 608  
 e 247 663      j 163 878

Challenge 2

- 1 a 2 058 128      j 5 261 396  
 b 1 748 646      k 629 825  
 c 3 549 617      l 3 286 612  
 d 3 613 937      m 1 521 349  
 e 4 679 556      n 746 641  
 f 6 610 784      o 6 428 405  
 g 1 812 537      p 6 202 729  
 h 3 538 666      q 8 286 508  
 i 3 560 954      r 8 556 129

- 2 a 2 322 933      f 3 055 554  
 b 4 204 214      g 4 575 432  
 c 3 799 789      h 2 788 447  
 d 178 260      i 1 913 731  
 e 1 118 100      j 4 475 276  
 a 2 120 987      f 7 736 677  
 b 3 665 070      g 4 359 500  
 c 1 771 666      h 6 754 794  
 d 1 171 760      i 8 386 043  
 e 7 737 581      j 8 250 638

#### Lesson 3: Adding and subtracting decimals

Challenge 1

- a 8027.83      e 3911.12  
 b 8411.7      f 3069.07  
 c 7167.77      g 4094.93  
 d 6060.28      h 3635.83

Challenge 2

- 1 a 94 788.29      e 85 716.42  
 b 95 777.15      f 122 844.24  
 c 88 985.4      g 27 190.92  
 d 98 860.17      h 48 760.38

2 Open

3 Open

Challenge 3

- 1 a 30 313.76      d 798 613.7  
 b 41 309.92      e 23 720.598  
 c 339 321.97      f 76 790.004

2 Answers will vary.

#### Lesson 4: Book problems

Challenge 1

- a 21 385      c £31  
 b 1 585 296      d 866 507

Challenge 2

- a Book two hardback: 900 000  
 Book one paperback: 1 975 152  
 b £1  
 c £7.50  
 d 94th and 95th novels  
 e 5th and 8th

Challenge 3

- 1 a Mystery novel      £7.95  
 Science book      £11.99  
 Atlas      £16.99  
 b 49  
 c 12 855 285  
 d 26 700

2 Answers will vary.

### Unit 3, Week 2: Number - Decimals

#### Lesson 1: Numbers with 3 decimal places

Challenge 1

- 1 a 3.47      count on to      3.52  
 b 2.89      count on to      2.94  
 c 4.07      count on to      4.12  
 d 5.26      count on to      5.31  
 e 3.98      count on to      4.03  
 f 4.57      count on to      4.62  
 g 6.39      count on to      6.44  
 h 2.06      count on to      2.11  
 i 8.18      count on to      8.23  
 j 4.95      count on to      5.0  
 k 7.35      count on to      7.40  
 l 8.88      count on to      8.93

- 2 a 3.4      3.5  
 b 2.8      2.9  
 c 4.0      4.1  
 d 5.2      5.3  
 e 3.9      4.0  
 f 4.5      4.6  
 g 6.3      6.4  
 h 2.0      2.1  
 i 8.1      8.2  
 j 4.9      5.0  
 k 7.3      7.4  
 l 8.8      8.9

Challenge 2

- 1 a 3.867      count on to      3.872  
 b 6.108      count on to      6.113  
 c 2.759      count on to      2.764  
 d 9.015      count on to      9.020  
 e 4.268      count on to      4.273  
 f 7.009      count on to      7.014  
 g 5.486      count on to      5.491  
 h 3.111      count on to      3.116  
 i 5.437      count on to      5.442  
 j 6.546      count on to      6.551  
 k 1.001      count on to      1.006  
 l 4.873      count on to      4.878

- 2 a 3.86                      3.87  
 b 6.10                        6.11  
 c 2.75                        2.76  
 d 9.01                        9.02  
 e 4.26                        4.27  
 f 7.00                        7.01  
 g 5.48                        5.49  
 h 3.11                        3.12  
 i 5.43                        5.44  
 j 6.54                        6.55  
 k 1.00                        1.01  
 l 4.87                        4.88

3 Answers will vary.

- 4 1.001   2.759   3.111   3.867   4.268  
 4.873   5.437   5.486   6.108   6.546  
 7.009   9.015

5 Answers will vary.

Challenge  
3

1 Answers will vary.

2 Answers will vary.

### Lesson 2: Multiplying and dividing by 10, 100 and 1000

Challenge  
1

- 1 a  $28 \times 10 = 280$   
 $28 \times 100 = 2800$   
 $28 \div 10 = 2.8$   
 $28 \div 100 = 0.28$   
 b  $150 \times 10 = 1500$   
 $150 \times 100 = 15\,000$   
 $150 \div 10 = 15$   
 $150 \div 100 = 1.5$   
 c  $63 \times 10 = 630$   
 $63 \times 100 = 6300$   
 $63 \div 10 = 6.3$   
 $63 \div 100 = 0.63$   
 d  $89 \times 10 = 890$   
 $89 \times 100 = 8900$   
 $89 \div 10 = 8.9$   
 $89 \div 100 = 0.89$   
 e  $580 \times 10 = 5800$   
 $580 \times 100 = 58\,000$   
 $580 \div 10 = 58$   
 $580 \div 100 = 5.8$   
 f  $630 \times 10 = 6300$   
 $630 \times 100 = 63\,000$   
 $630 \div 10 = 63$   
 $630 \div 100 = 6.3$   
 g  $72 \times 10 = 720$   
 $72 \times 100 = 7200$   
 $72 \div 10 = 7.2$   
 $72 \div 100 = 0.72$   
 h  $370 \times 10 = 3700$   
 $370 \times 100 = 37\,000$   
 $370 \div 10 = 37$   
 $370 \div 100 = 3.7$   
 i  $230 \times 10 = 2300$   
 $230 \times 100 = 23\,000$   
 $230 \div 10 = 23$   
 $230 \div 100 = 2.3$

- j  $487 \times 10 = 4870$   
 $487 \times 100 = 48\,700$   
 $487 \div 10 = 48.7$   
 $487 \div 100 = 4.87$   
 k  $362 \times 10 = 3620$   
 $362 \times 100 = 36\,200$   
 $362 \div 10 = 36.2$   
 $362 \div 100 = 3.62$   
 l  $163 \times 10 = 1630$   
 $163 \times 100 = 16\,300$   
 $163 \div 10 = 16.3$   
 $163 \div 100 = 1.63$

2 Answers will vary.

3 Answers will vary.

Challenge  
2

- 1 a  $28 \times 10 = 280$   
 $28 \times 100 = 2800$   
 $28 \times 1000 = 28\,000$   
 $28 \div 10 = 2.8$   
 $28 \div 100 = 0.28$   
 $28 \div 1000 = 0.028$   
 b  $287 \times 10 = 2870$   
 $287 \times 100 = 28\,700$   
 $287 \times 1000 = 287\,000$   
 $287 \div 10 = 28.7$   
 $287 \div 100 = 2.87$   
 $287 \div 1000 = 0.287$   
 c  $169 \times 10 = 1690$   
 $169 \times 100 = 16\,900$   
 $169 \times 1000 = 169\,000$   
 $169 \div 10 = 16.9$   
 $169 \div 100 = 1.69$   
 $169 \div 1000 = 0.169$   
 d  $83 \times 10 = 830$   
 $83 \times 100 = 8300$   
 $83 \times 1000 = 83\,000$   
 $83 \div 10 = 8.3$   
 $83 \div 100 = 0.83$   
 $83 \div 1000 = 0.083$   
 e  $307 \times 10 = 3070$   
 $307 \times 100 = 30\,700$   
 $307 \times 1000 = 307\,000$   
 $307 \div 10 = 30.7$   
 $307 \div 100 = 3.07$   
 $307 \div 1000 = 0.307$   
 f  $726 \times 10 = 7260$   
 $726 \times 100 = 72\,600$   
 $726 \times 1000 = 726\,000$   
 $726 \div 10 = 72.6$   
 $726 \div 100 = 7.26$   
 $726 \div 1000 = 0.726$   
 g  $45 \times 10 = 450$   
 $45 \times 100 = 4500$   
 $45 \times 1000 = 45\,000$   
 $45 \div 10 = 4.5$   
 $45 \div 100 = 0.45$   
 $45 \div 1000 = 0.045$   
 h  $932 \times 10 = 9320$   
 $932 \times 100 = 93\,200$   
 $932 \times 1000 = 932\,000$   
 $932 \div 10 = 93.2$   
 $932 \div 100 = 9.32$   
 $932 \div 1000 = 0.932$

- i  $57 \times 10 = 570$   
 $57 \times 100 = 5700$   
 $57 \times 1000 = 57\,000$   
 $57 \div 10 = 5.7$   
 $57 \div 100 = 0.57$   
 $57 \div 1000 = 0.057$   
 j  $42 \times 10 = 420$   
 $42 \times 100 = 4200$   
 $42 \times 1000 = 42\,000$   
 $42 \div 10 = 4.2$   
 $42 \div 100 = 0.42$   
 $42 \div 1000 = 0.042$   
 k  $868 \times 10 = 8680$   
 $868 \times 100 = 86\,800$   
 $868 \times 1000 = 868\,000$   
 $868 \div 10 = 86.8$   
 $868 \div 100 = 8.68$   
 $868 \div 1000 = 0.868$   
 l  $83 \times 10 = 830$   
 $83 \times 100 = 8300$   
 $83 \times 1000 = 83\,000$   
 $83 \div 10 = 8.3$   
 $83 \div 100 = 0.83$   
 $83 \div 1000 = 0.083$

- 2 a  $36.2 \times 100 = 3620$   
 $36.2 \div 100 = 0.362$   
 b  $83.6 \times 100 = 8360$   
 $83.6 \div 100 = 0.836$   
 c  $92.5 \times 100 = 9250$   
 $92.5 \div 100 = 0.925$   
 d  $73.1 \times 100 = 7310$   
 $73.1 \div 100 = 0.731$   
 e  $43.7 \times 100 = 4370$   
 $43.7 \div 100 = 0.437$   
 f  $63.2 \times 100 = 6320$   
 $63.2 \div 100 = 0.632$   
 g  $92.9 \times 100 = 9290$   
 $92.9 \div 100 = 0.929$   
 h  $28.3 \times 100 = 2830$   
 $28.3 \div 100 = 0.283$   
 i  $82.7 \times 100 = 8270$   
 $82.7 \div 100 = 0.827$

3 Open

Challenge  
3

- 1 a  $1836 \times 10 = 18\,360$   
 $1836 \times 100 = 183\,600$   
 $1836 \times 1000 = 1\,836\,000$   
 $1836 \div 10 = 183.6$   
 $1836 \div 100 = 18.36$   
 $1836 \div 1000 = 1.836$   
 b  $2924 \times 10 = 29\,240$   
 $2924 \times 100 = 292\,400$   
 $2924 \times 1000 = 2\,924\,000$   
 $2924 \div 10 = 292.4$   
 $2924 \div 100 = 29.24$   
 $2924 \div 1000 = 2.924$   
 c  $3715 \times 10 = 37\,150$   
 $3715 \times 100 = 371\,500$   
 $3715 \times 1000 = 3\,715\,000$   
 $3715 \div 10 = 371.5$   
 $3715 \div 100 = 37.15$   
 $3715 \div 1000 = 3.715$



- d**  $5206 \times 10 = 52\ 060$   
 $5206 \times 100 = 520\ 600$   
 $5206 \times 1000 = 5\ 206\ 000$   
 $5206 \div 10 = 520.6$   
 $5206 \div 100 = 52.06$   
 $5206 \div 1000 = 5.206$
- e**  $7188 \times 10 = 71\ 880$   
 $7188 \times 100 = 718\ 800$   
 $7188 \times 1000 = 7\ 188\ 000$   
 $7188 \div 10 = 718.8$   
 $7188 \div 100 = 71.88$   
 $7188 \div 1000 = 7.188$
- f**  $34\ 492 \times 10 = 344\ 920$   
 $34\ 492 \times 100 = 3\ 449\ 200$   
 $34\ 492 \times 1000 = 34\ 492\ 000$   
 $10 = 3449.2$   
 $100 = 344.92$   
 $1000 = 34.492$
- g**  $87\ 725 \times 10 = 877\ 250$   
 $87\ 725 \times 100 = 8\ 772\ 500$   
 $87\ 725 \times 1000 = 87\ 725\ 000$   
 $87\ 725 \div 10 = 8772.5$   
 $87\ 725 \div 100 = 877.25$   
 $87\ 725 \div 1000 = 87.725$
- h**  $21\ 396 \times 10 = 213\ 960$   
 $21\ 396 \times 100 = 2\ 139\ 600$   
 $21\ 396 \times 1000 = 21\ 396\ 000$   
 $21\ 396 \div 10 = 2139.6$   
 $21\ 396 \div 100 = 213.96$   
 $21\ 396 \div 1000 = 21.396$
- i**  $50\ 532 \times 10 = 505\ 320$   
 $50\ 532 \times 100 = 5\ 053\ 200$   
 $50\ 532 \times 1000 = 50\ 532\ 000$   
 $50\ 532 \div 10 = 5053.2$   
 $50\ 532 \div 100 = 505.32$   
 $50\ 532 \div 1000 = 50.532$
- j**  $47\ 872 \times 10 = 478\ 720$   
 $47\ 872 \times 100 = 4\ 787\ 200$   
 $47\ 872 \times 1000 = 47\ 872\ 000$   
 $47\ 872 \div 10 = 4787.2$   
 $47\ 872 \div 100 = 478.72$   
 $47\ 872 \div 1000 = 47.872$
- k**  $19\ 294 \times 10 = 192\ 940$   
 $19\ 294 \times 100 = 1\ 929\ 400$   
 $19\ 294 \times 1000 = 19\ 294\ 000$   
 $19\ 294 \div 10 = 1929.4$   
 $19\ 294 \div 100 = 192.94$   
 $19\ 294 \div 1000 = 19.294$
- l**  $74\ 816 \times 10 = 748\ 160$   
 $74\ 816 \times 100 = 7\ 481\ 600$   
 $74\ 816 \times 1000 = 74\ 816\ 000$   
 $74\ 816 \div 10 = 7481.6$   
 $74\ 816 \div 100 = 748.16$   
 $74\ 816 \div 1000 = 74.816$

- 2** 3600 tins of dog food  
 26 000 packets of cereal  
 19 800 packets of biscuits  
 8650 jars of jam

**3** Open

**Lesson 3: Multiplying decimals**

- Challenge 1**
- 1 a** 0.2  
0.4  
0.6  
0.8  
1.0  
1.2  
1.4  
1.6  
1.8  
2.0  
2.2  
2.4
- b** 0.3  
0.6  
0.9  
1.2  
1.5  
1.8  
2.1  
2.4  
2.7  
3.0  
3.3  
3.6
- 2 a** 0.8  
**b** 2.0  
**c** 1.2
- Challenge 2**
- 1** 0.6  
1.2  
1.8  
2.4  
3.0  
3.6
- 2 a**  $5 \times 3 = 15$   
 $0.5 \times 3 = 1.5$   
 $5 \times 0.3 = 1.5$   
**b**  $4 \times 7 = 28$   
 $0.4 \times 7 = 2.8$   
 $4 \times 0.7 = 2.8$   
**c**  $2 \times 8 = 16$   
 $0.2 \times 8 = 1.6$   
 $2 \times 0.8 = 1.6$   
**d**  $6 \times 3 = 18$   
 $0.6 \times 3 = 1.8$   
 $6 \times 0.3 = 1.8$   
**e**  $8 \times 4 = 32$   
 $0.8 \times 4 = 3.2$   
 $8 \times 0.4 = 3.2$
- 3 a** £3.60  
**b** £6.40  
**c** £11.70  
**d** £13.60  
**e** £13.30
- Challenge 3**
- 1** string  $24 \times \pounds 0.70$  £16.80  
 rope  $31 \times \pounds 0.90$  £27.90  
 leather  $15.6 \times \pounds 4$  £62.40  
 fine wire  $27 \times \pounds 2.30$  £62.10  
 nylon rope  $43 \times \pounds 0.40$  £17.20  
 thick wire  $35 \times \pounds 2.70$  £94.50  
 chain  $40 \times \pounds 3.20$  £128
- c** 0.5  
1.0  
1.5  
2.0  
2.5  
3.0  
3.5  
4.0  
4.5  
5.0  
5.5  
6.0
- d** 2.4  
**e** 3.5  
**f** 2.4

- 2** 28 metres £0.40 change
- 3** Answers will vary. 18 m of rope and 6 m of fine wire will cost exactly £30.

**Lesson 4: Rounding decimals**

- Challenge 1**
- 1 a** 5  
**b** 3  
**c** 7  
**d** 10  
**e** 1  
**f** 4  
**g** 9
- h** 3  
**i** 8  
**j** 5  
**k** 9  
**l** 9  
**m** 8  
**n** 3
- 2** Answers will vary.
- Challenge 2**
- 1 a** 36  
**b** 29  
**c** 50  
**d** 26  
**e** 42  
**f** 50  
**g** 19
- h** 63  
**i** 28  
**j** 83  
**k** 47  
**l** 73  
**m** 18  
**n** 57
- 2** 28.6  
26.3  
41.7  
18.6  
63.5
- 28.2  
47.4  
72.9  
18.0

**3** Answers will vary.

**4** Answers will vary.

- Challenge 3**
- 1 a** 38  
**b** 26  
**c** 39  
**d** 48  
**e** 94  
**f** 26  
**g** 49  
**h** 36
- i** 95  
**j** 87  
**k** 68  
**l** 74  
**m** 50  
**n** 57  
**o** 27

**2** Answers will vary.

**3** Answers will vary.

**4** Answers will vary.

**Unit 3, Week 3: Measurement (length)**

**Lesson 1: Converting units of length**

- Challenge 1**
- 1 a** 6.3 cm  
**b** 12.9 cm
- c** 7.5 cm  
**d** 14.8 cm
- 2 a** 14.39 m  
**b** 52.6 m
- c** 8.27 m  
**d** 3.09 m
- 3 a** 8.6 km  
**b** 4.13 km
- c** 6.5 km  
**d** 7.72 km
- Challenge 2**
- 1 a** 3.727 km  
**b** 4.42 km
- c** 5.01 km  
**d** 3.205 km

- 2 a** 725 m  
**b** 408 m
- c** 9.14 m  
**d** 7.02 m

- 3 a** 6.6 cm  
**b** 24.2 cm  
**c** 160 cm  
**d** 973 cm

973 cm, 160 cm, 24.2 cm, 6.6 cm

4 A = 0.65 m, B = 0.88 m, C = 1.05 m,  
D = 1.2m, E = 1.27 F = 1.43m

b i 55 cm                      iii 39 cm  
ii 55 cm

c i 1.27 m                      iii 1.93 m  
ii 2.31 m                      iv 2.63 m

d i 0.21 m                      ii 1.15 m

Challenge 3

- 1 a Children's diagrams  
b Explanation that states that the number of ways is the sum of the preceding two numbers of ways.

c

Number of slabs in path	Number of ways	Length of path (m)
1	1	0.5
2	2	1.0
3	3	1.5
4	5	2.0
5	8	2.5
6	13	3.0
7	21	3.5
8	34	4.0
9	55	4.5
10	89	5.0

Lesson 2: Sporting distances

Challenge 1

1 A 25.6 m      B 16.8 m  
C 33.3 m      D 19.5 m  
E 26.6 m

2 a 16.5 m                      b 13.8 m

Challenge 2

1 3.78 km

2 a 0.946 km                      b 946 m

3 3.75 km

4 Keira 45 cm  
Len 13 cm  
Mark 54 cm  
Naomi 26 cm

5 a 15.48 km                      d 15.075 km

b 14.25 km                      e 13.2 km

c 16.76 km                      f 15.12 km

Challenge 3

a, b 64 pieces of ribbon each  
0.125 m long

Number of folds	0	1	2	3	4	5	6	7
Number of pieces of ribbon	1	2	4	8	16	32	64	128
Length of each piece of ribbon (m)	32	16	8	4	2	1	0.5	0.25

Lesson 3: The Kelly family go to the circus

Challenge 1

1 a 0.26 cm                      c 0.07 m

b 0.12 m                      d 0.55 m

2 55 cm

3 Chris

Challenge 2

1 a 8.75 km                      b 82.51 km

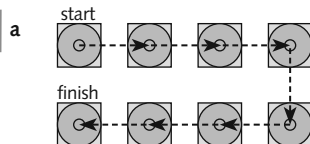
2 a 9 m                              b 12 m

3 a 196 cm                      b 1.96 m

4 a 5 pairs                      b 150 cm

5 9 different lengths

Challenge 3



b 36 m

Lesson 4: Converting miles to kilometres

Challenge 1

1

Miles	0	5	10	15	20	25
Kilometres	0	8	16	24	32	40
Coordinates	(0, 0)	(5, 8)	(10, 16)	(15, 24)	(20, 32)	(25, 40)

2, 3 a 10 miles

b 25 miles

c 24 km

d 48 km

Challenge 2

1 a 32 km

b 56 km

c 40 miles

d 50 miles

e 80 km

f 96 km

2 b 20 km ≈ 12.5 miles

c 28 km ≈ 17.5 miles

d 30 km ≈ 19 miles

e 36 km ≈ 22.5 miles

3 a 100 miles ≈ 160 km

b 250 miles ≈ 400 km

c 450 miles ≈ 720 km

d 505 miles ≈ 808 km

4 a 240 km ≈ 150 miles

b 640 km ≈ 400 miles

c 480 km ≈ 300 miles

d 1000 km ≈ 625 miles

5 a 110 km

b 90 miles

Challenge 3

a Stewart 480 km      Sheila 160 km  
Jack 256 km      Jenny 64 km

b 960 km ≈ 600 miles

Unit 4, Week 1: Number - multiplication and division

Lesson 1: Multiples and factors

Challenge 1

a 6, 12, 18, 24, 30, 36

9, 18, 27, 36, 45, 54

b 12, 24, 36, 48, 60, 72

18, 36, 54, 72, 90, 108

c 7, 14, 21, 28, 35, 42

4, 8, 12, 16, 20, 24

d 10, 20, 30, 40, 50, 60

25, 50, 75, 100, 125, 150

e 21, 42, 63, 84, 105, 126

14, 28, 42, 56, 70, 84

f 30, 60, 90, 120, 150, 180

50, 100, 150, 200, 250, 300

g 15, 30, 45, 60, 75, 90

20, 40, 60, 80, 100, 120

Challenge 2

h 5, 10, 15, 20, 25, 30  
8, 16, 24, 32, 40, 48

2 a 24, 48, 72, 96

b 60

c 52

d 8, 16, 24, 32, 40, 48, 56, 64, 72, 80,  
88, 96

1 a 24: 1, 2, 3, 4, 6, 8, 12, 24

40: 1, 2, 4, 5, 8, 10, 20, 40

b 36: 1, 2, 3, 4, 6, 9, 12, 18, 36

64: 1, 2, 4, 8, 16, 32, 64

56: 1, 2, 4, 7, 8, 14, 28, 56

c 56: 1, 2, 4, 7, 8, 14, 28, 56

80: 1, 2, 4, 5, 8, 10, 16, 20, 40, 80

d 35: 1, 5, 7, 35

18: 1, 2, 3, 6, 9, 18

e 32: 1, 2, 4, 8, 16, 32

48: 1, 2, 3, 4, 6, 8, 12, 16, 24, 48

80: 1, 2, 3, 4, 5, 8, 10, 16, 20, 40, 80

f 60: 1, 2, 3, 4, 5, 6, 10, 12, 15, 20,  
30, 60

102: 1, 2, 3, 6, 17, 34, 51, 102

55: 1, 5, 11, 55

g 27: 1, 3, 9, 27

42: 1, 2, 3, 6, 7, 14, 21, 42

h 20: 1, 3, 9, 27

54: 1, 2, 3, 6, 9, 18, 27, 54

108: 1, 2, 3, 4, 6, 9, 12, 18, 27, 36,  
54, 108

i 35: 1, 5, 7, 35

84: 1, 2, 3, 4, 6, 7, 12, 14, 21, 28,  
42, 84

2 a 8

b 4

c 8

d 16

e 16

f 9

g 3

h 27

i 7

3 Answers will vary.

Challenge 3

1 a 87: 3, 29

b 232: 2, 29

c 185: 5, 37

d 98: 2, 7

e 146: 2, 73

f 356: 2, 89

2 Answers will vary.

3 Answers will vary.

Lesson 2: Division ThHTO ÷ O with a remainder

Challenge 1

1 18

2 24

60

64

36

48

48

88

66

32

42

32

78

80

84

88

- 3 21  
15 84  
36 21  
60 56  
12 49  
27 63  
33 84  
90 91

- Challenge 2**  
a 719.6;  $719\frac{3}{5}$   
b 879.5;  $879\frac{1}{2}$   
c 1911.25;  $1911\frac{1}{4}$   
d 1083  
e 1647.75;  $1647\frac{3}{4}$   
f 953  
g 809  
h 475.5;  $475\frac{1}{2}$   
i 567.25;  $567\frac{1}{4}$   
j 1296.5;  $1296\frac{1}{2}$   
k 877.5;  $877\frac{1}{2}$   
l 972  
m 874.4;  $874\frac{2}{5}$   
n 768.5;  $768\frac{1}{2}$   
o 1318.5;  $1318\frac{1}{2}$   
p 963

**Challenge 3** Answers will vary.

**Lesson 3: Dividing THHTO by 11 and 12 using the formal written method of short division**

- Challenge 1**  
1 a 99 f 132  
b 121 g 440  
c 2200 h 5500  
d 660 i 330  
e 88 j 7700  
2 a 84 f 1440  
b 240 g 1200  
c 4800 h 600  
d 72 i 3600  
e 96 j 108  
3 a 60 e 300  
b 70 f 500  
c 90 g 400  
d 30 h 800

**Challenge 2** 1, 2 Strategies may vary but should be along the lines of the following.

Mental method  
 $5566 \div 11 = 506$   
 $3696 \div 12 = 308$   
 $8899 \div 11 = 809$   
 $4872 \div 12 = 406$

Written method  
 $432 \div 12 = 36$   
 $5160 \div 12 = 430$   
 $3768 \div 12 = 314$   
 $4741 \div 11 = 431$   
 $7183 \div 11 = 653$   
 $2880 \div 12 = 240$   
 $3564 \div 11 = 324$   
 $396 \div 11 = 36$

- Challenge 3**  
1 a £214 each  
b 115 km/hour  
c 270.5 km per day  
d Sasha = £613 Jamal = £583  
Sasha pays £30 per day more for her holiday.

2 Answers will vary.

**Lesson 4: Solving word problems (2)**

- Challenge 1**  
a < f <  
b < g >  
c = h >  
d < i =  
e < j =

- Challenge 2**  
a 248 omelettes  
b 58 dozen eggs  
4 dozen (48) eggs were not used.  
c £1512 + £2637 = £4149  
d 632 breakfasts  
e £776: omelettes  
£4656: beans on toast  
Beans on toast were more popular.  
f Joel spends £192.50.  
g 256 more breakfasts were sold in the second week.  
h Martin spends £68 on breakfasts in a week.

**Challenge 3** Answers will vary.

**Unit 4, Week 2: Number - fractions (including decimals and percentages)**

**Lesson 1: Fraction and decimal equivalents (1)**

- Challenge 1**  
1 a 0.5  
b 0.25 0.5 0.75  
c 0.1 0.2 0.3 0.4 0.5 0.6 0.7  
0.8 0.9  
d 0.2 0.4 0.6 0.8  
e 0.125 0.25 0.375 0.5 0.625  
0.75 0.875

- 2 Completed fraction wall showing: 1, halves, quarters, fifths, eighths, tenths  
 $\frac{1}{2} = 0.5$   $\frac{1}{4} = 0.25$   $\frac{1}{5} = 0.2$   $\frac{1}{8} = 0.125$   
 $\frac{1}{10} = 0.1$   $\frac{3}{4} = 0.75$   $\frac{3}{8} = 0.375$   
 $\frac{5}{8} = 0.625$   $\frac{7}{8} = 0.875$   $\frac{2}{10} = 0.2$   
 $\frac{3}{10} = 0.3$   $\frac{4}{10} = 0.4$   $\frac{5}{10} = 0.5$   $\frac{6}{10} = 0.6$   
 $\frac{7}{10} = 0.7$   $\frac{8}{10} = 0.8$   $\frac{9}{10} = 0.9$   
 $\frac{2}{5} = 0.4$   $\frac{3}{5} = 0.6$   $\frac{4}{5} = 0.8$

- 3 a 0.5  
b 0.25 + 0.25 + 0.25  
c 0.1 + 0.1 + 0.1 + 0.1 + 0.1 + 0.1 + 0.1 + 0.1  
d 0.2 + 0.2 + 0.2 + 0.2  
e 0.125 + 0.125 + 0.125 + 0.125 + 0.125 + 0.125

- Challenge 2**  
1 a 0.5  
b  $\frac{1}{4}$   $\frac{1}{2}$   $\frac{3}{4}$   
c 0.25 0.5 0.75

- d  $\frac{1}{10}$   $\frac{2}{10}$   $\frac{3}{10}$   $\frac{4}{10}$   $\frac{5}{10}$   $\frac{6}{10}$   $\frac{7}{10}$   $\frac{8}{10}$   $\frac{9}{10}$   
e 0.1 0.2 0.3 0.4 0.5 0.6 0.7  
0.8 0.9  
f  $\frac{1}{5}$   $\frac{2}{5}$   $\frac{3}{5}$   $\frac{4}{5}$   
g 0.2 0.4 0.6 0.8  
h  $\frac{1}{8}$   $\frac{2}{8}$   $\frac{3}{8}$   $\frac{4}{8}$   $\frac{5}{8}$   $\frac{6}{8}$   $\frac{7}{8}$   
i 0.125 0.25 0.375 0.5 0.625  
0.75 0.875

2 Fraction and decimal equivalents circled.

**Challenge 3** 1 Answers will vary.

- 2 a 0.05 0.25 0.65 0.75 0.95  
Explanations will vary.  
b Decimal equivalents: 0.33 0.67  
Explanations will vary.

**Lesson 2: Fraction and decimal equivalents (2)**

**Challenge 1** Answers will vary.

- Challenge 2**  
1 a  $\frac{1}{2} = 1 \div 2 = 0.5$   
b  $\frac{1}{4} = 1 \div 4 = 0.25$   
c  $\frac{3}{4} = 3 \div 4 = 0.75$   
d  $\frac{1}{5} = 1 \div 5 = 0.2$   
e  $\frac{3}{10} = 3 \div 10 = 0.3$   
f  $\frac{7}{10} = 7 \div 10 = 0.7$   
g  $\frac{2}{5} = 2 \div 5 = 0.4$   
h  $\frac{3}{8} = 3 \div 8 = 0.375$   
i  $\frac{4}{5} = 4 \div 5 = 0.8$   
j  $\frac{4}{10} = 4 \div 10 = 0.4$

- 2, 3 Less than half More than half  
 $\frac{3}{9} = 0.333$   $\frac{7}{12} = 0.583$   
 $\frac{2}{7} = 0.285$   $\frac{4}{7} = 0.571$   
 $\frac{1}{3} = 0.333$   $\frac{8}{9} = 0.888$   
 $\frac{2}{11} = 0.181$   $\frac{8}{13} = 0.615$   
 $\frac{5}{12} = 0.416$   $\frac{2}{3} = 0.666$   
 $\frac{6}{15} = 0.4$   $\frac{6}{7} = 0.857$

4 Answers will vary.

- Challenge 3**  
1 0.111 0.222 0.333 0.444 0.555  
0.666 0.777 0.888  
Answers will vary.

- 2 a 0.571 e 0.818  
b 0.462 f 0.059  
c 0.214 g 0.667  
d 0.583 h 0.857

**Lesson 3: Fractions, decimals and percentages (1)**

- Challenge 1**  
1 a 1% =  $\frac{1}{100} = 0.01$   
b 25% =  $\frac{25}{100} = 0.25$   
c 7% =  $\frac{7}{100} = 0.07$   
d 24% =  $\frac{24}{100} = 0.24$

- e  $36\% = \frac{36}{100} = 0.36$
- f  $41\% = \frac{41}{100} = 0.41$
- g  $55\% = \frac{55}{100} = 0.55$
- h  $63\% = \frac{63}{100} = 0.63$
- i  $79\% = \frac{79}{100} = 0.79$
- j  $86\% = \frac{86}{100} = 0.86$
- k  $92\% = \frac{92}{100} = 0.92$
- l  $99\% = \frac{99}{100} = 0.99$
- m  $11\% = \frac{11}{100} = 0.11$
- n  $19\% = \frac{19}{100} = 0.19$
- o  $48\% = \frac{48}{100} = 0.48$
- p  $57\% = \frac{57}{100} = 0.57$
- q  $68\% = \frac{68}{100} = 0.68$
- r  $5\% = \frac{5}{100} = 0.05$
- s  $37\% = \frac{37}{100} = 0.37$
- t  $71\% = \frac{71}{100} = 0.71$

2 Answers will vary.

**Challenge 2**

1 Fraction equivalents will vary.

- a 0.25                      f 0.4
- b 0.8                        g 0.2
- c 0.5                        h 0.6
- d 0.3                        i 0.1
- e 0.75                       j 0.9

- 2 a  $47\% = \frac{47}{100} = 0.47$
- b  $20\% = \frac{1}{5} = 0.2$
- c  $83\% = \frac{83}{100} = 0.83$
- d  $75\% = \frac{3}{4} = 0.75$
- e  $92\% = \frac{92}{100} = 0.92$
- f  $10\% = \frac{1}{10} = 0.1$
- g  $25\% = \frac{1}{4} = 0.25$
- h  $65\% = \frac{65}{100} = 0.65$
- i  $60\% = \frac{3}{5} = 0.6$
- j  $31\% = \frac{31}{100} = 0.31$
- k  $22\% = \frac{22}{100} = 0.22$

**Challenge 3**

- 1 a 0.65                       $\frac{13}{20}$
- b 0.38                        $\frac{19}{50}$
- c 0.24                        $\frac{6}{25}$
- d 0.86                        $\frac{43}{50}$
- e 0.16                        $\frac{4}{25}$
- f 0.45                        $\frac{9}{20}$
- g 0.88                        $\frac{22}{25}$
- h 0.95                        $\frac{19}{20}$
- i 0.32                        $\frac{8}{25}$
- j 0.05                        $\frac{1}{20}$

2 Answers will vary.

**Lesson 4: Calculating percentages**

**Challenge 1**

- 1 a 800                        f 1860
- b 1500                       g 2120
- c 1000                       h 4970
- d 380                        i 700
- e 510

- 2 a £1550                    c 25% 300
- b 480

**Challenge 2**

- 1 a 2340    1950    6240    1404
- b 1863    6075    3969    4860
- c 5673    3720    465    7347
- d 4048    1760    5720    968
- e 8730    3492    5141    291
- f 1625    2500    9375    12 375

2 Answers will vary.

- 3 a £4410
- b £588
- c £620.80
- d 320 drove  
1600 caught a bus  
2688 walked  
1792 caught a train

**Challenge 3**

- 1 a 1195    3585    478    47.8
- b 1799    2056    925.2    3135.4
- c 4664.6    3653    1629.8    2641.4
- d 952.5    4762.5    4572    190.5
- e 1895.6    5754.5    2437.2    4332.8
- f 7157.7    1518.3    4844.1    795.3

- 2 a £9800
- b £490    printing  
£3528    band  
£980    staff  
£2352    charity

**Unit 4, Week 3: Measurement (time)**

**Lesson 1: Converting units of time**

**Challenge 1**

- 1 a 100 min                    c 270 min
- b 140 min                    d 196 min
- 2 a 1 h 30 min              c 3 h 20 min
- b 2 h 40 min                d 2 h 45 min

- 3 a 1 min 35 s
- b 160 s
- c 72 h
- d 2 days 2 h
- e 28 days
- f 5 weeks 5 days
- g 72 months
- h 4 years 2 months

**Challenge 2**

- 1 a 205 min                    d 734 min
- b 342 min                    e 1440 min
- c 637 min                    f 10 080 min
- 2 a 4 h 10 min              c 8 h 25 min
- b 6 h 40 min                d 16 h 40 min

- 3 a 2 min 24 s
- b 588 s
- c 168 h
- d 3 days 3 h

- e 91 days
- f 18 weeks 4 days
- g 96 months
- h 6 years 8 months
- i 520 weeks
- j 1 year 48 weeks
- 4 a 3600 s
- b 1440 min
- c 168 h

5 86 400 beats

**Challenge 3**

Hours (h)	0.1	0.2	0.3	0.4	0.5
Minutes (min)	6	12	18	24	30

- 2 a 3 h 24 min              c 5 h 48 min
- b 2 h 42 min                d 3 h 36 min

- 3 a 2.3 h                      c 9.9 h
- b 7.7 h                        d 12.2 h

- 4 a 1 million seconds = 11 days.
- b 1 million minutes = 99 weeks.
- c 1 million hours = 114 years.

**Lesson 2: Problems involving time**

**Challenge 1**

- 1 Saturday
- 2  $13\frac{1}{2}$  h
- 3 13 min
- 4 37 min
- 5 4 h 30 min

**Challenge 2**

- 1 a 26 min 40 s              c 10:48 a.m.
- b 18 min 20 s
- 2 32 days
- 3 624 weeks
- 4 12:55 p.m.

- 5 Mercury: 14 h 45 min
- Venus: 60 h 45 min
- Earth: 6 h
- Mars: 6 h 15 min
- Jupiter: 2 h 30 min
- Uranus: 4 h 15 min
- Pluto: 38 h 15 min

**Challenge 3**

Answers will vary.

**Lesson 3: Finding the average speed**

**Challenge 1, 2**

- 1 a 40 km/h                    d 62 km/h
- b 25 mph                    e 500 mph
- c 5 km/h                     f 14 km/h
- 2 a 50 km/h                    d 30 km/h
- b 40 km/h                    e 35 km/h
- c 40 km/h

**Challenge 3**

- 1 a 30 mph                    c 35 mph
- b 45 mph
- 2 a 80 km/h                    d 7.5 km/h
- b 30 km/h                    e 6 km/h
- c 15 km/h

- 3 a 160 km/h      d 15 km/h  
 b 60 km/h      e 12 km/h  
 c 30 km/h

4 Speed of lorry = 55 mph which is 5 mph below the speed limit

**Challenge 3** 1

Time (h)	$\frac{1}{4}$	$\frac{1}{2}$	1	2	3	4
Distance (km)	20	40	80	160	240	320

2

Time (h)	$\frac{1}{4}$	$\frac{1}{2}$	1	2	3	4
Distance (km)	4.5	9	18	36	54	72

**Lesson 4: Calculating speed**

**Challenge 1**

- 1 a 17 m/s      c 900 m/h  
 b 30 cm/min      d 7 cm/s  
 2 a 500 m/min      d 1.3 cm/s  
 b 20 cm/min      e 66 m/min  
 c 12 m/min      f 1.6 km/min

**Challenge 2**

- 1 a Matt: 125 m/min, Leon: 90 m/min, Ken: 100 m/min  
 b Matt, Ken, Leon  
 2 a 1600 m/h, 1.6 km/h  
 b 2000 m/h, 2 km/h  
 c 1500 m/h, 1.5 km/h  
 d 1050 m/h, 1.05 km/h

- e 5200 m/h, 5.2 km/h  
 f 7400 m/h, 7.4 km/h

- 3 a Aeroplane A 567 mph  
     Aeroplane B 547 mph  
     Aeroplane C 530 mph  
 b 222 miles  
 4 24 cm/day  
 5 14.6 km/year

**Challenge 3**

- 1 a 930 000 miles  
 b i 500 s  
    ii 8.3 min  
 2 5 mins

# Pupil Book 6B

## Unit 5, Week 1: Number - Addition, subtraction, multiplication and division, incl. Number and place value

### Lesson 1: Negative numbers

- Challenge 1** 1 a -5      count on to      -15  
 b -17      count on to      -27  
 c -24      count on to      -34  
 d -37      count on to      -47  
 e -49      count on to      -59  
 f -60      count on to      -70

- 2 a -2      f -8  
 b -5      g -3  
 c -4      h -9  
 d -4      i -5  
 e -3      j -5

- Challenge 2** 1 a -7      e -25  
 b -11      f -20  
 c -9      g -18  
 d -17      h -26

- 2 a -4      e -5  
 b -8      f -9  
 c -5      g -2  
 d -1      h -22

- 3 a 23      e 63  
 b 18      f 64  
 c 41      g 82  
 d 55      h 101

4 Answers will vary.

- Challenge 3** 1 Answers will vary.  
 2 Answers will vary.  
 3 Answers will vary.  
 4 Answers will vary.

### Lesson 2: Negative problems

- Challenge 1** 1 a  $-21^{\circ}\text{C}$       c  $-36^{\circ}\text{C}$   
 b  $-17^{\circ}\text{C}$

**Challenge 2**

- 1 a  $-\text{£}35$   
 b  $-\text{£}8$   
 c  $\text{£}2$   
 d  $-\text{£}6.99$   
 e Answers will vary.  
 2 a  $-\text{£}105$       b 4 weeks  
 3 Answers will vary.

- 1  $-\text{£}107.40$   
 $-\text{£}117.40$   
 $-\text{£}147.37$   
 $-\text{£}97.37$   
 $-\text{£}52.37$   
 $-\text{£}64.37$  carried forward

### Lesson 3: Order of operations (1)

**Challenge 1**

- a 15      g 6  
 b 21      h 14  
 c 16      i 18  
 d 16      j 55  
 e 13      k 50  
 f 4      l 90

**Challenge 2**

- 1 a 69      g 130  
 b 130      h 200  
 c 42      i 89  
 d 22      j 60  
 e 153      k 780  
 f 20      l 112

- 2 Answers will vary.  
 3 Answers will vary.

**Challenge 3**

- 1 Answers will vary.  
 2 Answers could be:  
 a  $4 \times 25 - (40 - 20) = 80$   
 b  $4 \times 16 + 4 \times 4 = 80$   
 c  $4 \times (5 \times 2) \times 2 = 80$   
 d  $4 \times 25 - (4 \times 2) - (3 \times 4) = 80$   
 3 Answers will vary.

### Lesson 4: Addition and subtraction review

**Challenge 1**

- 1 a 52 593      e 361 297  
 b 36 761      f 337 651  
 c 24 580      g 708 489  
 d 44 293      h 1 110 781

- 2 a  $\text{£}2\ 240$       c 35 hours  
 b  $\text{£}15\ 128$

**Challenge 2**

- 1 a 5 245 413      e 2 725 225  
 b 7 280 914      f 782 295  
 c 3 357 461      g 2 495 207  
 d 5 754 186      h 708 296

- 2 a Dictionary       $\text{£}18.40$   
     Cookbook       $\text{£}12.50$   
     Novel       $\text{£}8.25$   
 b  $\text{£}15\ 068\ 284$   
 c  $\text{£}2\ 634$

**Challenge 3**

- 1 a Four bedroom      14  
     Three bedroom      17  
     Two bedroom      24  
 b 5  
 2 i  $\text{£}427\ 680$   
    ii  $\text{£}316\ 465$   
    iii  $\text{£}239\ 005$

## Unit 5, Week 2: Algebra

### Lesson 1: Simple formulae

**Challenge 1**

- 1 a  $p = 6$       c  $t = 2$   
 b  $y = 9$       d  $m = 15$

- 2 a  $D = 100\ \text{km}$   
 b  $D = 250\ \text{km}$   
 c  $D = 400\ \text{km}$

- 3 a  $\text{£}14$       c  $\text{£}350$   
 b  $\text{£}70$

**Challenge 2**

- 1 a  $y = 37$       c  $n = 102$   
 b  $m = 37$       d  $p = 75$

- 2 a 40 seats      c  $20n$  seats  
 b 200 seats

- 3 a 72 bottles      c  $24n$  bottles  
 b 120 bottles

4  $N = 6p$

5  $B = 8t$

6 The answers may include 'cm'.

- a  $L = x - 4$
- b  $L = 3x$
- c  $L = x + 6$  (or  $L = 6 + x$ )
- d  $L = 2x + 2$

7  $I = 10 + 0.25p$  where  $I$  = weekly income and  $p$  = number of papers delivered

- 8 a Car A 49 mph Rounded 50 mph
- b Car B 41 mph Rounded 40 mph
- c Car C 34.8 mph Rounded 30 mph

Challenge 3

- 1 a  $p = 9$  d  $n = 250$
- b  $z = 60$  e  $q = 12$
- c  $r = 11$  f  $a = 7$

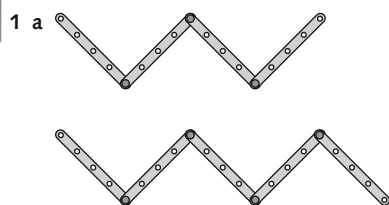
2

Dice throw	Score = $3 + d$	Score = $2d$
1	4	2
2	5	4
3	6	6
4	7	8
5	8	10
6	9	12

Person B should win more often because three of their outcomes give a larger answer whereas there are only two outcomes where person A has the larger answer. For the sixth outcome they are equal.

Lesson 2: Formulae and number sequences

Challenge 1

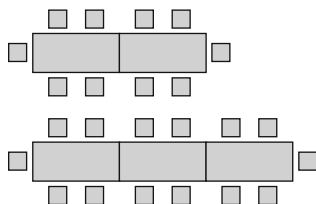


b

Geostrips	1	2	3	4	5	6	7	8	9	10
Fasteners	0	1	2	3	4	5	6	7	8	9

- c i 9 fasteners
- ii 49 fasteners
- iii 99 fasteners
- d Number of fasteners is one less than the number of geostrips.
- e  $F = g - 1$

2 a



b

No. of tables, $n$	1	2	3	4	5	6	7	8
No. of people, $P$	6	10	14	18	22	26	30	34

c  $P = 4n + 2$

Challenge 2

1 a

Triangles	1	2	3	4	5	6	7	8	9	10
Geostrips	3	5	7	9	11	13	15	17	19	21
Fasteners	3	4	5	6	7	8	9	10	11	12

- b i 31 geostrips
- ii 81 geostrips
- iii 191 geostrips
- c The number of geostrips needed is equal to twice the number of triangles plus one.
- d  $N = 2t + 1$
- e  $F = t + 2$

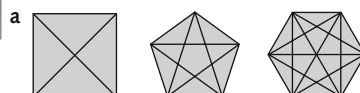
2 a

Term	5	6	7	$n$ th
Number	53	63	73	$10n + 3$

b

Term	5	6	7	$n$ th
Number	13	16	19	$3n - 2$

Challenge 3



- a Square = 2 diagonals;
- pentagon = 5 diagonals;
- hexagon = 9 diagonals
- b Octagon = 20 diagonals



c Hexagon = 4850 diagonals

Lesson 3: Building formulae

Challenge 1

- 1 a  $C = 60 + 40t$  (where  $C$  is the total cost and  $t$  is the number of hours. Children may choose alternative letters.)
- b £180
- c 5 hours

- 2 a  $n + 12 = 16$  so  $n = 4$
- b  $2n + 1 = 13$  so  $n = 6$
- c  $4n - 7 = 9$  so  $n = 4$

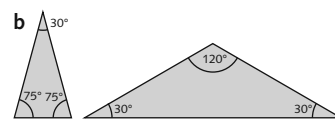
Challenge 2

- 1 a i  $A = x + (8 \times 50) - (2 \times 75) = x + 250$
- ii  $B = x + (10 \times 50) = x + 500$
- iii  $C = x + (6 \times 50) - (4 \times 75) = x$
- iv  $D = x + (5 \times 50) - (5 \times 75) = x - 125$
- b  $A = \text{£}1250$ ;  $B = \text{£}1500$ ;  $C = \text{£}1000$ ;  $D = \text{£}875$

- 2 a  $S = 1000 + 100n$
- b i £2200 ii £1700
- c i 19 cars ii 3 cars

Challenge 3

1 a  $2a + b = 180$



c Open

2 Open

Answers may include:

- cost of flights  $\times$  number of people
- money conversion
- (cost of hotel  $\times$  number of nights)  $\times$  number of rooms

Also:

- cost of hire car  $\times$  number of days
- cost of insurance  $\times$  number of people

Lesson 4: Solving problems with unknowns and variables

Challenge 1

- 1 a  $3t + 2d = 21$
- b Possible solutions are 1 tripler and 9 doublers; 3 triplers and 6 doublers; 5 triplers and 3 doublers; (also 7 triplers and no doublers).

- 2 a Parcel B weighs 21 kg; Parcel A weighs 13 kg.
- b Parcels weigh 7 kg, 7 kg and 12 kg.
- c Parcels weigh 4.67 kg, 4.67 kg, 4.67 kg, 14 kg and 14 kg.

Challenge 2

- 1  $10a + 5b = 50$
- |                |                   |                  |
|----------------|-------------------|------------------|
| 10 10 10 10 10 |                   | $a = 5$ $b = 0$  |
| 10 10 10 10    | 5 5               | $a = 4$ $b = 2$  |
| 10 10 10       | 5 5 5             | $a = 3$ $b = 4$  |
| 10 10          | 5 5 5 5 5         | $a = 2$ $b = 6$  |
| 10             | 5 5 5 5 5 5 5     | $a = 1$ $b = 8$  |
|                | 5 5 5 5 5 5 5 5 5 | $a = 0$ $b = 10$ |

- 2  $7s + 3t = 55$
- Possible solutions are 1 sevenee and 16 tripes; 4 sevenees and 9 tripes; 7 sevenees and 2 tripes.

3 Tony is 11 and Anna is 9.

4 Open

- 5 2 boys and 6 girls
- 3 boys and 5 girls
- 4 boys and 4 girls
- 5 boys and 3 girls
- 6 boys and 2 girls

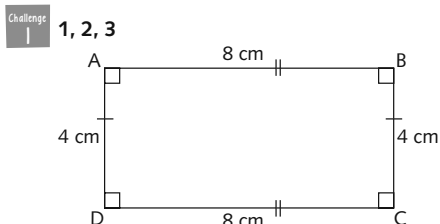
Challenge 3

- 1  $11b + 5y + 3p = 50$
- Possible solutions are  $4b + 2p$ ;  $3b + y + 4p$ ;  $2b + 5y + p$ ;  $2b + 2y + 6p$ ;  $b + 6y + 3p$ ;  $b + 3y + 8p$ ;  $10y$ ;  $7y + 5p$ ;  $4y + 10p$ ;  $y + 15p$

- 2 a  $5a + 2b = 100$   
 b  $50 \times £2$   
 $2 \times £5$  and  $45 \times £2$   
 $4 \times £5$  and  $40 \times £2$   
 $6 \times £5$  and  $35 \times £2$   
 $8 \times £5$  and  $30 \times £2$   
 $10 \times £5$  and  $25 \times £2$   
 $12 \times £5$  and  $20 \times £2$   
 $14 \times £5$  and  $15 \times £2$   
 $16 \times £5$  and  $10 \times £2$   
 $18 \times £5$  and  $5 \times £2$   
 $20 \times £5$

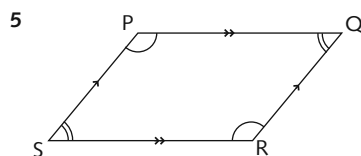
### Unit 5, Week 3: Geometry - Properties of shapes

#### Lesson 1: Drawing 2-D shapes



Note: allow differences of  $\pm 0.1$  cm and  $\pm 1^\circ$  in answers.

- Challenge 2
- Triangle as per diagram in Pupil Book
  - Triangle as per diagram in Pupil Book  
 a  $\angle K = 80^\circ$ ,  $\angle L = 55^\circ$   
 b  $KL = 65$  mm
  - Triangle as per diagram in Pupil Book  
 a  $PQ = 74$  mm  
 b  $\angle P = 59^\circ$ ,  $\angle Q = 31^\circ$
  - Trapezium as per diagram in Pupil Book  
 a  $AB = 30$  mm,  $BC = 100$  mm  
 b  $\angle B = 138^\circ$



Challenge 3 Open

#### Lesson 2: Reasoning about shapes and angles

- Challenge 1
- a A, B, C, F                      c A, B, E, G  
 b A, B, C, F                      d D, G
  - a =  $80^\circ$ , b =  $50^\circ$ , c =  $40^\circ$
- Challenge 2
- a A, F                                  c C, E  
 b D, E                                  d C, D, F
  - a =  $63^\circ$ , b =  $61^\circ$   
 c =  $88^\circ$ , d =  $88^\circ$   
 e =  $33^\circ$ , f =  $52^\circ$
  - a =  $52^\circ$ , b =  $52^\circ$ , c =  $76^\circ$   
 d =  $45^\circ$ , e =  $45^\circ$ , f =  $45^\circ$ , g =  $135^\circ$   
 h =  $70^\circ$ , i =  $110^\circ$ , j =  $110^\circ$   
 k =  $120^\circ$ , l =  $60^\circ$ , m =  $90^\circ$ , n =  $90^\circ$

- Challenge 3
- 36°: d, g, h, k  
 72°: (a, given) c, e, f, j, l  
 108°: b, i

#### Lesson 3: Vertically opposite angles

- Challenge 1
- a =  $b = 50^\circ$   
 c =  $d = 120^\circ$
  - As per diagram in Pupil Book  
 Coloured angle =  $40^\circ$
- Challenge 2
- a =  $45^\circ$   
 b =  $125^\circ$   
 c =  $151^\circ$ , d =  $29^\circ$ , e =  $151^\circ$   
 f =  $118^\circ$ , g =  $62^\circ$ , h =  $62^\circ$   
 i =  $24^\circ$ , j =  $90^\circ$ , k =  $24^\circ$ , l =  $66^\circ$   
 m =  $32^\circ$ , n =  $58^\circ$ , p =  $122^\circ$   
 q =  $111^\circ$ , r =  $35^\circ$ , s =  $34^\circ$

2

Angle a	Angle b	Angle c	Angle d
$65^\circ$	$115^\circ$	$65^\circ$	$115^\circ$
$78^\circ$	$102^\circ$	$78^\circ$	$102^\circ$
$23^\circ$	$157^\circ$	$23^\circ$	$157^\circ$

- Challenge 3
- a =  $64^\circ$                                   d =  $58^\circ$   
 b =  $116^\circ$                                 e =  $32^\circ$   
 c =  $64^\circ$                                   f =  $32^\circ$

#### Lesson 4: All about angles

- Challenge 1
- a =  $90^\circ$ , right  
 b =  $40^\circ$ , acute  
 c =  $93^\circ$ , obtuse  
 d =  $15^\circ$ , acute  
 e =  $118^\circ$ , obtuse  
 f =  $335^\circ$ , reflex
- Challenge 2
- a  $45^\circ$ , acute  
 b  $105^\circ$ , obtuse  
 c  $93^\circ$ , acute  
 d  $15^\circ$ , acute  
 e  $35^\circ$ , acute  
 f  $150^\circ$ , obtuse

- a  $\angle EOA$                                   c  $\angle AOD$   
 b  $\angle FOD$                                 d  $\angle EOB$
- $45^\circ$
- a  $71^\circ$                                       b  $104^\circ$
- a reflex,  $316^\circ$   
 b obtuse,  $112^\circ$   
 c obtuse,  $140^\circ$   
 d obtuse,  $110^\circ$

- a =  $112^\circ$                                   f =  $76^\circ$   
 b =  $68^\circ$                                   g =  $107^\circ$   
 c =  $112^\circ$                                 h =  $73^\circ$   
 d =  $104^\circ$                                 i =  $107^\circ$   
 e =  $76^\circ$

- Challenge 3
- a  $320^\circ$                                       c  $316^\circ$   
 b  $342^\circ$                                       d  $231^\circ$

### Unit 6, Week 1: Number - Multiplication and division

#### Lesson 1: Multiplication HTO $\times$ TO using partitioning

- a 48    d 4800  
 b 480                                        e 48 000  
 c 4800
- a 42    d 4200  
 b 420                                        e 42 000  
 c 4200
- a 72    d 7200  
 b 720                                        e 72 000  
 c 7200
- a 20    d 2000  
 b 200                                        e 20 000  
 c 2000
- a 18    d 1800  
 b 180                                        e 18 000  
 c 1800
- a 21    d 2100  
 b 210                                        e 21 000  
 c 2100
- a 63    d 6300  
 b 630                                        e 63 000  
 c 6300

- Challenge 2
- Answers will vary.
  - a  $245 \times 36 = 8820$   
 b  $444 \times 19 = 8436$   
 c  $456 \times 34 = 15\,504$   
 d  $162 \times 45 = 7290$

Challenge 3 Answers will vary.

#### Lesson 2: Multiplication HTO $\times$ TO using the grid method

- Challenge 1
- |                       |                       |
|-----------------------|-----------------------|
| $80 \times 8 = 640$   | $40 \times 8 = 320$   |
| $300 \times 8 = 2400$ | $700 \times 8 = 5600$ |
| $60 \times 8 = 480$   | $5 \times 8 = 40$     |
| $200 \times 9 = 1800$ | $90 \times 9 = 810$   |
| $60 \times 9 = 540$   | $8 \times 9 = 72$     |
| $700 \times 9 = 6300$ | $30 \times 9 = 270$   |
| $30 \times 7 = 210$   | $70 \times 7 = 490$   |
| $500 \times 7 = 3500$ | $6 \times 7 = 42$     |
| $800 \times 7 = 5600$ | $40 \times 7 = 280$   |

- Challenge 2
- Answers will vary.
  - a 12 388                                      e 16 422  
 b 8588                                        f 2760  
 c 15 912                                      g 42 460  
 d 18 032                                      h 34 672

- a  $462 \times 37 = 17094$   
 b  $269 \times 28 = 7532$

- Challenge 3
- $14 \times 14 = 196$
  - $32 \times 32 = 1024$

**Lesson 3: Multiplication HTO × TO using the expanded written method**

- Challenge 1**
- |          |          |
|----------|----------|
| 1 a 420  | i 6300   |
| b 32 000 | j 5400   |
| c 3600   | k 21 000 |
| d 4000   | l 3600   |
| e 25 000 | m 12 000 |
| f 24 000 | n 48 000 |
| g 5600   | o 7200   |
| h 4800   |          |
- 2 a 18 000 000      c 81 000 000  
b 3840              d 32 000 000

- Challenge 2**
- |          |          |
|----------|----------|
| a 27 872 | f 47 892 |
| b 6407   | g 59 128 |
| c 10 286 | h 34 398 |
| d 6270   | i 33 051 |
| e 20 553 |          |

- Challenge 3**
- a £27 048  
b in 13 hours, 6578 miles; in 1 day, 12 144 miles  
Answers will vary.  
c 35 256 km/year

**Lesson 4: Multiplication HTO × TO using the formal written method**

- Challenge 1**
- |      |       |
|------|-------|
| 1 60 | 2 400 |
| 40   | 600   |
| 90   | 800   |
| 180  | 600   |
| 650  | 500   |
| 330  | 800   |
| 790  | 900   |

- 3 a 2880              e 4560  
b 2580              f 1920  
c 2280              g 2450  
d 7380              h 4900

- Challenge 2**
- |            |          |
|------------|----------|
| 1 a 16 170 | f 27 004 |
| b 20 237   | g 78 144 |
| c 13 158   | h 42 588 |
| d 15 700   | i 51 282 |
| e 17 043   |          |

- 2  $238 \times 72 = 17\ 136$   
 $476 \times 36 = 17\ 136$   
 $952 \times 18 = 17\ 136$   
 $1904 \times 9 = 17\ 136$   
 $4284 \times 4 = 17\ 136$

- Challenge 3**
- |   |   |   |  |
|---|---|---|--|
| a | $\begin{array}{r} 219 \\ \times 37 \\ \hline 1533 \\ 6570 \\ \hline 8103 \end{array}$   | b | $\begin{array}{r} 365 \\ \times 28 \\ \hline 2920 \\ 7300 \\ \hline 10220 \end{array}$ |
| c | $\begin{array}{r} 406 \\ \times 69 \\ \hline 3654 \\ 24360 \\ \hline 28014 \end{array}$ |   |  |

**Unit 6, Week 2: Number - Multiplication and division, incl. Decimals**

**Lesson 1: Multiplying decimals using mental methods**

- Challenge 1**
- 1 36 tenths  
84 tenths  
70 tenths  
68 tenths  
42 tenths  
89 tenths  
250 tenths
- 2 536 hundredths  
62 hundredths  
310 hundredths  
453 hundredths  
2 hundredths  
234 hundredths  
700 hundredths

- Challenge 2**
- |        |        |
|--------|--------|
| a 0.3  | i 0.9  |
| b 0.06 | j 0.8  |
| c 0.4  | k 47.6 |
| d 0.01 | l 3.12 |
| e 0.8  | m 59.2 |
| f 0.4  | n 48   |
| g 0.05 | o 2.82 |
| h 0.5  |        |

- Challenge 3**
- $58 \times 7 = 406$   
 $5.8 \times 7 = 40.6$   
 $0.58 \times 7 = 4.06$
- $73 \times 8 = 584$   
 $7.3 \times 8 = 58.4$   
 $0.73 \times 8 = 5.84$

- $64 \times 9 = 576$   
 $6.4 \times 9 = 57.6$   
 $0.64 \times 9 = 5.76$

- $79 \times 6 = 474$   
 $7.9 \times 6 = 47.4$   
 $0.79 \times 6 = 4.74$

- $45 \times 8 = 360$   
 $4.5 \times 8 = 36$   
 $0.45 \times 8 = 3.6$

- $64 \times 6 = 384$   
 $6.4 \times 6 = 38.4$   
 $0.64 \times 6 = 3.84$

- $22 \times 1 = 22$   
 $2.2 \times 1 = 2.2$   
 $0.22 \times 1 = 0.22$

- $87 \times 3 = 261$   
 $8.7 \times 3 = 26.1$   
 $0.87 \times 3 = 2.61$

- $8.1 \times 6 = 48.6$   
 $0.81 \times 6 = 4.86$   
 $81 \times 6 = 486$

- $4.6 \times 4 = 18.4$   
 $0.46 \times 4 = 1.84$   
 $46 \times 4 = 184$

**Lesson 2: Multiplying decimals by a 1-digit number using the grid method**

- Challenge 1**
- 1 a 18, 0.3, 0.21, 12, 2.7  
b 0.32, 48, 6.4, 0.56, 7.2  
c 54, 0.48, 0.42, 2.4, 0.12
- 2 a  $0.7 \times 5 = 3.5$   
b  $0.8 \times 3 = 2.4$   
c  $0.03 \times 4 = 0.12$   
d  $0.8 \times 9 = 7.2$   
e  $0.02 \times 7 = 0.14$   
f  $0.8 \times 4 = 3.2$   
g  $0.5 \times 5 = 2.5$   
h  $0.09 \times 7 = 0.63$   
i  $0.6 \times 9 = 5.4$   
j  $0.04 \times 3 = 0.12$   
k  $0.6 \times 6 = 3.6$   
l  $0.03 \times 8 = 0.24$

- Challenge 2**
- |          |          |
|----------|----------|
| a 22.68  | g 348.81 |
| b 391.3  | h 475.23 |
| c 26.24  | i 291.6  |
| d 29.34  | j 707.85 |
| e 137.25 | k 60.48  |
| f 10.44  | l 524.82 |

- Challenge 3** Answers will vary.

**Lesson 3: Multiplying decimals by a 1-digit number using the expanded written method**

- Challenge 1**
- |             |        |
|-------------|--------|
| a 4.8       | g 24.5 |
| b 0.56      | h 1.5  |
| c 1.2       | i 0.16 |
| d 8         | j 1.28 |
| e 3.2       | k 3.6  |
| f 7.5 or 10 |        |

- Challenge 2**
- |          |          |
|----------|----------|
| a 13.9   | f 193.8  |
| b 17.4   | g 751.05 |
| c 20.22  | h 13.9   |
| d 394.68 | i 305.52 |
| e 293.92 | j 47.18  |

- Challenge 3**
- |             |           |
|-------------|-----------|
| 1 a £11.67  | e £27.00  |
| b £20.61    | f £8.80   |
| c £34.08    | g £17.43  |
| d £55.12    | h £17.08  |
| 2 a £717.20 | e £71.84  |
| b £155.40   | f £422.75 |
| c £254      | g £286.17 |
| d £395.10   | h £61.35  |

**Lesson 4: Multiplying decimals by a 1-digit number using the formal written method**

- Challenge 1**
- |        |     |      |
|--------|-----|------|
| 1 a 18 | 1.8 | 0.18 |
| b 56   | 5.6 | 0.56 |
| c 54   | 5.4 | 0.54 |
| d 28   | 2.8 | 0.28 |
| e 72   | 7.2 | 0.72 |
| f 12   | 1.2 | 0.12 |
| g 63   | 6.3 | 0.63 |
| h 48   | 4.8 | 0.48 |



- 2 a 4.8                      d 40  
 b 3.6                        e 0.72  
 c 7.2                        f 44.1
- Challenge 2  
 a 266.4                      f 53.64  
 b 20.19                      g 269  
 c 245.7                      h 191.45  
 d 19.46                      i 69.02  
 e 459.24

- Challenge 3  
 a  $5 \times \pounds 6.85 = \pounds 34.25$ ;  
 $\pounds 50 - \pounds 34.25 = \pounds 15.75$   
 b  $5 \times \pounds 18.50 = \pounds 92.50$ ;  
 $\pounds 92.50 - \pounds 34.25 = \pounds 58.25$   
 c  $\pounds 3.80 \times 7 = \pounds 26.60$ ;  
 $\pounds 50 - \pounds 26.60 = \pounds 23.40$   
 d  $7 \times 27.39 = \pounds 191.73$   
 $\pounds 191.73 \times 3 = \pounds 575.19$   
 $\pounds 575.19 - \pounds 191.73 = \pounds 383.46$   
 e  $100 \text{ m} = 0.1 \text{ km}$   
 $15.62 \div 0.1 = 156.2$   
 $156.2 \times \pounds 0.09 = \pounds 14.06$

Unit 6, Week 3: Measurement (mass)

Lesson 1: Mass in action

- Challenge 1  
 1 a i 0.3 kg    ii 0.03 kg    iii 0.003 kg  
       b i 0.7 kg    ii 0.07 kg    iii 0.007 kg
- 2 a i 0.4 kg    ii 0.04 kg    iii 0.004 kg  
       b i 0.9 kg    ii 0.09 kg    iii 0.009 kg  
       c i 1.2 kg    ii 0.12 kg    iii 0.012 kg
- 3 a i 800 g    ii 80 g        iii 8 g  
       b i 4500 g    ii 4050 g    iii 4005 g

- Challenge 2  
 1 a 6.818 kg, 6.8 kg  
       b 9.09 kg, 9.1 kg  
       c 7.366 kg, 7.4 kg  
       d 14.275 kg, 14.3 kg  
       e 12.05 kg, 12.1 kg  
       f 10.025 kg, 10 kg

- 2 a 7.96 kg, 7960 g  
       b 11.97 kg, 11 970 g  
       c 16.895 kg, 16 895 g  
       d 12.405 kg, 12 405 g  
       e 12.851 kg, 12 851 g  
       f 20 kg, 20 000 g

- Challenge 3  
 1 £2    1200 g, 1.2 kg  
       £1    950 g, 0.95 kg  
       50p    800 g, 0.8 kg  
       20p    500 g, 0.5 kg  
       10p    650 g, 0.65 kg  
       5p     325 g, 0.325 kg  
       2p     712 g, 0.712 kg  
       1p     356 g, 0.356 kg

- 2 a £40                      c £10  
       b £160                    d £30

Lesson 2: Massive masses

- Challenge 1  
 1 a 6 t                        f 6.8 t  
       b 9 t                        g 13.6 t  
       c 3 t                        h 21.7 t  
       d 12 t                      i 19.9 t  
       e 5.7 t

- 2 a 1400 kg                      d 15 500 kg  
       b 3800 kg                    e 18 700 kg  
       c 7900 kg                    f 24 600 kg

Challenge 2 1

	Whale	Tonnes (t)	Kilograms (kg)
a	blue	150	150 000
b	bowhead	100	100 000
c	sei	20	20 000
d	humpback	30	30 000
e	grey	28.5	28 500
f	minke	7.5	7500
g	bottlenose	6.5	6500
h	killer	3.988	3988
i	pilot	2.2	2200
j	narwhal	1.25	1250

- 2 a 5 times                      b 20 times  
 3 5 times  
 4 a 10 t                        c 39.88 t  
       b 11 t  
 5 6 elephants

Challenge 3

- 1 a 4000 kg                      b 40 000 kg  
 2 a 4000 kg                    b 10 000 kg  
 3 20 000

Lesson 3: Backpack masses

Challenge 1

- 1 Oscar: 5248 g                      Julie: 4685 g  
       Mina: 5813 g                      Steve: 8157 g  
       Terry: 6478 g                    Abby: 7589 g
- 2 8 g    800 g    8 g    8000 g    80 g
- 3 2.909 kg

Challenge 2

Backpack	Rounded to nearest $\frac{1}{10}$ kg (kg)	Rounded to nearest kg (kg)
Oscar	5.2	5
Mina	5.8	6
Terry	6.5	6
Julie	4.7	5
Steve	8.2	8
Abby	7.6	8

- 2 38 kg  
 3 a 1230 g                      c 2904 g  
       b 2344 g  
 4 Oscar, Mina, Julie  
 5 a orange    apple    banana  
       i 80 g    120 g    70 g  
       ii 0.8 kg    1.2 kg    0.7 kg  
       iii 8 kg    12 kg    7 kg  
 b 0.31 kg

Challenge 3

- Harry 4.3 kg  
 Holly 3.9 kg  
 Heather 3.7 kg

Lesson 4: Newspaper problems

Challenge 1

Number of copies	Echo	Express	Globe	Times
1	0.275 kg	0.31 kg	0.25 kg	0.4 kg
10	2.75 kg	3.1 kg	2.5 kg	4 kg
100	27.5 kg	31 kg	25 kg	40 kg

Challenge 2

Newspaper	Total mass (g)	Total mass (kg)
Echo	5500	5.5
Express	15 500	15.5
Globe	10 000	10
Times	12 000	12

- 2 a 2.36 kg                      c 1.9 kg  
       b 2.8 kg                        d 4.55 kg
- 3 a 6 copies of the Times  
       b 44.31 kg
- 4 13.3 kg  
 5 5.915 kg  
 6 10 customers

Challenge 3

- 1 Grace: 6.6 kg, David: 7.2 kg,  
 Lauren: 7.2 kg  
 2 Open

Unit 7, Week 1: Number - Fractions

Lesson 1: Adding and subtracting fractions (1)

Challenge 1

- 1 a  $\frac{5}{4}$                               k  $\frac{2}{8}$   
       b  $\frac{8}{10}$                             l  $\frac{5}{10}$   
       c  $\frac{13}{12}$                           m  $\frac{2}{6}$   
       d  $\frac{8}{6}$                             n  $\frac{3}{12}$   
       e  $\frac{9}{12}$                             o  $\frac{3}{14}$   
       f  $\frac{14}{14}$                           p  $\frac{7}{20}$   
       g  $\frac{17}{20}$                           q  $\frac{11}{18}$   
       h  $\frac{17}{18}$                           r  $\frac{1}{6}$   
       i  $\frac{7}{6}$                              s  $\frac{1}{10}$   
       j  $\frac{13}{10}$                           t  $\frac{7}{24}$

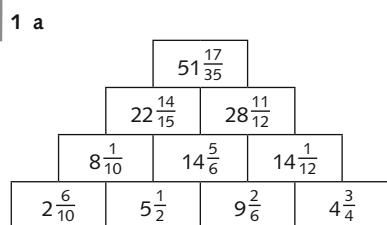
- 2 a  $1\frac{1}{4}$                             f 1  
       c  $1\frac{1}{12}$                           i  $1\frac{1}{6}$   
       d  $1\frac{2}{6}$                           j  $1\frac{3}{10}$

Challenge 2

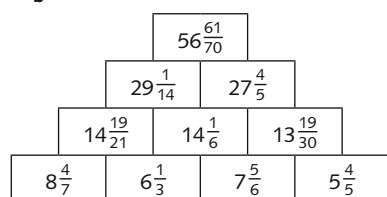
- 1 a  $24\frac{11}{20}$                           i  $61\frac{9}{42}$   
       b  $27\frac{3}{20}$                           j  $68\frac{23}{40}$   
       c  $34\frac{20}{24}$                           k  $12\frac{7}{20}$   
       d  $53\frac{8}{18}$                           l  $9\frac{3}{20}$   
       e  $40\frac{1}{12}$                           m  $7\frac{19}{24}$   
       f  $52\frac{11}{35}$                           n  $7\frac{5}{12}$   
       g  $51\frac{6}{30}$                           o  $9\frac{22}{35}$   
       h  $56\frac{8}{30}$                           p  $12\frac{20}{30}$

- 2 Answers will vary;  $3\frac{16}{33}$   
 3  $\frac{105}{20} = 5\frac{1}{4}$  l is left. This is  $\frac{7}{8}$  of a full turn  
 4 Answers will vary.

Challenge 3



b



- 2 Answers will vary.

Lesson 2: dividing fractions

Challenge 1

- |                  |                  |
|------------------|------------------|
| a $\frac{1}{4}$  | g $\frac{1}{6}$  |
| b $\frac{1}{6}$  | h $\frac{1}{9}$  |
| c $\frac{1}{8}$  | i $\frac{1}{12}$ |
| d $\frac{1}{8}$  | j $\frac{1}{10}$ |
| e $\frac{1}{12}$ | k $\frac{1}{15}$ |
| f $\frac{1}{16}$ | l $\frac{1}{20}$ |

Challenge 2

- |                   |                  |
|-------------------|------------------|
| 1 a $\frac{2}{9}$ | g $\frac{3}{16}$ |
| b $\frac{1}{5}$   | h $\frac{1}{8}$  |
| c $\frac{1}{5}$   | i $\frac{5}{24}$ |
| d $\frac{1}{3}$   | j $\frac{1}{5}$  |
| e $\frac{1}{9}$   | k $\frac{1}{5}$  |
| f $\frac{1}{4}$   | l $\frac{1}{5}$  |

- 2 a  $\frac{1}{6}$  kg      b  $\frac{3}{20}$  kg  
 c  $\frac{1}{24}$  of the bag

3 Open

Challenge 3

- 1 Answers will vary.  
 2 a  $\frac{5}{48}$       j  $\frac{1}{18}$   
           $\frac{3}{28}$       k  $\frac{2}{13}$   
           $\frac{6}{45}$       l  $\frac{1}{9}$   
           $\frac{2}{15}$       m  $\frac{2}{25}$   
           $\frac{7}{44}$       n  $\frac{7}{44}$   
           $\frac{9}{60}$       o  $\frac{1}{8}$   
           $\frac{1}{24}$       p  $\frac{3}{49}$   
           $\frac{1}{15}$

- 3 Answers will vary.  
 4 Answers will vary.

Lesson 3: Multiplying fractions

Challenge 1

- |                   |                  |
|-------------------|------------------|
| 1 a $\frac{1}{6}$ | e $\frac{1}{12}$ |
| b $\frac{1}{10}$  | f $\frac{1}{12}$ |
| c $\frac{1}{6}$   | g $\frac{1}{15}$ |
| d $\frac{1}{12}$  | h $\frac{1}{8}$  |

- |                   |                 |
|-------------------|-----------------|
| 2 a $\frac{1}{6}$ | d $\frac{1}{5}$ |
| b $\frac{1}{5}$   | e $\frac{1}{2}$ |
| c $\frac{1}{9}$   | f $\frac{3}{5}$ |

Challenge 2

- 1 Answers will vary.  
 2 Answers will vary.

Challenge 3

Open

Lesson 4: Fraction problems

Challenge 1

- 1 Open  
 2  $\frac{3}{4}$  kg butter  
     $\frac{1}{2}$  kg flour  
     $\frac{1}{5}$  kg sugar  
     $1\frac{3}{5}$  kg apples

Challenge 2

- 1  $1\frac{2}{5}$  kg flour  
 2 l water  
     $2\frac{1}{4}$  l tomato sauce  
     $2\frac{2}{5}$  kg mozzarella cheese  
    4 kg mushrooms  
 2  $1\frac{6}{10}$  kg sugar  
     $1\frac{1}{7}$  kg butter  
     $1\frac{1}{2}$  kg flour  
     $\frac{2}{5}$  kg cocoa powder  
    1 teaspoon baking powder  
     $2\frac{2}{5}$  kg icing sugar

Challenge 3

- |                    |                  |
|--------------------|------------------|
| 3 a $\frac{3}{20}$ | d $\frac{3}{25}$ |
| b $\frac{2}{15}$   | e $\frac{1}{8}$  |
| c $\frac{4}{25}$   |                  |

Challenge 3

- 1 Answers will vary.  
 2 Answers will vary.

Unit 7, Week 2: Ratio and proportion

Lesson 1: Proportion problems

Challenge 1

- |          |         |
|----------|---------|
| a i 10   | iii 140 |
| ii 24    | iv 1000 |
| b i 120  | iii 40  |
| ii 30    | iv 60   |
| 1 a i 16 | iii 200 |
| ii 40    | iv 1200 |
| b i 450  | iii 900 |
| ii 360   | iv 1800 |

- 2 a 3 blue, 17 other; 6 blue, 34 other;  
 9 blue, 51 other; 12 blue, 68 other;  
 or any multiple  
 b Answers will vary.

- 3 a i 4                      iii 26  
    ii 12  
    b i 75                    iii 240  
    ii 165  
    c 300

Challenge 3

- 1 a i 6                      iii 144  
    ii 30                    iv 720  
    b i 500                   iii 1580  
    ii 800                   iv 1020

- 2 5760 drivers in the town;  
 640 advanced drivers

Lesson 2: Ratio and scale factors

Challenge 1

- |             |                |
|-------------|----------------|
| 1 a 1 : 2   | e 5 : 9        |
| b 1 : 3     | f 7 : 10       |
| c 4 : 5     | g 5 : 6        |
| d 4 : 3     | h 5 : 11       |
| 2 a A 2 : 3 | b A 2 out of 5 |
| B 4 : 1     | B 4 out of 5   |
| C 2 : 5     | C 2 out of 7   |
| D 2 : 71    | D 2 out of 9   |

- 3 a The scale factor is 3.  
 b Sides are 9 cm, 12 cm and 15 cm.

Challenge 2

- |                 |                |
|-----------------|----------------|
| 1 a A 1 : 2 : 3 | b A 1 out of 6 |
| B 3 : 4 : 2     | B 3 out of 9   |
| C 2 : 3 : 5     | C 1 out of 5   |
| D 4 : 2 : 1     | D 4 out of 7   |

- 2 Large triangle: scale factor 3;  
 c 27 m                      d 12 m  
 Medium triangle: scale factor 1.5;  
 a 6 m                        b 10.5 m

- 3 a i Year 3: 50 boys, 30 girls  
    Year 4: 36 boys, 48 girls  
    Year 5: 48 boys, 42 girls  
    Year 6: 45 boys, 40 girls  
    ii 179 boys  
    iii 160 girls  
    b 9 : 8 (When the new boy joins there  
    will be 180 boys and 160 girls.)

Challenge 3

- a Any five from the ratios below  
 b All the repeating patterns shown below
- |              |              |
|--------------|--------------|
| <b>R : B</b> | <b>R : B</b> |
| 1 : 1        |              |
| 1 : 2        | 2 : 1        |
| 1 : 4        | 4 : 1        |
| 2 : 3        | 3 : 2        |
| 1 : 5        | 5 : 1        |
| 3 : 7        | 7 : 3        |
| 1 : 9        | 9 : 1        |
| 7 : 8        | 8 : 7        |
| 4 : 11       | 11 : 4       |
| 1 : 14       | 14 : 1       |
| 2 : 13       | 13 : 2       |

**Lesson 3: Ratio problems**

- Challenge 1**
- 1 a 6000                      d 14 666  
 b 12 000                    e 6000  
 c 5500
- 2 a True                      c False  
 b True

- Challenge 2**
- 1 a Strawberry and Nectarine Smoothie for 12: 36 strawberries, 9 nectarines, 12 apples  
 Strawberry and Banana Smoothie for 12: 64 strawberries; 4 bananas; 4 oranges; 16 apples  
 b Strawberry and Banana Smoothie  
 c 24 oranges will make enough Strawberry and Banana Smoothie for 72.  
 24 nectarines will make enough Strawberry and Nectarine Smoothie for 32.  
 So you can serve 104 people.

- 2 a i 3 : 2                      iii 9 : 5  
 ii 9 : 10                    iv 2 : 1
- b i 30 servings  
 ii 72 servings  
 iii 60 servings  
 iv 6 servings

- 3 a True                      c True  
 b True                      d True

- Challenge 3**
- a True                      c False  
 b True                      d True

**Lesson 4: Ratio and proportion problems**

- Challenge 1**
- 1 a  $1\frac{1}{2}$  cauliflowers (about 1050 g); 60 g butter; 60 g plain flour; 675 ml milk; 150 g cheese; 30 g breadcrumbs  
 b Alternative methods are: divide by 4, then multiply by 6; multiple by  $1\frac{1}{2}$ ; add half of each amount to the original recipe.  
 c Open

- 2 a 1.4 litres (1400 ml)  
 b 28 litres

- Challenge 2**
- 1 a 4 eggs; 12 spoonful of flower; 8 cups of milk  
 4 eggs will make 16 pancakes.  
 b 25 eggs; 75 spoonfuls of flour; 50 cups of milk

- 2 a Puzzling purple  
 8/ red; 10/ blue; 2/ white  
 Outrageous orange  
 6/ red; 12/ yellow; 2/ white  
 Pretty pink  
 8/ red; 12/ white  
 Groovy grey  
 7.5/ black; 12.5/ black  
 Bold brown  
 10/ red; 7.5/ blue; 2.5/ yellow

- b i The company should make Outrageous orange.  
 ii They can make 40 litres.
- 3 Ratio of red to yellow to green peppers is 2 : 1 : 2.  
 Possible numbers are 40, 20, 40; 42, 21, 42; 44, 22, 44; or 46, 23, 46.

- Challenge 3**
- a Pandas: £600, tigers: £900, elephants: £1500  
 b Pandas : tigers : elephants 5 : 4 : 6  
 c Amounts paid by each charity: £100, £150, £250  
 Profits made by pandas: £900, tigers: £650, elephants: £950  
 The elephant charity made the most profit overall.

**Unit 7, Week 3: Statistics**

**Lesson 1: Water sports centre pie charts**

**Challenge 1**

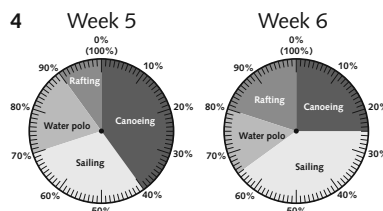
Activity	Week 1	Week 2	Week 3	Week 4
Canoeing	50%	40%	30%	20%
Sailing	30%	30%	60%	50%
Water polo	20%	30%	10%	30%

**Challenge 2, 3**

Week	Total number of children	Number of children choosing each activity		
		Canoeing	Sailing	Water polo
1	40	20	12	8
2	50	20	15	15
3	50	15	30	5
4	60	12	30	18

- 2 a Week 2                      d Week 1  
 b Week 3                      e Week 4  
 c Week 4

- 3 a Weeks 1 and 2  
 b Weeks 3 and 4



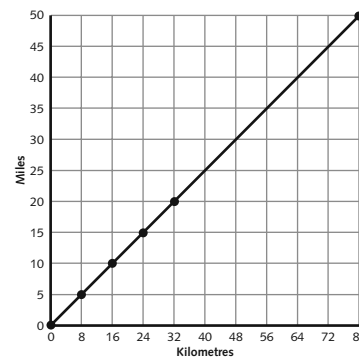
- Challenge 3**
- 1, 2 Answers will vary.

**Lesson 2: Using line graphs**

**Challenge 1**

Kilometres	0	8	16	24	32	80
Miles	0	5	10	15	20	50

**2 Distance conversion graph: kilometres to miles**



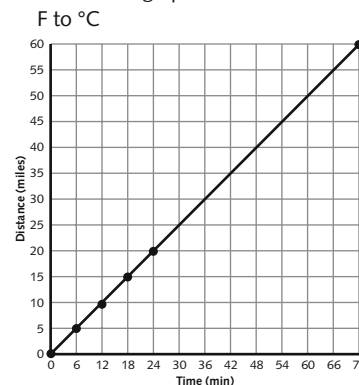
- 3 a 40 km                      c 80 km  
 b 48 km
- 4 a 12.5 miles                      c 27.5 km  
 b 17.5 miles

**Challenge 2**

1

Time (min)	0	6	12	18	24	72
Distance (km)	0	5	10	15	20	60

**2 Time distance graph**



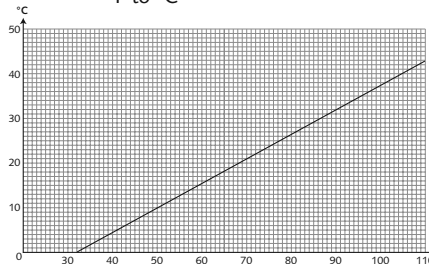
- 3 a 30 km                      b 50 km
- 4 a 42 min                      b 54 min
- 5 a i £5                      ii £11  
 iii £17                      iv £9.50  
 b i 7 miles                      ii 9 miles

**Challenge 3**

1 a

°F	32	41	61	82	95	110
°C	0	5	16	28	35	43

**b Temperature conversion graph °F to °C**



c					
City	°F	°C	City	°F	°C
Boston	77	25	Dubai	102	39
Canberra	52	11	Luxor	106	41
Madrid	81	27	Paris	66	19
Tokyo	72	22	Bangkok	91	33

**Lesson 3: Making a survey**

Challenge 1 Open

Challenge 2 Open

Challenge 3 Open

**Lesson 4: Finding the mean**

Challenge 1 a 7 c 8  
b 6 d 5

Challenge 2 1 a 10 c 20  
b 12 d 15

2 a A 10; B 16; C 20; D 18  
b 16

3 a Donna 2, Leah 3,  
Maria 3, Tanya 3.5  
b 11.5 goals per game

4 Derek 9 km  
Jonny 6.5 km  
Jordan 7.4 km  
Simon 8.3 km

Challenge 3 Joyce: 14 hands

**Unit 8, Week 1: Number - Multiplication and division**

**Lesson 1: Division HTO ÷ TO using the expanded written method**

- Challenge 1 1 a 78 b 780  
2 a 296 b 2960  
3 a 114 b 1140  
4 a 315 b 3150  
5 a 756 b 7560  
6 a 252 b 2520  
7 a 630 b 6300  
8 a 140 b 1400  
9 a 198 b 1980  
10 a 486 b 4860  
11 a 294 b 2940  
12 a 348 b 3480  
13 a 648 b 6480  
14 a 110 b 550  
15 a 284 b 2880

- Challenge 2 1 a 27 f 35  
b  $24\frac{1}{3}$  g  $42\frac{4}{7}$   
c  $21\frac{3}{4}$  h 31  
d 30 i 44  
e  $29\frac{19}{23}$  j 54

2 Open

- Challenge 3 a 8.43 miles in 1 minute  
b 14 minutes  
c 63 litres on average per day  
d £39 per night  
e Answers will vary.

**Lesson 2: Division ThHTO ÷ TO using the expanded written method**

- Challenge 1 1 a 2400 b 4200  
2 a 6700 b 7600  
3 a 5900 b 9500  
4 a 252 b 2 5200  
5 a 228 b 22 800  
6 a 441 b 44 100  
7 a 425 b 42 500  
8 a 128 b 12 800
- Challenge 2 1 a 169 e 781  
b  $65\frac{4}{5}$  f 313  
c  $328\frac{1}{2}$  g 291  
d  $165\frac{1}{4}$  h  $273\frac{1}{2}$

2 Open

- Challenge 3  $1225 \div 25$ ;  $1127 \div 23$ ;  $882 \div 18$ ;  
 $588 \div 12$ ;  $1764 \div 36$

**Lesson 3: Division HTO ÷ TO using the formal written method**

- Challenge 1 1 a 10 d 10  
b 10 e 10  
c 10
- 2 a 20 d 20  
b 20 e 30  
c 30
- 3 a 50 d 70  
b 50 e 20  
c 40
- 4 a 32 d 9  
b 13 e 9  
c 9
- Challenge 2 1 a  $16\frac{7}{12}$  g  $60\frac{3}{7}$   
b 43 h  $18\frac{11}{13}$   
c  $32\frac{7}{8}$  i  $20\frac{1}{3}$   
d  $22\frac{4}{7}$  j 19  
e  $56\frac{9}{17}$  k  $31\frac{1}{5}$   
f  $28\frac{1}{6}$  l  $88\frac{2}{3}$

2 a 
$$\begin{array}{r} 22\text{ r }8 \\ \overline{) 27602} \\ \underline{54} \\ 62 \\ \underline{54} \\ 8 \end{array}$$

b 
$$\begin{array}{r} 43\text{ r }7 \\ \overline{) 8781} \\ \underline{72} \\ 61 \\ \underline{54} \\ 7 \end{array}$$

c 
$$\begin{array}{r} 23\text{ r }22 \\ \overline{) 37873} \\ \underline{74} \\ 133 \\ \underline{111} \\ 22 \end{array}$$

- Challenge 3 a 44 books are on each shelf.  
b 56 boxes of pencils are in the carton.  
c 22 children in each class receive a packed lunch.  
d 38 items are received by each class.

**Lesson 4: Division ThHTO ÷ TO using the formal written method**

- Challenge 1 a i 320 + 8 r 1 82 r 1  
ii 120 + 32 r 2 38 r 2  
iii 280 + 4 71  
iv 440 + 4 r 3 111 r 3  
v 200 + 8 52
- b i 320 + 32 r 5 44 r 5  
ii 400 + 32 r 3 54 r 3  
iii 240 + 16 32  
iv 160 + 24 r 4 23 r 4  
v 560 + 8 r 3 71 r 3
- c i 360 + 18 63  
ii 480 + 6 r 2 81 r 2  
iii 240 + 12 r 4 42 r 4  
iv 600 + 36 r 3 106 r 3  
v 540 + 24 r 1 94 r 1
- d i 270 + 9 31  
ii 540 + 9 61  
iii 630 r 1 70 r 1  
iv 450 r 2 50 r 2  
v 720 r 3 80 r 3

- Challenge 2 a 703 e  $491\frac{1}{3}$   
b 395 f  $299\frac{1}{2}$   
c  $445\frac{1}{3}$  g 341  
d  $359\frac{1}{9}$  h 88

Challenge 3 1

Period of time	1 day	1 week	1 fortnight	Month of May	6-week summer holidays
Total distance run (km)	14	182	392	1178	2016
Distance run per day (km)	14	26	28	38	48

2 a 
$$\begin{array}{r} 24 \\ \overline{) 1246} \\ \underline{89} \\ 14 \\ \underline{14} \\ 0 \end{array}$$
  $1246 \div 89 = 14$

b 
$$\begin{array}{r} 17 \\ \overline{) 2136} \\ \underline{136} \\ 77 \\ \underline{77} \\ 0 \end{array}$$
  $2176 \div 136 = 16$

c 
$$\begin{array}{r} 99 \\ \overline{) 4217} \\ \underline{4} \\ 217 \\ \underline{217} \\ 0 \end{array}$$
  $4991 \div 217 = 23$

d 
$$\begin{array}{r} 30 \\ \overline{) 8173} \\ \underline{48} \\ 337 \\ \underline{337} \\ 0 \end{array}$$
  $8304 \div 173 = 48$



- Challenge 3**  
 1 A red: 30 cm<sup>2</sup>, yellow: 24 cm<sup>2</sup>  
 B red: 48 cm<sup>2</sup>, yellow, 48 cm<sup>2</sup>

**Lesson 3: Area of triangles**

- Challenge 1**  
 1 A 6 cm<sup>2</sup> D 8 cm<sup>2</sup>  
 B 6 cm<sup>2</sup> E 4 cm<sup>2</sup>  
 C 8 cm<sup>2</sup> F 4.5 cm<sup>2</sup>

2 triangle c

- Challenge 2**  
 1 A 24 cm<sup>2</sup> E 20 cm<sup>2</sup>  
 B 16 cm<sup>2</sup> F 35 cm<sup>2</sup>  
 C 36 cm<sup>2</sup> G 18 cm<sup>2</sup>  
 D 24.5 cm<sup>2</sup>

- 2 A 18 cm<sup>2</sup> C 24 cm<sup>2</sup>  
 B 8 cm<sup>2</sup> D 12 cm<sup>2</sup>

- Challenge 3**  
 A 10 cm<sup>2</sup> C 7.5 cm<sup>2</sup>  
 B 5 cm<sup>2</sup> D 2.5 cm<sup>2</sup>

**Lesson 4: Area of parallelograms**

- Challenge 1, 2**  
 A 6 cm<sup>2</sup> D 12 cm<sup>2</sup>  
 B 8 cm<sup>2</sup> E 6 cm<sup>2</sup>  
 C 4 cm<sup>2</sup> F 12 cm<sup>2</sup>

# Pupil Book 6C

## Unit 9, Week 1: Number - Addition, subtraction, multiplication and division

### Lesson 1: Mental addition and subtraction

- Challenge 1**  
 1 a 226 430 f 476 286  
 b 267 338 g 630 160  
 c 371 700 h 388 763  
 d 821 642 i 340 229  
 e 769 518 j 385 724

2 Answers will vary.

- Challenge 2, 3**  
 1 a i 3 170 000 d i 3 158 700  
 ii 2 677 000 ii 3 220 800  
 iii 2 636 000 iii 3 119 800  
 iv 2 370 000 iv 2 757 800  
 b i 4 404 800 e i 7 175 000  
 ii 4 356 800 ii 7 038 000  
 iii 3 950 800 iii 6 977 000  
 iv 4 347 800 iv 6 999 700  
 c i 6 414 000 f i 4 391 322  
 ii 5 722 000 ii 4 990 822  
 iii 5 709 000 iii 4 334 822  
 iv 5 713 600 iv 3 690 822

2 Open

**Challenge 3** Open

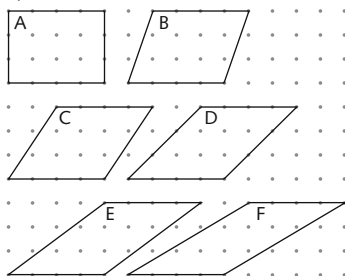
### Lesson 2: Missing numbers

- Challenge 1**  
 1 a 342 297 f 215 317  
 b 186 782 g 217 503  
 c 184 592 h 318 315  
 d 615 071 i 514 513  
 e 731 327

2 Answers will vary.

- Challenge 2**  
 1 A 70 cm<sup>2</sup> C 54 cm<sup>2</sup>  
 B 96 cm<sup>2</sup>

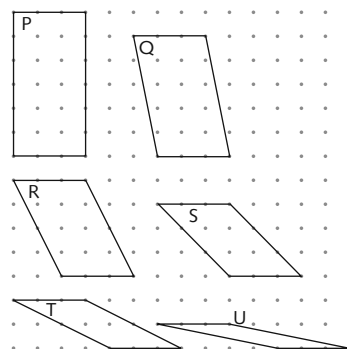
2 a, b



c

Shape	A	B	C	D	E	F
Area (cm <sup>2</sup> )	12	12	12	12	12	12

3 a



b

Shape	P	Q	R	S	T	U
Area (cm <sup>2</sup> )	18	15	12	9	6	3

c Area of parallelogram decreases by 3 cm<sup>2</sup> each time.

- Challenge 3**  
 A 72 cm<sup>2</sup> B 87.5 cm<sup>2</sup>

- Challenge 2**  
 1 a 2 312 782 f 3 415 483  
 b 2 542 734 g 5 719 631  
 c 5 165 794 h 6 372 651  
 d 3 481 672 i 8 427 655  
 e 2 651 470
- 2 a 27 156.93 d 25 610.52  
 b 35 912.39 e 53 453.21  
 c 32 156.22 f 75 529.76

- Challenge 3**  
 1 Answers will vary.  
 2 Answers will vary.

3 
$$\begin{array}{r} 793\ 527 \\ + 205\ 446 \\ \hline 998\ 973 \end{array}$$

### Lesson 3: Order of operations (2)

- Challenge 1**  
 1 a 77 d 20  
 b 33 e 2  
 c 34 f 600
- 2 a 13 d 5  
 9 26  
 b 60 e 12  
 44 72  
 c 126 f 9  
 1 4

- Challenge 2**  
 1 a 549 g 3  
 b 134 h 206  
 c 427 i 20  
 d 286 j 87  
 e 342 k 826  
 f 109 l 74

2 Answers will vary.

- Challenge 3**  
 1 a  $422 - 239 + 52 - 50 = 185$   
 $422 - (239 + 52) - 50 = 81$   
 b  $(25 + 30) \times (2 + 38) = 2200$   
 $25 + (30 \times 2) + 38 = 123$   
 c  $(64 + 25) \times 15 - 7 = 1328$   
 $64 + 25 \times (15 - 7) = 264$   
 d  $(216 - 9) \times 8 - 5 = 1651$   
 $216 - (9 \times 8) - 5 = 139$   
 e  $112 + (56 \div 7) + 14 = 134$   
 $(112 + 56) \div (7 + 14) = 8$   
 f  $95 + (190 \div 10) + 9 = 123$   
 $(95 + 190) \div (10 + 9) = 15$   
 g  $243 + 27 \div (9 - 3) = 247.5$   
 $(243 + 27) \div 9 - 3 = 27$   
 h  $936 - (429 \div 13) - 2 = 901$   
 $(936 - 429) \div 13 - 2 = 37$   
 i  $51 \times (9 - 6 + 53) = 2856$   
 $51 \times (9 - 6) + 53 = 206$   
 j  $(35 \times 6) - 18 + 2 = 194$   
 $35 \times (6 - 18) + 2 = -418$   
 k  $840 \div (5 + 3) \times 25 = 2625$   
 $840 \div (5 + 3 \times 25) = 10.5$   
 l  $53 \times (3 + 42) - 98 = 2287$   
 $53 \times (3 + 42 - 98) = -2809$   
 m  $(144 \div 8) \times (4 + 16) = 360$   
 $144 \div (8 \times 4 + 16) = 3$   
 Some children may offer the following answer with nested brackets.  
 $144 \div (8 \times (4 + 16)) = 0.9$

2 Answers will vary.

**Lesson 4: Marco's Cafes**

**Challenge 1** 1 £188.25

- 2 20 714 donuts
- 3 12 710 knives
- 4 58 tables

**Challenge 2** 1 Cafe P 53 920 napkins  
Cafe Q 48 680 napkins  
Cafe R 51 740 napkins

2 February 2311 customers  
March 11 555 customers  
April 14 890 customers

- 3 Last year 4180 mincepies  
This year 5016 mincepies
- 4 4554, 4555, 4556

- 5 1st week 31 hours  
2nd week 37 hours  
3rd week 43 hours

**Challenge 3** 1 a 14 916 paper towels  
b 10 974 cups

- 2 a 6952 cups of tea  
b Cafe P: £139.15, Cafe Q: £126.5

**Unit 9, Week 2: Algebra**

**Lesson 1: Formulae and number sequences**

**Challenge 1** 1 a  $8a$  e  $2a + 2b$   
b  $6x + 2y$  f  $10x - 5y$   
c  $6m - 5n$  g  $3m + 9n$   
d  $8s + 2t$  h  $8s - 12t$

- 2 a 6, 10, 14, 18, 22, 26, 30, 34, 38  
The rule is add four.
- b 80, 72, 64, 56, 48, 40, 32, 24, 16  
The rule is take away 8.

**Challenge 2** 1 a  $20a - 8b$  d  $12s + 9t$   
b  $12x + 4y$  e  $5m + 15n$   
c  $9m - 6n$  f  $4x + 4y$

- 2 The correct equations are:  
a  $11 + x = 23$   
 $23 - x = 11$   
b  $8p = 56$   
c  $g = 32 \div 8$   
 $8g = 32$   
d  $d = 15 \times 6$

- 3 -2, 0, 2, 4, 6  
10th term is 16  
200th term is 396

- 4 10, 13, 16, 19, 22  
10th term is 37  
200th term is 207

**Challenge 3** 1 a  $3x + 8y$  d  $14a + 2b$   
b  $6a + 8b$  e  $10t + 8s$   
c  $8x + 3y$  f  $a + 9b$

- 2 a 6, 10, 14, 18, 22, 26, 30, 34;  
nth term is  $4n + 2$ ; 100th term is 402; 250th term is 1002.
- b 3, 10, 17, 24, 31, 38, 45, 52; nth term is  $7n - 4$ ; 100th term is 696; 250th term is 1746.

**Lesson 2: Algebra problems**

**Challenge 1** 1 a John =  $\frac{x}{2}$ ; Jim =  $\frac{x}{2} + 12$ ;  
Jack =  $x - 3$   
b Tom 50 m; John 25 m; Jim 37 m;  
Jack 47 m

**Challenge 2** 1 a  $x = 3$  c  $x = 1$   
b  $x = 7$  d  $x = 6$

- 2 a Andrews family  $2a + 4c$   
Barnes family  $a + 2c$   
Singh family  $3a + 3c$

- 3 Andrews family £90  
Barnes family £45  
Singh family £99  
Answers will vary.

4 a

	F	V	E	F + V
<b>Tetrahedron</b>	4	4	6	8
<b>Cube</b>	6	8	12	14
<b>Octahedron</b>	8	6	12	14
<b>Dodecahedron</b>	12	20	30	32
<b>Icosahedron</b>	20	12	30	32
<b>Triangular Prism</b>	5	6	9	11
<b>Hexagonal pyramid</b>	7	7	12	14

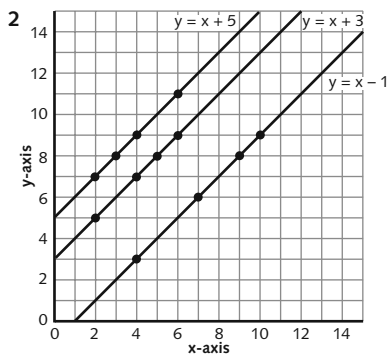
- b  $F + V - E = 2$
- c Yes. Answers will vary.

**Challenge 3**

Fahrenheit	Celsius	Kelvin
32°	0°	273
140°	60°	333
98.6°	37°	310
212°	100°	373

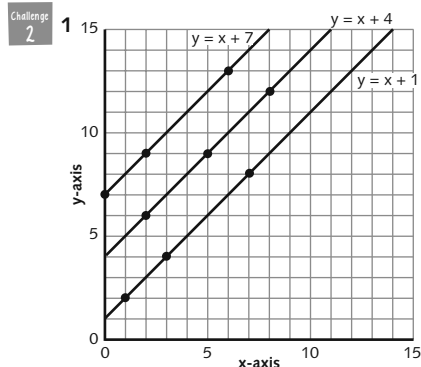
**Lesson 3: Linear equations**

**Challenge 1** 1 a The rule is  $y = x + 3$   
b The rule is  $y = x + 5$   
c The rule is  $y = x - 1$



The lines are parallel.

- 3 a For example, when  $x = 2, y = 4$ ;  
when  $x = 3, y = 2$
- b For example, when  $a = 7, b = 1$ ;  
when  $a = 4, b = 2$ ; when  $a = 1, b = 3$



	1st set of coordinates		2nd set of coordinates		3rd set of coordinates	
	x	y	x	y	x	y
$y = x + 1$	1	2	3	4	7	8
$y = x + 4$	2	6	5	9	8	12
$y = x + 7$	0	7	2	9	6	13

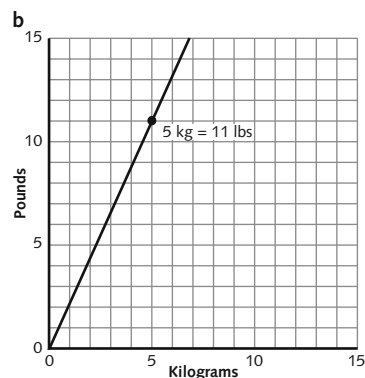
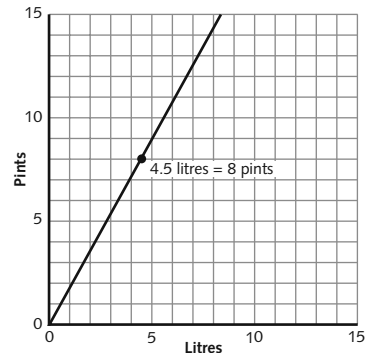
The lines are parallel.

Best answers are  $y = x + 10$   
or  $y = x - 2$ .

Accept any parallel line,  $y = x \pm c$

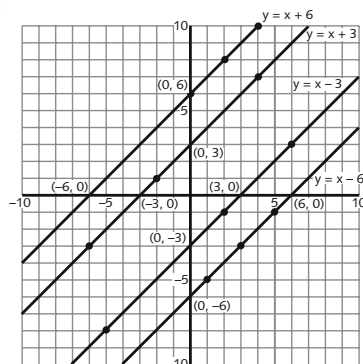
- 2 a For example, when  $a = 2, b = 5$ ;  
when  $a = 4, b = 4$ ; when  $a = 6, b = 3$ ; when  $a = 8, b = 2$
- b For example, when  $x = 9, y = 1$ ;  
when  $x = 6, y = 2$ ; when  $x = 3, y = 3$
- c For example, when  $a = 5, b = 2$ ;  
when  $a = 2, b = 4$
- d For example, when  $x = 2, y = 7$ ;  
when  $x = 4, y = 2$

- 3 a Children may have chosen to plot their conversion graph with litres on the y axis and pints on the x axis which is also correct. They may also have used different scales.



- 4 a 3.4 l c 12.4 pints  
b 6.6 lbs d 6.8 kg

**Challenge 3**



$y = x - 3$ :  $(-5, -8)$ ,  $(2, -1)$ ,  $(6, 3)$  See graph. x-axis  $(3, 0)$ ; y-axis  $(0, -3)$   
 $y = x + 3$ :  $(-6, -3)$ ,  $(-2, 1)$ ,  $(4, 7)$  See graph. x-axis  $(-3, 0)$ ; y-axis  $(0, 3)$   
 They are parallel.  
 $y = x - 6$  will cross x-axis at  $(6, 0)$  and y-axis at  $(0, -6)$   
 $y = x + 6$  will cross x-axis at  $(-6, 0)$  and y-axis at  $(0, 6)$   
 Predictions could include:  
 lines will be parallel to the first two lines;  
 $y = x + 6$  three squares above  $y = x + 3$ ;  
 $y = x - 6$  three squares below  $y = x - 3$ .  
 Individual choice of coordinates to plot lines. See graph.

**Lesson 4: Alternative solutions**

**Challenge 1**

- $2c + 4s = 12$   
 6 chickens  $c = 6, s = 0$   
 4 chickens and 1 sheep  $c = 4, s = 1$   
 2 chickens and 2 sheep  $c = 2, s = 2$   
 3 sheep  $c = 0, s = 3$

**Challenge 2**

- 1**  $2d + 4g = 28$   
 14 ducks  $d = 14$   
 12 ducks and 1 goat  $d = 12, g = 1$   
 10 ducks and 2 goats  $d = 10, g = 2$   
 8 ducks and 3 goats  $d = 8, g = 3$   
 6 ducks and 4 goats  $d = 6, g = 4$   
 4 ducks and 5 goats  $d = 4, g = 5$   
 2 ducks and 6 goats  $d = 2, g = 6$   
 7 goats  $d = 0, g = 7$

- 2 a**  $a = 1; b = 3$  (or reverse  $a = 3, b = 1$ );  
 $a = 2, b = 2$   
**b**  $x = 1, y = 9; x = 2, y = 6; x = 3, y = 3$   
**c**  $p = 1, q = 25; p = 2, q = 20; p = 3, q = 15; p = 4, q = 10; p = 5, q = 15$   
**d** If you try substituting for the first unknown systematically, 1, 2 and so on, then you reach a value where the second unknown is zero, or a value which is the reversal of a previous solution. Therefore you have found all the possible solutions.

**Challenge 3**

- 1**  $2c + 2d + 4s + 4g = 10$   
 $5c$   
 $4c + d$   
 $3c + 2d$   
 $2c + 3d$   
 $c + 4d$   
 $5d$   
 $3c + s$   
 $2c + d + s$   
 $c + 2d + s$   
 $3d + s$   
 $3c + g$   
 $2c + d + g$   
 $c + 2d + g$   
 $3d + g$   
 $c + 2s$   
 $d + 2s$   
 $c + s + g$   
 $d + s + g$   
 $c + 2g$   
 $d + 2g$

- 2** Answers will vary.  
**3** Solutions are:  
 $a = 1, b = 12; a = 4, b = 6;$   
 $a = 9, b = 4; a = 16, b = 3$

**Unit 9, Week 3: Geometry - Properties of shapes**

**Lesson 1: Drawing and naming circles**

**Challenge 1, 2, 3**

Open

**1**

Circle	A	B	C	D	E
Diameter (cm)	2	6	5	4	3
Radius (cm)	1	3	2.5	2	1.5

- 2** A 4 cm  $D$  5 cm  
 B 12 cm  $E$  11 cm  
 C 8 cm  $F$  7 cm

**3** Open

- 4** A 6 cm  
 B 7.5 cm  
 C 9.5 cm

**Challenge 3**

Open

**Lesson 2: Circle patterns (1)**

**Challenge 1, 2, 3**

Open

**Challenge 2**

Open

**Challenge 3**

Open

**Lesson 3: Circle patterns (2)**

**Challenge 1**

Open

**Challenge 2**

Open

**Challenge 3**

Open

**Lesson 4: Connecting midpoints**

**Challenge 1, 2**

- 1 a** i 14.6 cm  $iii$  7.3 cm  
 ii 7.3 cm  
**b** AF and FC (and possibly DE, drawn in Q2); AD and DB; BE and EC  
**2 a** 7.3 cm  $b$  DE = half AC

**Challenge 2**

- 1 a** BC = 7.4 cm, DF = 3.7 cm, DF = half BC  
**b**  $\angle ABC = 110^\circ, \angle ACB = 42^\circ,$   
 $\angle ADF = 110^\circ, \angle AFD = 42^\circ$  (also,  $\angle DEB = 42^\circ$ )  
**2 a** inner P = 18 cm outer P = 36 cm  
**b** The perimeter of the inner rectangle is half the perimeter of the outer rectangle.

**3**

Open

**Challenge 3**

- 1** The perimeter of the inner parallelogram is half the perimeter of the outer parallelogram.  
**2** The inner rectangle has one parallel side equal to the shorter side of the isosceles trapezium and one parallel side equal to one-third the length of the longer side of the isosceles trapezium.

**Unit 10, Week 1: Number - Multiplication and division incl. Decimals**

**Lesson 1: Multiplying decimals by a 2-digit number using the grid method**

**Challenge 1**

- 1 a** 18, 0.3, 0.21, 12, 2.7  
**b** 0.32, 48, 6.4, 0.56, 7.2  
**c** 540, 4.8, 4.2, 24, 1.2  
**d** 56, 0.7, 4.2, 28, 0.63  
**e** 2.4, 200, 3.2, 1.2, 0.4  
**f** 81, 72, 6.3, 45, 5.4  
**2 a** 33.21  $d$  89.53  
**b** 62.48  $e$  207.2  
**c** 574.2  $f$  209.7  
**3**  $\times 3, \times 8, \times 7, \times 40, \times 90, \times 60$   
**4** 540.99  
**5 a** 1080, 18, 12.6, 720, 162  
**b** 3.2, 480, 64, 5.6, 72  
**c** 27 000, 240, 210, 1200, 60  
**d** 2240, 28, 168, 1120, 25.2  
**e** 168, 14 000, 224, 84, 28  
**f** 1620, 1440, 126, 900, 108

**Challenge 2**

- a** 121.1  $i$  91.84  
**b** 624.03  $j$  462.01  
**c** 457.8  $k$  237.63  
**d** 173.7  $l$  308.38  
**e** 206.5  $m$  78.24  
**f** 247.25  $n$  107.73  
**g** 164.35  $o$  232.92  
**h** 132.3  $p$  662.58



**Challenge 3** Possible answers include:

- a  $13 \times 5.79 = 75.27$
- b  $13 \times 9.75 = 126.75$
- c  $7.31 \times 95 = 694.45$
- d  $4.68 \times 20 = 93.60$
- e  $6.02 \times 48 = 288.96$
- f  $0.42 \times 86 = 36.12$  or  $0.86 \times 42 = 36.12$

**Lesson 2: Multiplying decimals by a 2-digit number using the expanded written method**

- Challenge 1**
- a 0.54
  - b 0.75
  - c 42
  - d 25
  - e 15.6
  - f 15
  - g 71.2
  - h 0.05
  - i 0.08
  - j 1.49
  - k 18.87
  - l 23

- Challenge 2**
- a 59.5
  - b 209.3
  - c 212.04
  - d 323.68
  - e 188.72
  - f 131.4
  - g 65.55
  - h 97.3
  - i 267.96
  - j 181.98
  - k 132.3
  - l 202.98
  - m 298.22
  - n 405
  - o 178.22

- Challenge 3**
- 1 a £46.67
  - b £83.81
  - c £247.48
  - d £239.02
  - e £105.84
  - 2 a £153.90
  - b £365.80
  - c £159.10
  - d £187.20
  - e £311.60
  - f £121.25
  - g £42.33
  - h £306.44
  - i £52.93
  - j £152.10
  - f £98.56
  - g £356.82
  - h £199.53
  - i £253.23
  - j £138.72

**Lesson 3: Multiplying decimals by a 2-digit number using the formal written method**

- Challenge 1**
- 1 a 5400
  - 5400
  - 540
  - 54
  - 5.4
  - 0.54
  - c 4800
  - 480
  - 480
  - 4800
  - 4.8
  - 0.48
  - e 2700
  - 2700
  - 270
  - 27
  - 2.7
  - 0.27
  - g 8400
  - 8400
  - 840
  - 84
  - 8.4
  - 0.84
  - b 3500
  - 3500
  - 350
  - 35
  - 3.5
  - 0.35
  - d 4900
  - 4900
  - 490
  - 49
  - 4.9
  - 0.49
  - f 4400
  - 4400
  - 440
  - 44
  - 4.4
  - 0.44

2 Answers will vary.

- Challenge 2**
- a 114.12
  - b 160.82
  - c 229.97
  - d 208.5
  - e 196.04
  - f 563.22
  - g 101.5
  - h 207.25
  - i 364.82
  - j 372.36

- Challenge 3**
- a blue ribbon: 40 lengths  
red ribbon: 72 lengths  
32 more pieces of red ribbon
  - b £37.95  
£12.05 change from £50
  - c 215.46 m<sup>2</sup>
  - d £7.28 each
  - e £3.50
  - f £28.17

**Lesson 4: Solving word problems (4)**

- Challenge 1**
- a Answer given
  - b 6.3
  - c 0.48
  - d 33.3
  - e 25.8
  - f 0.98
  - g 15.6
  - h 1.71
  - a £30.72
  - b 192 packs
  - c £73.64 +  
£114.50 =  
£188.14
  - d 68p or £0.68
  - e i 13 packs  
ii £55.64
  - f £11.76
  - i 24
  - J 39
  - k 1.82
  - l 11.4
  - m 1.21
  - n 1.75
  - o 0.98
  - g £27.53
  - h £5.28
  - i £50.00 -  
£42.21 = £7.79
  - j i 18 packs  
ii £26.46
  - k £5.72
  - l i 146 packs;  
ii £107.31

**Challenge 3** Answers will vary.

**Unit 10, Week 2: Number - Fractions**

**Lesson 1: Fractions, factors and multiples (2)**

- Challenge 1**
- a  $\frac{4}{5}$
  - b  $\frac{1}{2}$
  - c  $\frac{3}{5}$
  - d  $\frac{3}{4}$
  - e  $\frac{5}{7}$
  - f  $\frac{2}{3}$
  - g  $\frac{3}{3}$
  - h  $\frac{4}{5}$
  - i  $\frac{11}{13}$
  - j  $\frac{3}{5}$
- 2 Open
- Challenge 2**
- 1 a  $\frac{30}{40} \rightarrow \div 2 = \frac{15}{40} \rightarrow \div 5 = \frac{3}{4}$
  - $\frac{30}{40} \rightarrow \div 10 = \frac{3}{4}$
  - b  $\frac{28}{36} \rightarrow \div 2 = \frac{14}{18} \rightarrow \div 2 = \frac{7}{9}$
  - $\frac{28}{36} \rightarrow \div 4 = \frac{7}{9}$
  - c  $\frac{20}{40} \rightarrow \div 2 = \frac{10}{20} \rightarrow \div 10 = \frac{1}{2}$
  - $\frac{20}{40} \rightarrow \div 20 = \frac{1}{2}$
  - d  $\frac{18}{36} \rightarrow \div 9 = \frac{2}{4} \rightarrow \div 2 = \frac{1}{2}$
  - $\frac{18}{36} \rightarrow \div 18 = \frac{1}{2}$
  - e  $\frac{32}{44} \rightarrow \div 2 = \frac{16}{22} \rightarrow \div 2 = \frac{8}{11}$
  - $\frac{32}{44} \rightarrow \div 4 = \frac{8}{11}$

- f  $\frac{18}{24} \rightarrow \div 2 = \frac{9}{12} \rightarrow \div 3 = \frac{3}{4}$
- $\frac{18}{24} \rightarrow \div 6 = \frac{3}{4}$
- g  $\frac{36}{44} \rightarrow \div 2 = \frac{18}{22} \rightarrow \div 2 = \frac{9}{11}$
- $\frac{36}{44} \rightarrow \div 4 = \frac{9}{11}$
- h  $\frac{45}{60} \rightarrow \div 3 = \frac{15}{20} \rightarrow \div 5 = \frac{3}{4}$
- $\frac{45}{60} \rightarrow \div 15 = \frac{3}{4}$
- i  $\frac{27}{45} \rightarrow \div 3 = \frac{9}{15} \rightarrow \div 3 = \frac{3}{5}$
- $\frac{27}{45} \rightarrow \div 9 = \frac{3}{5}$
- j  $\frac{48}{64} \rightarrow \div 8 = \frac{6}{8} \rightarrow \div 2 = \frac{3}{4}$
- $\frac{48}{64} \rightarrow \div 16 = \frac{3}{4}$

2 Answers will vary.

3 Answers will vary.

4 Answers will vary.

- Challenge 3**
- 1 Answers will vary.
  - 2 Open

**Lesson 2: Adding and subtracting fractions (2)**

- Challenge 1**
- a  $23\frac{1}{10}$
  - b  $34\frac{5}{12}$
  - c  $11\frac{1}{6}$
  - d  $38\frac{8}{9}$
  - e  $9\frac{7}{8}$
  - f  $26\frac{9}{10}$
  - g  $42\frac{5}{8}$
  - h  $18\frac{7}{15}$
  - i  $41\frac{7}{12}$
  - j  $15\frac{7}{9}$

- 2 a  $\frac{5}{12}$
- b  $\frac{1}{15}$
- c  $\frac{1}{8}$
- d  $\frac{1}{10}$

- Challenge 2**
- 1 a  $10\frac{7}{10}$
  - b  $11\frac{7}{12}$
  - c  $49\frac{5}{18}$
  - d  $54\frac{13}{14}$
  - e  $16\frac{13}{30}$
  - f  $61\frac{8}{21}$
  - g  $14\frac{8}{15}$
  - h  $66\frac{19}{20}$
  - i  $8\frac{3}{30}$
  - j  $65\frac{1}{36}$

- 2 a  $\frac{4}{15}$
- b  $\frac{7}{45}$
- c  $\frac{5}{24}$
- d i  $20\frac{7}{20}$  km altogether
- ii  $4\frac{17}{20}$  km further on second day
- e  $\frac{19}{20}$

- Challenge 3**
- 1 a Animal charity  $\frac{1}{15}$
  - b Children's charity £9000
  - Homeless charity £15 000
  - Sports charity £18 000
  - Animal charity £3000
  - c £13 750 altogether

2 Open

**Lesson 3: Fraction multiplication problems**

- Challenge 1**
- 1 a  $\frac{1}{12}$  f  $\frac{2}{15}$   
 b  $\frac{1}{8}$  g  $\frac{4}{12}$   
 c  $\frac{1}{21}$  h  $\frac{2}{24}$   
 d  $\frac{1}{10}$  i  $\frac{6}{20}$   
 e  $\frac{1}{12}$  j  $\frac{3}{25}$

- 2  $\frac{2}{6}$  cup of flour  
 $\frac{3}{8}$  cup of sugar  
 $\frac{1}{4}$  cup of butter  
 $\frac{1}{6}$  teaspoon of salt

- Challenge 2**
- 1 a  $\frac{3}{10}$  f  $\frac{1}{15}$   
 b  $\frac{1}{7}$  g  $\frac{7}{12}$   
 c  $\frac{3}{16}$  h  $\frac{1}{5}$   
 d  $\frac{2}{9}$  i  $\frac{15}{49}$   
 e  $\frac{1}{4}$  j  $\frac{9}{16}$

- 2 a  $\frac{3}{32}$  of a pizza  
 $\frac{1}{5}$  of pint of milk  
 $\frac{3}{16}$  of a cake  
 $\frac{1}{6}$  of bag of carrots  
 b  $\frac{3}{16}$  of a pizza  
 $\frac{2}{5}$  of pint of milk  
 $\frac{3}{8}$  of a cake  
 $\frac{1}{3}$  of bag of carrots  
 c  $\frac{1}{8}$  of a pizza  
 $\frac{4}{15}$  of pint of milk  
 $\frac{1}{4}$  of a cake  
 $\frac{2}{9}$  of bag of carrots

**Challenge 3**

	Sunday	Monday	Tuesday	Wednesday
Fraction of cereal eaten	$\frac{2}{10}$	$\frac{2}{10}$	$\frac{3}{10}$	$\frac{1}{5}$
Fraction of cereal left	$\frac{8}{10}$	$\frac{6}{10}$	$\frac{3}{10}$	$\frac{1}{10}$

- a i  $\frac{2}{10}$  ii  $\frac{6}{10}$   
 b i  $\frac{3}{10}$  ii  $\frac{3}{10}$   
 c i  $\frac{1}{5}$  ii  $\frac{1}{10}$   
 d  $\frac{8}{10}$  to  $\frac{1}{10} = \frac{7}{10}$

**Lesson 4: Fraction division problems**

- Challenge 1**
- 1 a  $\frac{1}{6}$  f  $\frac{1}{9}$   
 b  $\frac{1}{18}$  g  $\frac{3}{20}$   
 c  $\frac{2}{15}$  h  $\frac{3}{16}$   
 d  $\frac{3}{8}$  i  $\frac{2}{9}$   
 e  $\frac{1}{10}$

- 2 Pepperoni  $\frac{3}{16}$   
 Mushroom  $\frac{5}{24}$   
 Margarita  $\frac{3}{32}$

- Challenge 2**
- 1 a  $\frac{3}{20}$  g  $\frac{4}{15}$   
 b  $\frac{5}{32}$  h  $\frac{4}{25}$   
 c  $\frac{1}{5}$  i  $\frac{1}{15}$   
 d  $\frac{3}{14}$  j  $\frac{3}{20}$   
 e  $\frac{4}{27}$  k  $\frac{11}{36}$   
 f  $\frac{3}{16}$  l  $\frac{2}{45}$

- 2 Answers will vary.  
 3 a  $\frac{3}{20}$   
 b i  $\frac{5}{28}$  ii  $\frac{1}{7}$  each; Dad  $\frac{2}{7}$   
 c i  $\frac{1}{12}$  ii  $\frac{1}{8}$   
 d  $\frac{1}{10}$  of an hour (6 minutes)

- Challenge 3**
- a i  $\frac{3}{40}$  ii 75 grams  
 b i  $\frac{1}{10}$  ii 0.07 kg  
 c i  $\frac{3}{20}$  ii  $\frac{3}{25}$

**Unit 10, Week 3: Measurement (volume and capacity)**

**Lesson 1: Converting units of capacity**

- Challenge 1**
- 1 a i 0.4 l ii 0.04 l iii 0.004 l  
 b i 0.9 l ii 0.09 l iii 0.009 l  
 2 a i 0.3 l ii 0.03 l iii 0.003 l  
 b i 0.7 l ii 0.07 l iii 0.007 l  
 c i 1.6 l ii 0.16 l iii 0.016 l  
 3 a i 800 ml ii 80 ml iii 8 ml  
 b i 4500 ml ii 4050 ml iii 4005 ml

- Challenge 2**
- 1 a 5.727 l, 5.7 l  
 b 8.07 l, 8.1 l  
 c 3.704 l, 3.7 l  
 d 16.364 l, 16.4 l  
 e 18.095 l, 18.1 l  
 f 11.507 l, 11.5 l

- 2 a 4900 ml d 940 ml  
 b 4490 ml e 40 909 ml  
 c 9040 ml f 94 004 ml  
 3 a True d False  
 b False e False  
 c False f True  
 4 10 litres 9.001 litres  
 8.002 litres 7.003 litres  
 6.004 litres 5.005 litres  
 4.006 litres 3.007 litres  
 2.008 litres 1.009 litres  
 0.010 litres

Jars (ml)	Total (litres)
250	0.250
250 + 250	0.500
250 + 100	0.350
250 + 50	0.300
100	0.100
100 + 50	0.150
50	0.050

- Challenge 3** 16 possible combinations:  
 A + 1 A + 2 A + 3 A + 4  
 B + 1 B + 2 B + 3 B = 4  
 C + 1 C + 2 C + 3 C + 4  
 D + 1 D + 2 D + 3 D + 4

**Lesson 2: Maritime problems**

- Challenge 1**
- 1 a 10 c 20  
 b 15 d 24  
 2 a 108 l b 225 l  
 3 2.75 l

**Challenge 2**

Boat	Meter reading at fuel pump (l)		Fuel sold (l)
	Before sale	After sale	
Sea Wind	6658	6756	98
Sea Breeze	6756	6930	174
Sea Eagle	6930	7088	158
Sea Sprite	7088	7225	137
Sea Hawk	7225	7391	166

- 2 a 200 s b i 18 l ii 432 l  
 3 a 18 l b 16 l  
 4 a 1971.533 l  
 b 180.817 l  
 c Tank 1: 1173.825 l  
 Tank 2: 1354.642 l

**Challenge 3** One of several possible answers:

○		○	
	○		○
	○	○	
○			○
		○	○

**Lesson 3: Volume of cubes and cuboids**

- Challenge 1**
- 1 A 27 cm<sup>3</sup>  
 B 64 cm<sup>3</sup>  
 C 125 cm<sup>3</sup>  
 2 A 36 cm<sup>3</sup>  
 B 60 cm<sup>3</sup>  
 C 36 cm<sup>3</sup>  
 D 60 cm<sup>3</sup>

- Challenge 2**
- A 120 cm<sup>3</sup>  
B 280 cm<sup>3</sup>  
C 250 cm<sup>3</sup>  
D 36 cm<sup>3</sup>  
E 240 cm<sup>3</sup>  
F 216 cm<sup>3</sup>  
G 240 cm<sup>3</sup>  
H 448 cm<sup>3</sup>  
I 180 cm<sup>3</sup>

2 A = 300 cm<sup>3</sup>, B = 400 cm<sup>3</sup>, C = 264 cm<sup>3</sup>  
Smallest to largest: C, A, B

1 500 dice

2 Answers will vary.  
Dimensions for *l**b**h* = 6400 cm<sup>3</sup>

**Lesson 4: Calculating volume and finding missing lengths**

**Challenge 1**

Cuboid	Length (cm)	Breadth (cm)	Width (cm)	Volume (cm <sup>3</sup> )
A	3	3	3	27
B	6	3	2	36
C	8	3	10	240

- Challenge 2**
- A 6 cm  
B 3 cm  
C 3 cm  
D 7 cm

2 A 4 cm  
B 2 cm  
C 5 cm

3 A = 36 000 cm<sup>3</sup>, B = 36 750 cm<sup>3</sup>,  
difference = 750 cm<sup>3</sup>

4 A = 200 000 cm<sup>3</sup>, B = 240 000 cm<sup>3</sup>,  
difference = 40 000 cm<sup>3</sup>

- Challenge 3**
- length = 11 m, breadth = 3 m
  - 3 mm × 7 mm × 13 mm
  - 6 cm
  - 6 cm, 7 cm and 8 cm

**Unit II, Week 1: Number - Addition, subtraction, multiplication and division**

**Lesson 1: BODMAS**

- Challenge 1**
- |         |       |
|---------|-------|
| 1 a 158 | h 140 |
| b 45    | i 63  |
| c 101   | j 149 |
| d 171   | k 43  |
| e 8     | l 147 |
| f 71    | m 126 |
| g 129   | n 239 |

2 Answers will vary.

- Challenge 2**
- |        |          |
|--------|----------|
| 1 a 40 | i 280    |
| b 475  | j 693    |
| c 510  | k 510    |
| d 4230 | l 353    |
| e 312  | m 214    |
| f 250  | n 11 472 |
| g 772  | o 4356   |
| h 131  |          |

2 Answers will vary.

3 Answers will vary.

**Challenge 3**

- |         |          |
|---------|----------|
| 1 a 757 | i 352    |
| b 115   | j 9      |
| c 266   | k 277    |
| d 546   | l 5621   |
| e 13826 | m 17     |
| f 3966  | n 10 594 |
| g 1861  | o 5983   |
| h 4642  |          |

2 Answers will vary.

**Lesson 2: BODMAS challenge**

**Challenge 1**

Answers will vary.

**Challenge 2**

- |          |            |
|----------|------------|
| 1 20 = T | 18 = R     |
| 16 = P   | 19 = S     |
| 8 = H    | 25 = Y     |
| 7 = G    | 1 = A      |
| 15 = O   | Pythagoras |
| 2 23 = W | 15 = O     |
| 20 = T   | 5 = E      |
| 14 = N   | Newton     |
| 3 20 = T | 19 = S     |
| 3 = C    | 18 = R     |
| 1 = A    | 5 = E      |
| 4 = D    | Descartes  |
| 4 4 = D  | 19 = S     |
| 18 = R   | 8 = H      |
| 9 = I    | 3 = C      |
| 13 = M   | 1 = A      |
| 5 = E    | Archimedes |
| 5 9 = I  | 2 = B      |
| 15 = O   | 1 = A      |
| 14 = N   | 3 = C      |
| 6 = F    | Fibonacci  |

2 Answers will vary.

**Challenge 3**

Open

**Lesson 3: Number puzzles**

**Challenge 1**

- Across**
- 40725
  - 757
  - 816
  - 67000
  - 3642
  - 5638
  - 58416
  - 722
  - 790
  - 41395

**Down**

- 47823
- 756
- 5764
- 73016
- 740
- 47400
- 87245
- 7634
- 567
- 703

**Challenge 2**

**Across**

- 479382
- 40275
- 652106
- 170983
- 783515
- 592628
- 24000
- 744000
- 67032
- 999999

**Down**

- 76518
- 30195
- 246159
- 127936
- 457368
- 742368
- 300000
- 150729
- 28419
- 24039

**Challenge 3**

**Across**

- 22265
- 8597384
- 5384206
- 64200
- 470586
- 729340
- 706595
- 624918
- 28367
- 9204729

**Down**

- 1215
- 426800
- 75426879
- 78460
- 2916
- 239213
- 34106048
- 477222
- 222600
- 6935
- 9572
- 598
- 78
- 99

**Lesson 4: Curious questions**

**Challenge 1**

Answers will vary.

**Challenge 2**

- 500 000 seconds = 138.888 hours
- 500 000 cm = 5000 metres = 5 km  
Other answers will vary.
- 1 000 000 minutes = 16 666.66 hours = 694.4 days  
Other answers will vary.

**Challenge 3**

- 2 000 000 minutes = 3.805 years  
Other answers will vary.

**Unit II, Week 2: Ratio and proportion**

**Lesson 1: Flora and fauna proportion problems**

**Challenge 1**

- 50% frogs; 24% common toads; 16% natterjack toads; 10% great-crested newts

2 30 oak; 12 ash; 18 beech

**Challenge 2**

- badger 12%; fox 20%; hedgehog 16%; rabbit 28%; squirrel 24%

2 a 22 yew; 44 Scots pine  
b 110 trees

3 common lizard 0.27, 27%; slow worm 0.23, 23%; adder 0.13, 13%; grass snake 0.17, 17%; smooth snake 0.20, 20%

- 4 a 2010: 1.5%; 2011: 1.5%; 2012: 2%; 2013: 2%; 2014: 2.5%  
b He is correct; the proportion of stag beetles is increasing.

- Challenge 3**
- 1 tortoiseshell 360; common blue 270; red admiral 390; brimstone 210; peacock 270

- 2 600 hedge plants; 330 hawthorn; 150 hazel; 120 holly

**Lesson 2: Scale factor and ratio problems**

- Challenge 1**
- 1 a 160 minutes  
b 80 minutes

- 2 a 5 apples costs £2.25  
b 3 mangoes cost £5.20  
c 7 lemons cost £1.75  
d 3 pineapples cost £5.55

- Challenge 2**
- 1 a 2 cm square and 4 cm square enlargement  
b 1 cm × 4 cm rectangle and 2 cm × 8 cm rectangle enlargement  
c right-angled triangle with sides of length 2 cm and 3 cm and enlarged right-angled triangle with sides of 4 cm and 6 cm.

- 2 a 5 oranges cost £1.20  
b 3 figs cost £2.55  
c 4 grapefruit cost £2.72  
d 9 bananas cost £2.07  
e 7 limes cost £2.03

- 3 a 4 : 5  
b 3 : 10  
c 3 : 8  
d 1 : 2  
e 4 : 5  
f Answers will vary.
- 4 a 207 stores have a petrol station.  
b 138 stores have a bakery and a café.

- Challenge 3**
- 1 a green : white 2 : 1  
b green : yellow : red 3 : 2 : 3 (approx.)  
c blue : yellow : green 2 : 1 : 1  
d black : yellow : orange 1 : 1 : 1 (ignoring crested crane)  
e blue : white : red (8 or 9) : 2 : 1 (approx.) (ignoring circle of stars)

- 2 Answers will vary.

**Lesson 3: Building and jewellery ratios**

- Challenge 1**
- 1 a 1 : 2 for example, x○○ x○○ x○○  
x○○ x○○ x○○ or xx○○○○  
xx○○○○ xx○○○○  
b 3 : 1 for example, xxx○ xxx○  
xxx○ xxx○ or  
xxxxxx○○xxxxxx○○

- 2 a 12 grey slabs, 20 total  
b 30 grey slabs, 50 total  
c 54 grey slabs, 90 total

- Challenge 2**
- 1 a For example (xx○○○) repeated 8 times (40 beads), 9 times (45 beads), 10 times (50 beads), 11 times (55 beads) or 12 times (60 beads)

- b i 40, 48 or 56 beads  
ii 42, 49 or 56 beads  
iii 45 or 54 beads
- 2 a i 6 buckets of sand and 12 buckets of gravel  
ii 8 bags of sand and 16 bags of gravel  
iii 16 full wheelbarrows of sand and 32 full wheelbarrows of gravel  
b i 4 buckets of sand  
ii 10 full wheelbarrows of sand
- 3 a 40D; 80T; 120S; 160A  
b 500 homes  
c 1900 homes

- Challenge 3**
- 1 a For example (x○○○○) repeated 9, 10, 11, 12 or 13 times  
b i 50, 60, 70 or 80 beads (multiples of 10)  
ii 52, 65, 78 (multiples of 13)  
iii 57, 76 (multiples of 19)
  - 2 a 18 small, 30 medium, 6 large slabs  
b 15 small, 25 medium, 5 large slabs  
c 30 small, 50 medium, 10 large slabs

**Lesson 4: Tasty ratio and proportion problems**

- Challenge 1**
- 1 a lemonade for 12 people: 9 lemons, 420 g caster sugar, 3.6 litres water  
melon cooler for 12 people: 1 kg melon chunks, 4 limes – zest and juice, 200 ml apple juice  
2.8 litres shop bought lemonade  
b 16 people  
c 21 people
  - 2 a 9 cherries  
b 32 walnuts  
c 40 walnuts and 15 cherries

- Challenge 2**
- 1 a i 0.208 20.8%  
ii 0.167 16.7%  
iii 0.146 14.6%  
b i 3 : 2  
ii 5 : 4  
iii 4 : 5

- 2 a 150 g  
b 50 g  
c 220 g

- 3 a  $\frac{5}{8}$ ; 0.625; 62.5%  
b 6 people

- 4 a blueberry : peanut butter : pineapple = 140 : 112 : 196  
b He makes 168 blueberry ice creams, so 28 more.

- Challenge 3**
- 1 a 30 ml  
b 72 ml  
c 40 ml  
d 96 ml
  - 2 sweetcorn 16; carrots 32; peas 24; broccoli 12; cauliflower 8; courgettes 4

**Unit 11, Week 3: Geometry – Position and direction**

**Lesson 1: Using coordinates to locate shapes (2)**

- Challenge 1**
- 1 A (2, 4) B (5, 2)  
C (-1, 3) D (-4, 1)  
E (-5, -4) F (-3, -2)  
G (1, -3) H (3, -5)

- 2 G is nearest; H is furthest

**Challenge 2**

Coordinates of kick	(-3, 2)	(-4, 1)	(2, 0)	(-3, -2)	(-2, -1)	(0, 2)	(4, 2)
Result	Goal	Miss	Goal	Miss	Goal	Goal	Miss

- 2 a A (-5, 1), B (-1, 4), C (3, 1), D (-1, -2)  
b E (-4, 1), F (-2, 3), G (2, -1), H (0, -3)

- 3 J (-2, -1)

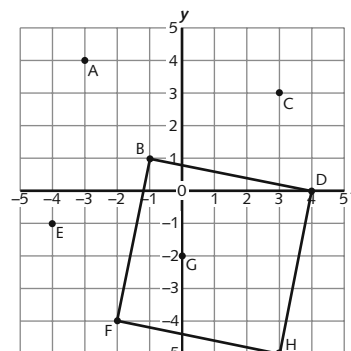
- 4 S (-2, -1)

**Challenge 3**

- 1 Start: (-1, -2), (1, -2), (1, -4), (-1, -4), (-1, 2), (-3, 2), (-3, 0), (3, 0), (3, 2), (-1, 2), (-1, 4), (1, 4), (1, -2) Finish

**Lesson 2: Plotting shapes in the four quadrants (2)**

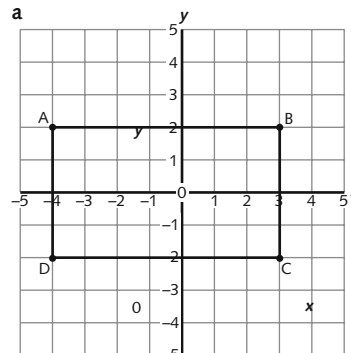
**Challenge 1**



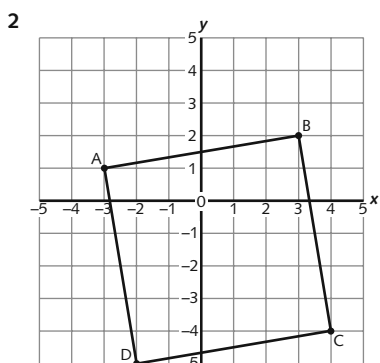
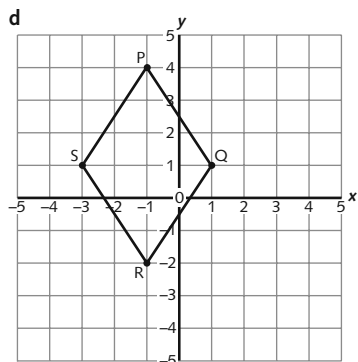
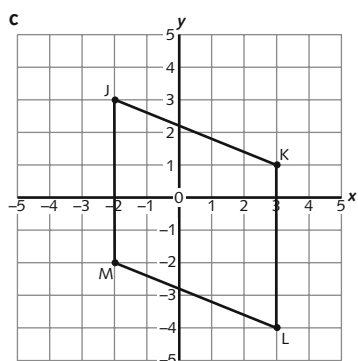
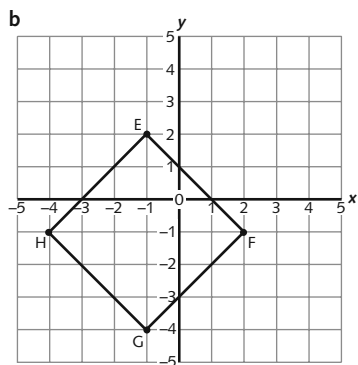
- 2 a A, B  
b E, F  
c H  
d D  
e G

- 3 See the diagram in 1.

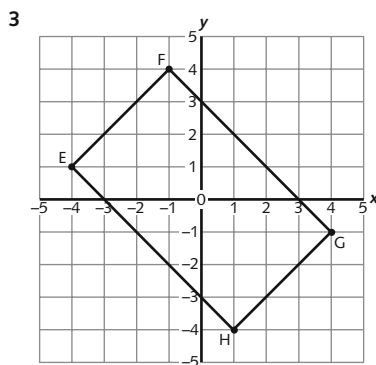
**Challenge 2**



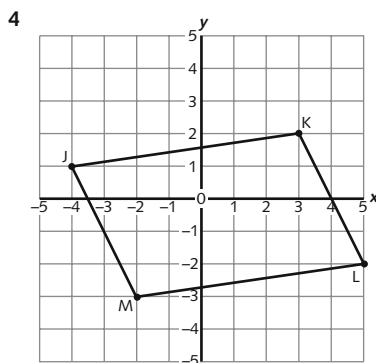
- 1 a



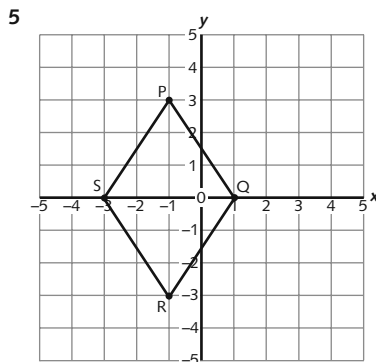
The coordinates of D: (-2, -5)



The coordinates of H: (1, -4)

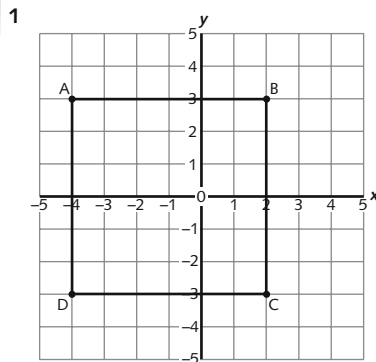


The coordinates of M: (-2, -3)

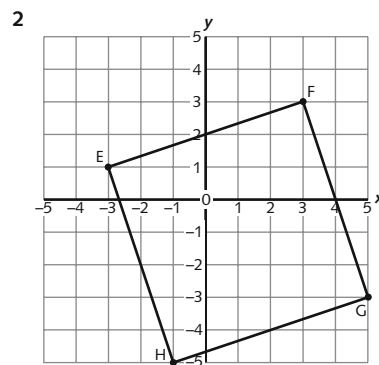


The coordinates of S: (-3, 0)  
Intersection of the diagonals: (-1, 0)

Challenge 3



B (2, 3), D (-4, -3)



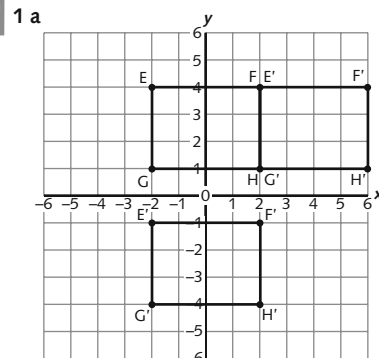
G (5, -3), H (-1, -5), J (1, -1)

**Lesson 3: Using coordinates to translate shapes (2)**

Challenge 1

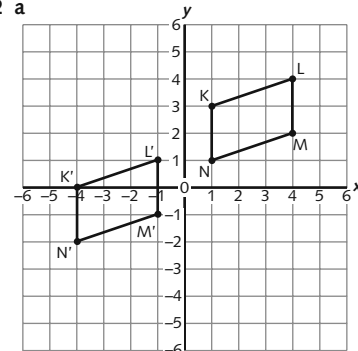
- A (-4, 1) → A' (1, 4)
- B (-2, 1) → B' (3, 4)
- C (-2, -3) → C' (3, 0)
- D (-4, -3) → D' (1, 0)

Challenge 2

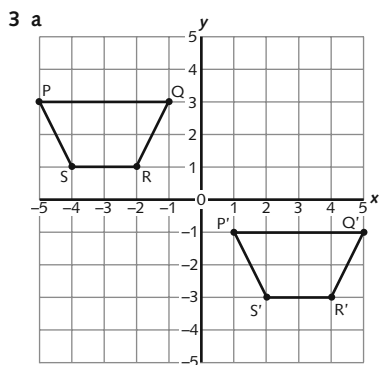


- b** E (-2, 4) → E' (2, 4)
- F (2, 4) → F' (6, 4)
- G (-2, 1) → G' (2, 1)
- H (2, 1) → H' (6, 1)
- c** E (-2, 4) → E' (-2, -1)
- F (2, 4) → F' (2, -1)
- G (-2, 1) → G' (-2, -4)
- H (2, 1) → H' (2, -4)

**2 a**



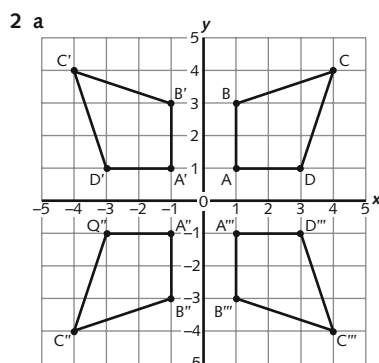
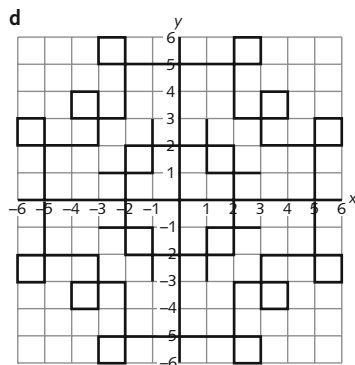
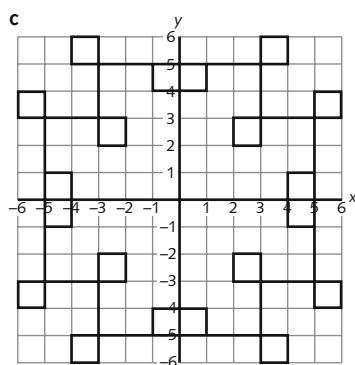
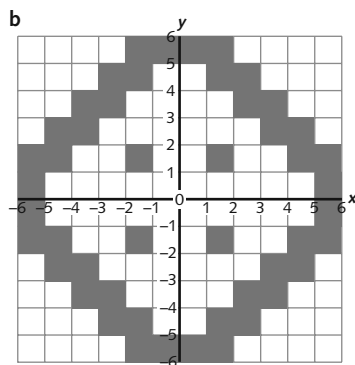
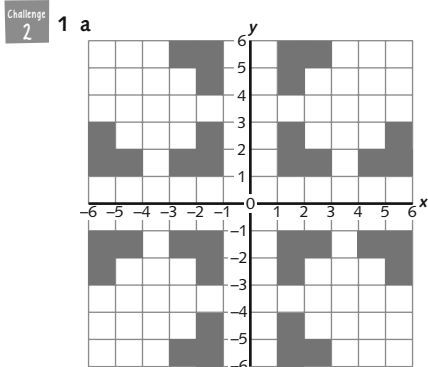
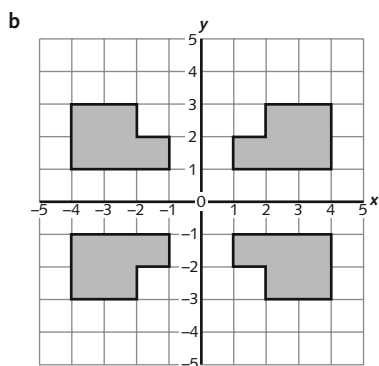
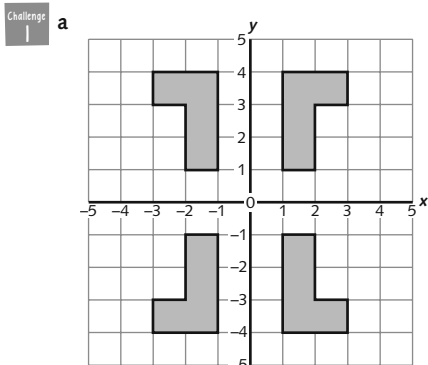
- b** K (1, 3) → K' (-4, 0)
- L (4, 4) → L' (-1, 1)
- M (4, 2) → M' (-1, -1)
- N (1, 1) → N' (-4, -2)



- b**  $P(-5, 3) \rightarrow P'(1, -1)$   
 $Q(-1, 3) \rightarrow Q'(5, -1)$   
 $R(-2, 1) \rightarrow R'(4, -3)$   
 $S(-4, 1) \rightarrow S'(2, -3)$

- Challenge 3**  
**1 a**  $x - 4, y + 4$       **c**  $x - 4, y - 4$   
**b**  $x - 4, y - 4$

**Lesson 4: Four quadrants reflection**



- b**  $A(1, 1), A'(-1, 1), A''(-1, -1), A'''(1, -1)$   
 $D(3, 1), D'(-3, 1), D''(-3, -1), D'''(3, -1)$   
 $C(4, 4), C'(-4, 4), C''(-4, -4), C'''(4, -4)$   
 $B(1, 3), B'(-1, 3), B''(-1, -3), B'''(1, -3)$

**Challenge 3** Open

**Unit 12, Week 1: Number - Multiplication and division incl. Decimals**

**Lesson 1: Using divisibility tests**

- Challenge 1**  
**1** Answers will vary.  
**a** Check answers are divisible by 5.  
**b** Check answers are divisible by 4.  
**c** Check answers are divisible by 3.  
**d** Check answers are divisible by 6.  
**e** Check answers are divisible by 9.  
**f** Check answers are divisible by 8.

**2** Answers will vary.

- Challenge 2**  
**1** A Multiples of 2; 4323  
 B Multiples of 4; 2483  
 C Multiples of 8; 1388  
 D Multiples of 3; 2393  
 E Multiples of 3; No odd one out  
 F Multiples of 4; 3074

- Challenge 3**  
**a** Yes, it will be a leap year: 72 is a multiple of 4.  
**b** 2000, 2004 . . . and multiples of 4 up to 2096  
**c** Yes, 768 is divisible by 8.  
**d** Yes, because 504 is a multiple of 8.  
**e** Yes, all numbers ending in 00 are multiples of 25.  
**f** Yes, because 96 is a multiple of 4.

**Lesson 2: Review multiplication and division of whole numbers**

**Challenge 1**

Start											Finish
7	$\times 8$	$\times 10$	$\div 4$	$\times 6$	$\div 10$	$\times 2$	$\times 5$	$\times 10$	$\div 40$	$\div 30$	7
56	560	140	840	84	168	840	8400	210	7		

- Challenge 2**  
**1, 2** Methods may vary but should be along these lines.  
 Mental method  
 $56 \times 40 = 2240$   
 $1248 \div 4 = 312$   
 $4872 \div 12 = 406$   
 $5427 \div 9 = 603$   
 $4222 \times 4 = 16\ 888$   
 Written method  
 $5333 \times 33 = 175\ 989$   
 $8639 \times 7 = 60\ 473$   
 $87 \times 32 = 2784$   
 $524 \times 82 = 42\ 968$   
 $7383 \div 36 = 205.08$   
 $4271 \div 5 = 854.2$   
 $3569 \div 6 = 594.83$   
 $4741 \div 11 = 431$   
 $432 \div 16 = 27$   
 $48 \times 57 = 2736$   
 $966 \div 21 = 46$   
 $38 \times 58 = 2204$

**Challenge 3** 1 a

	Time period				
	1 day	1 week	1 fortnight	June and July	1 year
Julie	8 km	56 km	112 km	488 km	2920 km
Janice	6 km	42 km	84 km	366 km	2190 km
Jessica	9 km	63 km	126 km	549 km	3285 km
Jasmine	12 km	84 km	168 km	732 km	4380 km
Jasmeen	9 km	63 km	126 km	549 km	3285 km

b Open

- 2 a 1875                      f 97  
 b 114                         g 2881  
 c 2580                      h 72  
 d 208                        i 966  
 e 9288

**Lesson 3: Review multiplication and division involving decimal numbers**

- Challenge 1** a 520                      g 360  
 b 54                            h 2.4  
 c 6300                        i 5.6  
 d 38                            j 36  
 e 630                         k 36000  
 f 800                         l 48

**Challenge 2** 1, 2 Methods may vary but should be

along the lines of:

Mental method

$6 \times 0.3 = 1.8$

$5.46 \div 6 = 0.91$

$0.76 \times 5 = 3.8$

$8.2 \times 4 = 32.8$

$4.72 \times 3 = 14.16$

Written method

$36.8 \div 4 = 9.2$

$53.43 \div 13 = 4.11$

$5.42 \times 43 = 233.06$

$61.2 \div 18 = 3.4$

$33.3 \times 8 = 266.4$

$88.8 \div 24 = 3.7$

- Challenge 3** 1 i  $\pounds 2.10 + \pounds 2.04 + \pounds 3.40 = \pounds 7.54$

- ii  $\pounds 7.54 \div 5 = \pounds 1.51$  per day on average

- 2  $\pounds 1.76 + \pounds 0.68 = \pounds 2.44$  per day  
 $\pounds 2.44 \times 5 = \pounds 12.20$

- 3 i Joseph:  $\pounds 1.51$ /per day;  $\pounds 7.54$ /per week, William:  $\pounds 2.44$ /per day;  $\pounds 12.20$ /per week, so William spends more

- ii Difference per day = 93p or  $\pounds 0.90$

- iii Difference per working week =  $\pounds 4.66$

- 4  $5 \times 68p = \pounds 3.40$

500g:

Meat =  $\pounds 2.80$

Cheddar =  $\pounds 6.80$

Cream cheese =  $\pounds 4.25$

Olives =  $\pounds 2.75$

Total =  $\pounds 20$  so no change.

- 5 Round 33.2 down to 33p per sandwich

- 6 7 tomatoes

- 7 5 sandwiches can be bought for  $\pounds 20$  with 75p remaining.

- 8 Round 13.6 up to 14p per slice

**Lesson 4: Solving word problems (5)**

- Challenge 1** a 100                            i 709  
 b 100                            j 3.11  
 c 10                              k 3  
 d 10                              l 0.21  
 e 100                            m 10  
 f 100                            n 0.46  
 g 10                              o 100  
 h 100

- Challenge 2** a  $\pounds 3.87 \times 6 = \pounds 23.22$

$\pounds 2.64 \times 12 = \pounds 31.68$

Total cost =  $\pounds 54.90$

- b  $\pounds 9.54$  per pizza;  $\pounds 1.19$  per slice

- c  $\pounds 17.50$

- d  $\pounds 500 - \pounds 318.63 = \pounds 181.37$

- e 33p each or  $\pounds 1.20$

- f  $\pounds 189.44$ ; 99p per cup

- g balloons & streamers + pizzas + party

hats + cupcakes + juice

$\pounds 54.90 + \pounds 620.10 + \pounds 17.50 + \pounds 318.63$

+  $\pounds 189.44 = \pounds 1200.57$

- h  $25\% = \pounds 300.14$

$10\% = \pounds 120.06$

Parents donate  $\pounds 1200.57 - \pounds 420.20 =$

$\pounds 780.37$

- i  $\pounds 1.28 \times 6 - \pounds 5.59 = \pounds 2.09$

- 2 a  $(372 \div 6) \times 9 = 558$

b  $(372 \times 6) \div 9 = 248$

c  $372 \times 6 + 9 = 2241$

d  $372 \div 6 + 9 = 71$

e  $372 \div (6+9) = 24.8$

f  $372 \times 6 - 9 = 2223$

- Challenge 3** 1 Answers will vary.

- 2 a  $247 \times 16 = 3952$

b  $472 \div 16 = 29.5$

c  $761 + 42 = 803$

d  $67.2 \div 14 = 4.8$

e  $42.6 \times 17 = 724.2$

f  $6.74 - 2.1 = 4.64$

**Unit 12, Week 2: Number - Fractions (including decimals and percentages)**

**Lesson 1: Percentages and prices**

- Challenge 1** racket  $\pounds 58.32$   
 small bike  $\pounds 116.64$   
 helmet  $\pounds 21.87$   
 trainers  $\pounds 94.77$   
 jacket  $\pounds 36.45$   
 big bike  $\pounds 182.25$

- Challenge 2** 1 Computer  $\pounds 619.65$

Tablet  $\pounds 328.05$

Camera  $\pounds 1093.50$

Game  $\pounds 656.10$

Laptop  $\pounds 1312.20$

T.V.  $\pounds 3426.30$

- 2 Day 1 price with 20% off =  $\pounds 1440$ ;

Day 2 price =  $\pounds 1458$

Reasoning will vary.

- 3 Day 1 price with 28% off =  $\pounds 1080$ ;

Day 3 price =  $\pounds 1093.50$

Reasoning will vary.

- Challenge 3** 1 Biscuits 20%

Water 20%

Rice 5%

Cat biscuits 10%

Potatoes 40%

Cheese 15%

Juice 30%

- 2 Open

**Lesson 2: Fractions, decimals and percentages (2)**

- Challenge 1** 1 a  $\frac{1}{2} > 0.3$

b  $45\% > \frac{1}{4}$

c  $0.6 < \frac{7}{10}$

d  $9/10 < 91\%$

e  $0.75 > \frac{7}{10}$

f  $\frac{7}{10} > 0.65$

g  $55\% > 0.15$

h  $0.1 = \frac{1}{10}$

i  $40\% < \frac{2}{4}$

j  $\frac{6}{10} < 0.8$

k  $\frac{3}{4} > 34\%$

l  $20\% < \frac{4}{10}$

- 2 Answers will vary.

- 3 a 0.2    23%     $\frac{1}{4}$      $\frac{1}{2}$     55%    0.6

b 1%    0.1    0.3     $\frac{1}{2}$     64%     $\frac{4}{5}$

c  $\frac{1}{5}$     35%    0.4    50%    0.6     $\frac{7}{10}$

d  $\frac{3}{10}$     61%    0.7     $\frac{4}{5}$      $\frac{9}{10}$     99%

- 4 Open

- Challenge 2** 1 a  $13\% < \frac{1}{3}$

b  $30\% > 0.03$

c  $\frac{7}{10} < 0.71$

d  $0.25 < \frac{2}{5}$

e  $52\% > 0.5$

f  $\frac{1}{5} < 50\%$

g  $80\% = \frac{4}{5}$

h  $0.14 < 44\%$

i  $\frac{8}{20} = 0.4$

j  $\frac{5}{8} > 60\%$

k  $0.06 > \frac{1}{20}$

l  $5\% = 0.05$

m  $61\% < 0.66$

n  $0.16 < \frac{1}{6}$

o  $66\% > 0.6$

p  $\frac{8}{20} = 40\%$

- 2 a  $\frac{8}{20}$  m = 40 cm  
 b 40% of a metre = 40 cm  
 c 0.52 m = 52 cm  
 d  $\frac{3}{5}$  m = 60 cm  
 e  $\frac{7}{10}$  m = 70 cm  
 f 16% of a metre = 16 cm
- 3 a 34% of a kilogram = 340 g  
 b 0.65 kg = 650 g  
 c  $\frac{3}{8}$  kg = 375 g  
 d 72% of a kilogram = 720 g  
 e 0.99 kg = 990 g  
 f  $\frac{23}{50}$  kg = 460 g

4 Answers will vary.

Challenge 3

- 1 Open  
 2 Open

Lesson 3: Fraction and decimal equivalents (3)

Challenge 1

- 1 a 0.25                      f 0.8  
 b 0.4                         g 0.9  
 c 0.7                         h 0.25  
 d 0.75                        i 0.2  
 e 0.3                         j 0.375

2

Fraction	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{6}$	$\frac{1}{7}$	$\frac{1}{8}$	$\frac{1}{9}$	$\frac{1}{10}$
Decimal	0.5	0.33	0.25	0.2	0.167	0.143	0.125	0.111	0.1

Challenge 2

- 1 Answers will vary.
- 2 i a 0.63                      ii a 0.625  
 b 0.45                        b 0.455  
 c 1.00                        c 1.000  
 d 0.58                        d 0.583  
 e 0.56                        e 0.556  
 f 0.08                        f 0.077  
 g 0.43                        g 0.429  
 h 0.43                        h 0.429  
 i 0.79                        i 0.786  
 j 0.40                        j 0.400  
 k 0.56                        k 0.563  
 l 0.87                        l 0.867

3 Answers will vary.

- 4 a Their brother  
 b 18.5%  
 c 31.5%  
 d 50%

Challenge 3

- 1 a  $\frac{27}{50}$  0.54                      f  $\frac{17}{20}$  0.85  
 b  $\frac{23}{25}$  0.92                      g  $\frac{12}{25}$  0.48  
 c  $\frac{39}{100}$  0.39                      h  $\frac{3}{20}$  0.15  
 d  $\frac{11}{50}$  0.22                      i  $\frac{16}{25}$  0.64  
 e  $\frac{3}{100}$  0.03                      j  $\frac{7}{20}$  0.35

2 Answers will vary.

Lesson 4: Find the fractions

Challenge 1

- 1 a  $0.1 = \frac{1}{10} = \frac{2}{20} = \frac{3}{30} = \frac{4}{40} = \frac{6}{60} = \frac{10}{100}$   
 $\frac{12}{120} = \frac{14}{140}$   
 b  $0.5 = \frac{50}{100} = \frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{12}{24} = \frac{25}{50} = \frac{31}{62} =$   
 $\frac{39}{78} = \frac{40}{80}$   
 c  $0.25 = \frac{25}{100} = \frac{1}{4} = \frac{3}{12} = \frac{5}{20} = \frac{10}{40} = \frac{13}{52} =$   
 $\frac{15}{60} = \frac{20}{80}$   
 d  $0.8 = \frac{80}{100} = \frac{8}{10} = \frac{16}{20} = \frac{24}{30} = \frac{32}{40} = \frac{40}{50} =$   
 $\frac{48}{60} = \frac{56}{70}$

2 Open

Challenge 2

- 1 Answers will vary.
- 2 a  $\frac{27}{90}$      $\frac{57}{190}$      $\frac{75}{250}$      $\frac{84}{280}$      $\frac{111}{370}$   
 b  $\frac{24}{60}$      $\frac{44}{110}$      $\frac{80}{200}$      $\frac{104}{260}$      $\frac{136}{340}$   
 c  $\frac{70}{100}$      $\frac{105}{150}$      $\frac{154}{220}$      $\frac{238}{340}$      $\frac{273}{390}$   
 d  $\frac{162}{180}$      $\frac{243}{270}$      $\frac{270}{300}$      $\frac{306}{340}$      $\frac{369}{410}$   
 e  $\frac{15}{60}$      $\frac{40}{160}$      $\frac{51}{204}$      $\frac{95}{380}$      $\frac{103}{412}$   
 f  $\frac{80}{500}$      $\frac{92}{575}$      $\frac{104}{650}$      $\frac{116}{725}$      $\frac{128}{800}$

Challenge 3

Open

Unit 12, Week 3: Motorway cafe pie charts

Lesson 1: Motorway cafe pie charts

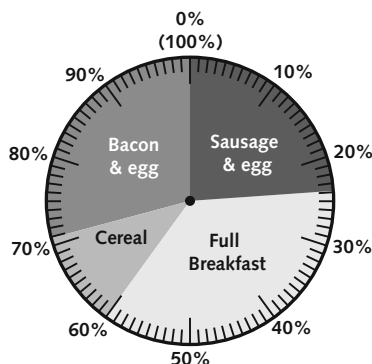
Challenge 1

- 1 a 52%                              c 29%  
 b 11%                              d 8%
- 2 a 26                                c 15  
 b 6                                 d 4

Challenge 2

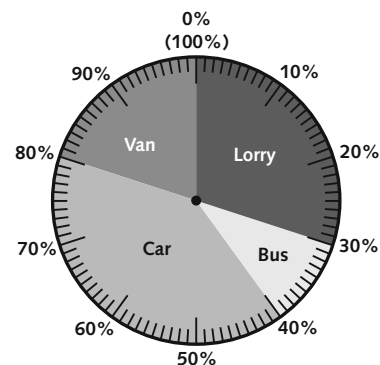
1 Total frequency 51

Order	Frequency	Percentage
Cereal	6	12%
Bacon and egg	15	29%
Sausage and egg	12	24%
Full breakfast	18	35%



2 Total frequency 180

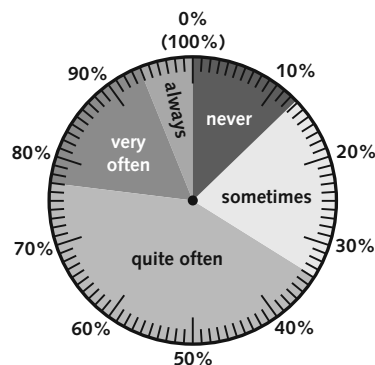
Transport	Frequency	Percentage
Lorry	54	30%
Bus	18	10%
Car	72	40%
Van	36	20%



- 3 a i tea: 50%  
 ii coffee: 20%  
 iii soft drinks: 15%  
 iv milk: 10%  
 v fresh orange: 5%
- b i tea: 250  
 ii coffee: 100  
 iii soft drinks: 75  
 iv milk: 50  
 v fresh orange: 25
- c 200

Challenge 3

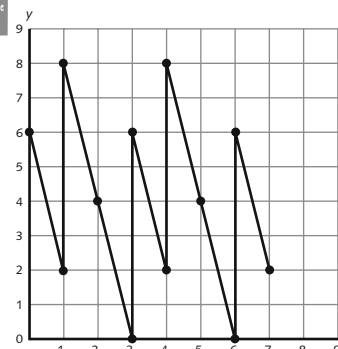
a



b Answers will vary.

Lesson 2: Export problems

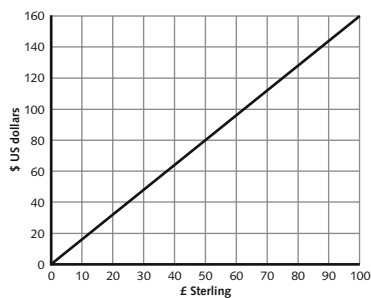
Challenge 1



Coordinates (3, 6) and (6, 6)



Challenge 2

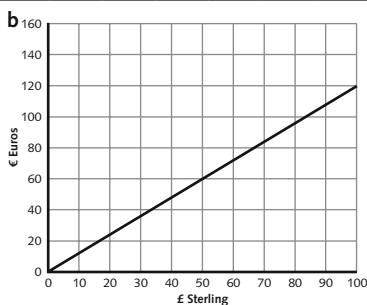


- a**
- b Golf club \$128      Gloves \$32
  - Gold balls \$24      Polo shirt \$40
  - Cap \$16              Umbrella \$56
  - Shoes \$96            Sweater \$64
  - Golf bag \$160
- c**
- i \$48                  iii \$256
  - ii \$80                iv \$120

Challenge 3

1 a

<b>Sterling (£)</b>	10	20	30	40	50	100
<b>Euro (€)</b>	12	24	36	48	60	120



- 2**
- a €900                  d €675
  - b €135                  e €945
  - c €1080                f €1080

**Lesson 3: Carrying out a survey**

Challenge 1, 2

Open

Challenge 3

Open

**Lesson 4: Mainly means**

Challenge 1

- a 8                                  d 10
- b 9                                  e £9
- c 6                                  f 13 m

Challenge 2

- 1 a 12 kg                          c 18 kg
- b 14 kg
- 2 9.3 kg
- 3 3.58 l
- 4 a Cole family: 8 h

b Kent: 26 °C

Dakin family: 9 h

Devon: 26 °C

Challenge 3

- a 14
- b 16
- c 18
- d 20
- e 22

# Progress Guide 6

## Unit 1, Week 1: Number - Number and place value

### Lesson 1, Support: 6-digit counting

- 1 a 399 890 – count on in 100s to 400 790
- b 187 712 – count on in 100s to 188 612
- c 562 138 – count back in 100s to 561 238
- d 856 502 – count back in 100s to 1 855 602
- 2 a 736 024 – count on in 1000s to 745 024
- b 1 827 553 – count on in 1000s to 183 655
- c 2 576 239 – count on in 1000s to 2 567 239
- d 3 857 320 – count on in 1000s to 3 848 320

### Lesson 2, Extension: Highest number wins

Open

### Lesson 3, Support: Round me

- a 45 720      45 700
- b 32 650      32 700
- c 73 290      73 300
- d 85 770      85 800
- e 48 380      48 400
- f 73 530      73 500
- g 61 650      61 600
- h 83 210      83 200
- i 66 790      66 800

### Lesson 4, Extension: Why 11?

- 1 1 653 454; Yes
- 2 Answers will vary.
- 3 Answers will vary.
- 4 Answers will vary.

## Unit 1, Week 2: Number - Addition and subtraction

### Lesson 1, Extension: Number chain

- 200 000    5000    24 000    600 000
- 650    43 000    900 000    8000
- 11 000    25 000    45 000

### Lesson 2, Support: Subtraction number lines

- a 464 048                          d 241 123
- b 375 704                          e 631 104
- c 577 029

### Lesson 3, Extension: Decimal puzzles

Answers will vary.

### Lesson 4, Support: Museum figures

- 1 470 000
- 725 000
- 232 000
- 83 000
- 108 000
- 134 000
- 53 000
- 104 000

- 2 25 000
- 100 000
- 8000
- 7000
- 20 000
- 16 000
- 17 000
- 10 000

- 3 Natural History
- 4 157 000
- 5 672 000
- 6 216 539
- 7 Answers will vary.

## Unit 1, Week 3: Geometry - Properties of shape

### Lesson 2, Support: Identifying nets

1, 2

Shape	A	B	C	D	E	F
Net of an open cube	✓	✓	✗	✓	✗	✓

### Lesson 3, Extension: 2-piece puzzle

Open

### Lesson 4, Support: Net of a triangular prism

Open

### Lesson 4, Extension: Cubes from square-based pyramids

Open

### Unit 2, Week 1: Number - Multiplication and division

#### Lesson 1, Support: Multiplying ThHTO × O

- 1, 2, 3 a 10 638      f 51 102  
 b 56 457      g 28 240  
 c 53 732      h 71 104  
 d 22 928      i 41 214  
 e 23 916

#### Lesson 2, Support: Multiplication TO × TO using the expanded written method

- 1, 2, 3 a 2457      d 2628  
 b 12 393      e 3870  
 c 1296      f 3770

#### Lesson 3, Extension: Multiplication TO × TO using the formal written method

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#### Lesson 4, Extension: Solving word problems

- 1, 2 Answers will vary.

### Unit 2, Week 2: Number - Fractions

#### Lesson 1, Extension: Five simplifications challenge

- 1, 2 Answers will vary.

#### Lesson 2, Support: Common denominators

- |                                 |                                 |
|---------------------------------|---------------------------------|
| a $\frac{4}{8} \frac{5}{8}$     | g $\frac{9}{12} \frac{8}{12}$   |
| b $\frac{8}{18} \frac{15}{18}$  | h $\frac{9}{24} \frac{8}{24}$   |
| c $\frac{5}{8} \frac{6}{8}$     | i $\frac{20}{24} \frac{18}{24}$ |
| d $\frac{4}{12} \frac{7}{12}$   | j $\frac{10}{12} \frac{8}{12}$  |
| e $\frac{12}{18} \frac{14}{18}$ | k $\frac{5}{9} \frac{6}{9}$     |
| f $\frac{8}{12} \frac{3}{12}$   | l $\frac{4}{6} \frac{4}{6}$     |

#### Lesson 3, Extension: Fraction combinations

- Answers will vary.

#### Lesson 4, Support: Fraction subtraction

- |                 |                  |
|-----------------|------------------|
| a $\frac{3}{5}$ | f $\frac{9}{10}$ |
| b $\frac{3}{4}$ | g $\frac{7}{8}$  |
| c $\frac{5}{6}$ | h $\frac{9}{7}$  |
| d $\frac{6}{7}$ | i $\frac{1}{3}$  |
| e $\frac{3}{4}$ | j $\frac{2}{5}$  |

### Unit 2, Week 3: Geometry - Position and direction

#### Lesson 1, Support: 3-in-a-row coordinates

Open

#### Lesson 1, Extension: 4-in-a-row coordinates

Open

#### Lesson 2, Support: Hunt the square

Open

#### Lesson 2, Extension: Hunt the rectangle

Open

### Unit 3, Week 1: Number - Addition and subtraction

#### Lesson 1, Support: 5-digit addition

- |          |           |
|----------|-----------|
| a 87 192 | g 94 656  |
| b 81 884 | h 101 862 |
| c 45 385 | i 97 646  |
| d 67 094 | j 96 201  |
| e 91 939 | k 73 166  |
| f 89 219 | l 96 662  |

#### Lesson 2, Extension: Hit the target (1)

Answers will vary.

#### Lesson 3, Extension: Hit the target (2)

Answers will vary.

#### Lesson 4, Support: Book sales

- |             |         |
|-------------|---------|
| a 817 000   | 807 000 |
| 816 000     | 794 000 |
| 814 000     | 792 000 |
| 810 000     | 792 000 |
| 807 000     | 791 000 |
| b 836 585   | 826 538 |
| 835 586     | 814 201 |
| 834 370     | 812 187 |
| 829 641     | 811 507 |
| 827 311     | 811 095 |
| c 1 585 000 |         |
| d 26 000    |         |
| e 751 507   |         |

### Unit 3, Week 2: Number - Decimals

#### Lesson 1, Extension: 3000-in-a-row

Open

#### Lesson 2, Support: Move the digits

- |        |       |
|--------|-------|
| a 7400 | f 5.4 |
| 0.74   | 5.4   |
| b 290  | g 27  |
| 2.9    | 0.27  |
| c 35   | h 96  |
| 3.5    | 0.96  |
| d 1400 | i 480 |
| 0.14   | 0.48  |
| e 800  |       |
| 0.83   |       |

#### Lesson 3, Extension: What other calculations?

- a  $0.5 \times 8 = 4$   
 $5 \times 0.8 = 4$   
 $0.5 \times 0.8 = 0.4$   
 $0.05 \times 0.8 = 0.04$   
 $0.5 \times 0.08 = 0.04$   
 $0.05 \times 8 = 0.4$
- b  $0.6 \times 9 = 5.4$   
 $6 \times 0.9 = 5.4$   
 $0.6 \times 0.9 = 0.54$   
 $0.06 \times 0.9 = 0.054$   
 $0.6 \times 0.09 = 0.054$   
 $0.06 \times 9 = 0.54$
- c  $0.8 \times 7 = 5.6$   
 $8 \times 0.7 = 5.6$   
 $0.8 \times 0.7 = 0.56$   
 $0.08 \times 0.7 = 0.056$   
 $0.8 \times 0.07 = 0.056$   
 $0.08 \times 7 = 0.56$

- d  $0.12 \times 6 = 0.72$   
 $12 \times 0.6 = 7.2$   
 $0.12 \times 0.6 = 0.072$   
 $0.012 \times 0.6 = 0.0072$   
 $0.12 \times 0.06 = 0.0072$   
 $0.012 \times 6 = 0.072$

- e  $0.14 \times 5 = 0.7$   
 $14 \times 0.5 = 7$   
 $0.14 \times 0.5 = 0.07$   
 $0.014 \times 0.5 = 0.007$   
 $0.14 \times 0.05 = 0.007$   
 $0.014 \times 5 = 0.07$
- f  $0.7 \times 15 = 10.5$   
 $7 \times 0.15 = 1.05$   
 $0.7 \times 0.15 = 0.105$   
 $0.07 \times 0.15 = 0.0105$   
 $0.7 \times 0.015 = 0.0105$   
 $0.07 \times 15 = 1.05$

**Lesson 4, Support: Rounding up or down?**

- a 4 4.6 (5)
- b (2) 2.3 3
- c 7 7.5 (8)
- d (9) 9.4 10
- e 1.3 1.37 (1.4)
- f (5.2) 5.23 5.3
- g (3.2) 3.21 3.3
- h 6.1 6.18 (6.2)

**Unit 3, Week 3: Measurement (length)**

**Lesson 1, Support: See-saw lengths**

See-saw	Total length (mm)	Length to midpoint (mm)	Length to midpoint (cm)
A	50	25	2.5
B	72	36	3.6
C	38	19	1.9
D	90	45	4.5
E	66	33	3.3
F	30	15	1.5
G	130	65	6.5
H	150	75	7.5

**Lesson 2, Extension: Gerry's jumping bean**

- 1 5.375 cm
- 2 11.125 mm
- 3 Open

**Lesson 4, Support: Motor boat hires**

1

Motor boat	Distance (miles)	Distance (km)
Seagull	10	16
Tern	5	8
Puffin	15	24
Sandpiper	12.5	20
Kittiwake	7.5	12
Petrel	20	32
Mallard	17.5	28
Guillemot	2.5	4

- 2 27.5 miles
- 3 40 km

**Lesson 4, Extension: Distances by air**

- 1, 2 a 1229 km 768 miles
- b 1348 km 843 miles
- c 1639 km 1024 miles
- d 2039 km 1274 miles

**Unit 4, Week 1: Number - Multiplication and division**

**Lesson 1, Support: Multiples and Factors**

- 1 Three different factor trees for 36.

- 2 a 24: (1)(2)(3)(4)(6) 8 (12) 24  
36: (1)(2)(3)(4)(6) 9 (12) 18 36
- b 20: (1)(2) 4 (5) (10) 20  
30: (1)(2) 3 (5) 6 (10) 15 30
- c 16: (1)(2)(4)(8) 16  
40: (1)(2)(4) 5 (8) 10 20 40
- d 25: (1)(5)(25)  
50: (1) 2 (5) 10 (25) 50  
100: (1) 2 4 (5) 10 50 (25) 50 100
- e 32: (1)(2)(4) 8 16 32  
48: (1)(2) 3 (4) 6 8 12 16 24 48  
60: (1)(2) 3 (4) 5 6 10 12 15 20  
30 60

**Lesson 1, Extension: Multiples and factors**

- a 5
- b 6, 9 or any multiple of 3. If 3 is not factor of a number then any multiple of 3 cannot be a factor either. Examples will vary.
- c Most even numbers have an even number of factors except for square numbers which have an odd number of factors. Examples will vary.
- d Answers will vary.
- e 16 and 31 January

**Lesson 3, Support: Dividing ThHTO by 11 and 12 using the formal written method of short division**

- a 198
- b 199
- c 313
- d 411
- e 196
- f 393
- g 310
- h 516

**Lesson 3, Extension: Dividing ThHTO by 11 and 12 using the formal written method of short division**

- a 568 dozen roses
- b 1728 roses
- c 689 bunches of tulips
- d 106 tulips; 158 lilies; 264 bunches in total
- e Answers will vary.
- f Answers will vary.

**Unit 4, Week 2: Number - Fractions, incl. Decimals and percentages**

**Lesson 1, Extension: Fraction and decimal triangles**

Open

**Lesson 2, Support: One divided**

- a 0.5
- b 0.25
- c 0.2
- d 0.1
- e 0.125

**Lesson 3, Extension: 3-in-a-row**

Open

**Lesson 4, Support: Theatre percentages**

- a 10%
- b 22%
- c 9%
- d 1%

**Unit 4, Week 3: Measurement (time)**

**Lesson 1, Support: Time dominoes**

Open

**Lesson 1, Extension: Domino times**

Open

**Lesson 2, Support: Secondary school visit**

- 1 50 min
- 2 4 h 10 min
- 3 1 h 50 min
- 4 a 25 min b 95 min
- 5 a 13 min b 73 min
- c 45 min

**Lesson 4, Extension: Applying units of speed**

- 1 a 3500 m b 300 cm c 300 m d 3.6 km e 54 cm f 600 mm
- g 135 cm h 1.2 m i 2 km j 12 km k 40 m l 120 m
- 2 1800 m
- 3 288 km
- 4 Answers will vary.

**Unit 5, Week 1: Number - Addition, subtraction, multiplication and division, incl. Number and place value**

**Lesson 1, Support: Negative tug of war**

Open

**Lesson 2, Extension: 4-in-a-row**

Open

**Lesson 3, Support: Brackets first!**

- a 96
- b 100
- c 80
- d 44
- e 80
- f 48
- g 24
- h 180
- i 24
- j 36
- k 5
- l 528

**Lesson 4, Extension: Roll the dice**

Open

### Unit 5, Week 2: Number - Algebra

#### Lesson 1, Support: Simplifying and using formulae games

Game 1: Matching formula pairs

- $5a, 5 \times a$        $3 \times b, 3b$
- $7b - b, 6b$      $2 \times a, 2a$
- $6c - 4c, 2c$      $4b, 8b - 4b$
- $c, 15c - 14c$     $3a, a + a + a$
- $9b, 3b + 6b$     $10a, 8a + 2a$
- $10c, 10 \times c$     $7c, 2c + 3c + 2c$

Game 2: Open

#### Lesson 2, Extension: Investigating triangular numbers

1

	1st	2nd	3rd	4th	5th	6th	7th	8th
Triangular number	1	3	6	10	15	21	28	36

- 2 a The differences are 2, 3, 4, 5 . . . They increase by 1 each time.
- b When you add consecutive triangular numbers, the answer is a square number. Yes, the sum of two consecutive triangle numbers will always be a square number. The two triangle shapes of consecutive triangular numbers fit together to make a square.



$$c \frac{n(n+1)}{2}$$

#### Lesson 3, Support 2: Lucky numbers

- Anne:  $\frac{x+5}{2} = 7$  so  $x = 9$
- Ben:  $x^2 + 3 = 7$  so  $x = 2$
- Sajid:  $5x - 13 = 7$  so  $x = 4$
- Open

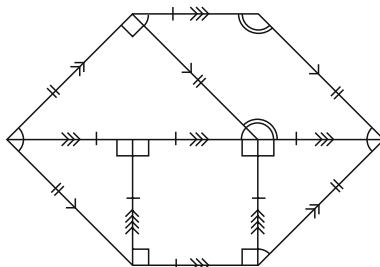
#### Lesson 4, Extension: Designing a patio

There are 12 possible ways but the first few are very long and narrow so would not make attractive patios.

- $1 \times 504; 2 \times 252; 3 \times 168; 4 \times 126;$
- $6 \times 84; 7 \times 72;$
- $8 \times 63; 9 \times 56; 12 \times 42; 14 \times 36;$
- $18 \times 28; 21 \times 24$

### Unit 5, Week 3: Geometry - Properties of shape

#### Lesson 1, Extension: 5-piece puzzle



#### Lesson 2, Extension: Angles in regular polygons



2

Number of sides	Number of triangles	Sum of interior angles	Size of interior angle
3	1	$180^\circ \times 1 = 180^\circ$	$180^\circ \div 3 = 60^\circ$
4	2	$180^\circ \times 2 = 360^\circ$	$360^\circ \div 4 = 90^\circ$
5	3	$180^\circ \times 3 = 540^\circ$	$540^\circ \div 5 = 108^\circ$
6	4	$180^\circ \times 4 = 720^\circ$	$720^\circ \div 6 = 120^\circ$
7	5	$180^\circ \times 5 = 900^\circ$	$900^\circ \div 7 = 129^\circ$
8	6	$180^\circ \times 6 = 1080^\circ$	$1080^\circ \div 8 = 135^\circ$
9	7	$180^\circ \times 7 = 1260^\circ$	$1260^\circ \div 9 = 140^\circ$

- 3 Sum of interior angles =  $1800^\circ$   
Size of interior angle =  $150^\circ$

#### Lesson 2, Support: Shapes on a pin board

Open

#### Lesson 4, Support: 3-angle puzzle

Open

### Unit 6, Week 1: Number - Multiplication and division

#### Lesson 1, Support: Multiplication HTO $\times$ TO using partitioning

- a 8142
- b 6600
- c 7230
- d 6048
- e 20 090
- f 17 424
- g 26 432
- h 10 672

#### Lesson 3, Support: Multiplication HTO $\times$ TO using the expanded written method

- a 10 257
- b 8496
- c 12 870
- d 12 393
- e 20 628
- f 26 970

#### Lesson 3, Extension: Multiplication HTO $\times$ TO using the expanded written method

a

5832
216 27
24 9 3
8 3 3 1

b

9216
192 48
24 8 6
6 4 2 3

c

25 088
448 56
56 8 7
7 8 1 7

d

18 432
288 64
36 8 8
9 4 2 4

e

25 515
405 63
45 9 7
5 9 1 7

f

28 000
350 80
35 10 8
7 5 2 4

g

69 984
972 72
54 18 4
6 9 2 2

h

93 312
864 108
48 18 6
8 6 3 2

#### Lesson 4, Extension: Multiplication HTO $\times$ TO using the formal written method

Open

### Unit 6, Week 2: Number - Multiplication and division, incl. Decimals

#### Lesson 1, Support: Multiplying decimals using mental methods

Related facts in sets as follows:

- $7 \times 8 = 56$        $6 \times 4 = 24$
- $0.7 \times 8 = 5.6$      $0.6 \times 4 = 2.4$
- $0.07 \times 8 = 0.56$     $0.06 \times 4 = 0.24$
- $7 \times 3 = 21$        $5 \times 7 = 35$
- $0.7 \times 3 = 2.1$      $0.5 \times 7 = 3.5$
- $0.07 \times 3 = 0.21$     $0.05 \times 7 = 0.35$
- $9 \times 9 = 81$        $6 \times 6 = 36$
- $0.9 \times 9 = 8.1$      $0.6 \times 6 = 3.6$
- $0.09 \times 9 = 0.81$     $0.06 \times 6 = 0.36$
- $4 \times 9 = 36$        $1 \times 6 = 6$
- $0.4 \times 9 = 3.6$      $0.1 \times 6 = 0.6$
- $0.04 \times 9 = 0.36$     $0.01 \times 6 = 0.06$
- $9 \times 6 = 54$        $5 \times 8 = 40$
- $0.9 \times 6 = 5.4$      $0.5 \times 8 = 4.0$
- $0.09 \times 6 = 0.54$     $0.05 \times 8 = 0.40$

**Lesson 1, Extension: Multiplying decimals using mental methods**

- |                        |                        |
|------------------------|------------------------|
| $37 \times 9 = 333$    | $94 \times 7 = 658$    |
| $3.7 \times 9 = 33.3$  | $9.4 \times 7 = 65.8$  |
| $0.37 \times 9 = 3.33$ | $0.94 \times 7 = 6.58$ |
| $58 \times 7 = 406$    | $47 \times 7 = 329$    |
| $5.8 \times 7 = 40.6$  | $4.7 \times 7 = 32.9$  |
| $0.58 \times 7 = 4.06$ | $0.47 \times 7 = 3.29$ |
| $64 \times 9 = 576$    | $63 \times 6 = 378$    |
| $6.4 \times 9 = 57.6$  | $6.3 \times 6 = 37.8$  |
| $0.64 \times 9 = 5.76$ | $0.63 \times 6 = 3.78$ |
| $83 \times 8 = 664$    | $99 \times 9 = 891$    |
| $8.3 \times 8 = 66.4$  | $9.9 \times 9 = 89.1$  |
| $0.83 \times 8 = 6.64$ | $0.99 \times 9 = 8.91$ |
| $67 \times 5 = 335$    | $39 \times 9 = 351$    |
| $6.7 \times 5 = 33.5$  | $3.9 \times 9 = 35.1$  |
| $0.67 \times 5 = 3.35$ | $0.39 \times 9 = 3.51$ |
| $49 \times 8 = 392$    | $78 \times 6 = 468$    |
| $4.9 \times 8 = 39.2$  | $7.8 \times 6 = 46.8$  |
| $0.49 \times 8 = 3.92$ | $0.78 \times 6 = 4.68$ |

**Lesson 3, Support: Multiplying decimals by a one-digit number using the expanded written method**

- |           |         |
|-----------|---------|
| 1 a 5.6   | e 87.2  |
| b 4.3     | f 98.4  |
| c 25.6    | g 117.5 |
| d 345.4   | h 654.3 |
| 2 a 0.35  | e 35.79 |
| b 0.68    | f 63.28 |
| c 3.45    | g 7.83  |
| d 4.78    | h 45.92 |
| 3 a 37.04 | c 26.91 |
| b 33.65   |         |

**Lesson 4, Extension: Multiplying decimals by a 1-digit number using the formal written method**

Open

**Unit 6, Week 3: Measurement (mass)**

**Lesson 1, Support: Domino grams and kilograms**

Open

**Lesson 3, Support: Mass of parcels**

1

Parcel	A	B	C	D	E	F
Mass (g)	200	330	480	640	890	970
Mass (kg)	0.2	0.33	0.48	0.64	0.89	0.97

- 2 A and F 1170 g 1.17 kg  
 B and E 1220 g 1.22 kg  
 C and D 1120 g 1.12 kg
- 3 B + D = F

**Lesson 3, Extension: Fish figures**

1

Pack	Gross mass (g)	Mass of trout (g)	Mass of packaging (g)
A	530	516	14
B	580	566	14
C	670	642	28
D	720	692	28
E	840	798	42
F	910	868	42

2 0.168 kg

3 2.132 kg

**Lesson 4, Extension: Delivery rounds**

Answers will vary.

**Unit 7, Week 1: Number - Fractions**

**Lesson 1, Extension: What's the question?**

Answers will vary.

**Lesson 2, Support: Dividing pizzas**

- |                  |                  |
|------------------|------------------|
| a $\frac{1}{6}$  | e $\frac{1}{12}$ |
| b $\frac{1}{8}$  | f $\frac{1}{6}$  |
| c $\frac{1}{10}$ | g $\frac{1}{9}$  |
| d $\frac{1}{8}$  | h $\frac{1}{12}$ |

**Lesson 3, Extension: Multiplying fractions rhyme**

Open

**Lesson 4, Support: Eating pizzas**

Answers will vary.

**Unit 7, Week 2: Ratio and proportion**

**Lesson 1, Support: Flowerbeds**

- 1 a 1 out of 4  
 b 1 out of 6  
 c 1 out of 3  
 d 2 out of 3  
 e 1 out of 12
- 2 Daffodils 60  
 White tulips 20  
 Yellow tulips 20  
 Purple tulips 20  
 Irises 40  
 Primroses 80
- 3 a 96 plants      c 8 purple tulips  
 b 24 tulips

**Lesson 2, Support: Stripy scarves**

Open

**Lesson 3, Extension: Music shop ratios**

a Store 1

Pop 320	Hip Hop 160	Reggae 80	Jazz 200	Country 80	Classical 520	Blues 80	Rock 80
---------	-------------	-----------	----------	------------	---------------	----------	---------

b Store 2

Pop 420	Hip Hop 280	Reggae 200	Jazz 280	Country 160	Classical 360	Blues 140	Rock 210
---------	-------------	------------	----------	-------------	---------------	-----------	----------

c

Blues 220	Hip Hop 440	Classical 880
-----------	-------------	---------------

Ratio of Blues : Hip Hop : Classical is 1 : 2 : 4

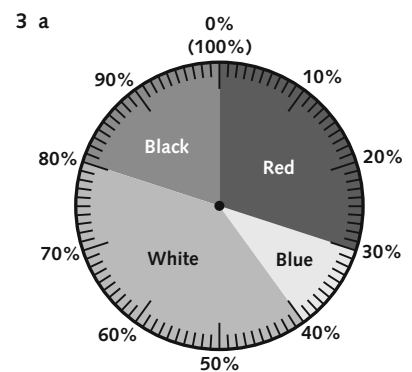
**Lesson 4, Extension: Best value breakfast**

- Orange juice: A, £1.50 per litre  
 (B, approx. £1.71 per litre)
- Melon: A, 70p per kg  
 (B, 80p per kg)
- Crunchy cereal: A, 40p per 100g  
 (B, 50p per 100 g)
- Strawberry jam: A, 0.41p per g  
 (B, 0.43p per g)
- Bread: B, 0.17p per g  
 (A, 0.18p per g)
- Butter: B, 250g costs £1.60  
 (A, 250g costs £2.20)

**Unit 7, Week 3: Statistics**

**Lesson 1, Support: Data in pie charts**

- 1 a 30%      c 20%  
 b 40%      d 10%
- 2 a 10%      c 20%  
 b 40%      d 30%



**Lesson 1, Extension: Driving lessons pie chart**

- 1 a 10%      c 15%  
 b 20%
- 2 a 120      c 90  
 b 30
- 3 120
- 4 600
- 5 May: least number of lessons given in this month

**Lesson 4, Support: Find the mean scores**

Open

**Lesson 4, Extension: 2-digit mean scores**

Open

**Unit 8, Week 1: Number - Multiplication and division**

**Lesson 1, Support: Division HTO ÷ TO using the expanded written method**

- a 35
- b 33
- c 49
- d 35
- e 29

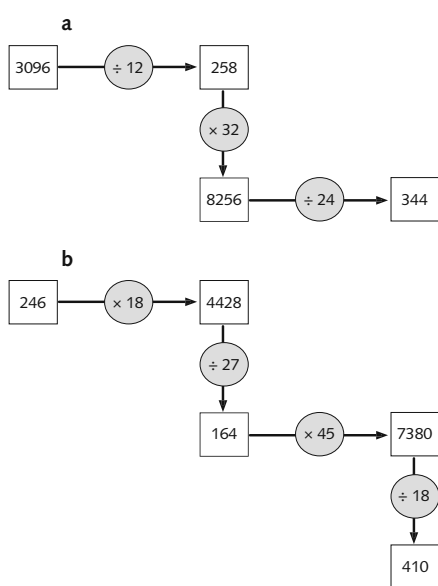
**Lesson 2, Support: Division ThHTO ÷ TO using the expanded written method**

- a 354
- b 437
- c 359
- d 527

**Lesson 2, Extension: Division ThHTO ÷ TO using the expanded written method**

- a 359
- b 278
- c 248
- d 356

**Lesson 4, Extension: Number pathways**



**Unit 8, Week 2: Number - Multiplication and division, incl. Decimals**

**Lesson 1, Support: Dividing decimals using mental methods**

Start 6	60	0.6	60	600	60	0.60	0.06	6	Finish 6
Start 7	700	70	0.7	7	0.07	0.7	0.07	7	Finish 7
Start 3	24	2.4	0.4	4.8	0.6	4.2	0.42	42	Finish 3
Start 9	108	10.8	5.4	0.6	3.6	36	108	9	Finish 9

**Lesson 2, Support: Dividing decimals using the expanded written method of long division**

- a 1.83
- b 7.35
- c 4.08
- d 4.36

**Lesson 2, Extension: Candle problems**

- a £3.66 per tea light
- b £4.62
- c £0.61 or 61p
- d  $51.24 + 274.50 = £325.74$
- e You save £16.08. New price = £48.24
- f You spend £180.54. There are 90 candles altogether.
- g 2 packs of dinner table candles and 1 set of floating candles
- h Answers will vary.

**Lesson 4, Extension: Car troubles**

- 1 £1612.60 per month
- 2 a £1050 per month  
b total cost = £9450
- 3 a £1013.44 per month  
b total cost = £8107.52
- 4 a £2342.00 discount  
b Cost = £7026.00

**Unit 8, Week 3: Measurement (perimeter and area)**

**Lesson 1, Support: Same perimeter**

- 1 a P = 12 cm, A = 5 cm<sup>2</sup>  
b P = 12 cm, A = 8 cm<sup>2</sup>  
c P = 12 cm, A = 6 cm<sup>2</sup>
- 2 Open

**Lesson 2, Extension: Investigating areas of squares**

1, 2

Square	A	B	C	D	E	F
Length of side (cm)	12	8.5	6	4.2	3	2.1
Perimeter (cm)	48	34	24	17	12	8.5
Area (cm <sup>2</sup> )	144		36		9	

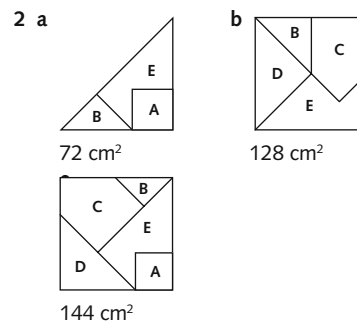
- 3 For squares A, C and E the length of side and perimeter is halved and the area is quartered.
- 4 G Perimeter = 6 cm, Area = 2.25 cm<sup>2</sup>

**Lesson 3, Support: Dot grid areas**

- a 6 cm<sup>2</sup>
- b 3 cm<sup>2</sup>
- c 2 cm<sup>2</sup>
- d 2 cm<sup>2</sup>
- e 4.5 cm<sup>2</sup>
- f 4 cm<sup>2</sup>
- g 5 cm<sup>2</sup>
- h 8 cm<sup>2</sup>
- i 5 cm<sup>2</sup>

**Lesson 3, Extension: Puzzling pieces**

- 1 B 16 cm<sup>2</sup>
- D 32 cm<sup>2</sup>
- E 40 cm<sup>2</sup>
- C 40 cm<sup>2</sup>



**Unit 9, Week 1: Number - Addition and subtraction**

**Lesson 1, Support: Race to 500 000**

Open

**Lesson 2, Extension: Shape values**

- 66 000
- [star] = 9500
- [square] = 20 000
- [circle] = 18 500
- [triangle] = 27 000
- Bottom and side add up to 263 500

**Lesson 3, Support: BODMAS rules!**

- a 455
- b 30
- c 81
- d 72
- e 7
- f 48
- g 27
- h 64
- i 168
- j 255
- k 28
- l 2

**Lesson 4, Extension: Franco's Chairs**

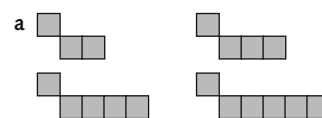
9 Fun chairs and 13 Country Style chairs or 22 Fun chairs and 4 Country style chairs

**Unit 9, Week 2: Algebra**

**Lesson 1, Support: Collecting terms and using brackets**

Open

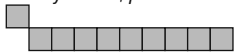
**Lesson 1, Extension: Serpent algebra**



b

Body size, $b$	2	3	4	5	$b$
Number of squares, $s$	3	4	5	6	$b + 1$
Perimeter, $p$	10	12	14	16	$2b + 6$

- c  $s = b + 1$ ;  $p = 2b + 6$   
 d For body size 9,  $p = 24$



e Two-headed serpents

Body size, $b$	2	3	4	5	$b$
Number of squares, $s$	4	5	6	7	$b + 2$
Perimeter, $p$	14	16	18	20	$2b + 10$

f Three-headed serpents

Body size, $b$	2	3	4	5	$b$
Number of squares, $s$	5	6	7	8	$b + 3$
Perimeter, $p$	18	20	22	24	$2b + 14$

g  $p = 4x + 2b + 2$

Lesson 3, Support: Algebra puzzle squares

a  $\blacksquare = 6$ ;  $\bullet = 3$ ;  $\blacktriangle = 2$

$\blacksquare$ $\bullet$ $\bullet$ $\blacksquare$	= 18
$\blacksquare$ $\blacktriangle$ $\bullet$ $\blacktriangle$	= 13
$\blacksquare$ $\blacksquare$ $\blacktriangle$ $\blacksquare$	= 20
$\blacksquare$ $\blacksquare$ $\bullet$ $\blacksquare$	= 21
$\blacksquare$	= 24
$\bullet$	= 17
$\blacktriangle$	= 11
$\blacksquare$	= 20

b  $\blacktriangledown = 2$ ;  $\star = 4$ ;  $\blacklozenge = 6$

$\star$ $\blacklozenge$ $\blacklozenge$ $\star$	= 14
$\blacktriangledown$ $\blacktriangledown$ $\blacktriangledown$ $\blacktriangledown$	= 36
$\star$ $\blacklozenge$ $\star$ $\blacklozenge$	= 14
$\blacktriangledown$ $\blacklozenge$ $\star$ $\blacktriangledown$	= 25
$\blacklozenge$	= 30
$\star$	= 24
$\blacktriangledown$	= 18
$\blacklozenge$	= 25

c  $\times = 2$ ;  $\diamond = 4$ ;  $\blacklozenge = 6$

$\times$ $\diamond$ $\diamond$ $\times$	= 16
$\times$ $\diamond$ $\diamond$ $\times$	= 12
$\times$ $\diamond$ $\diamond$ $\times$	= 18
$\blacklozenge$ $\diamond$ $\diamond$ $\blacklozenge$	= 16
$\times$	= 12
$\diamond$	= 16
$\blacklozenge$	= 20
$\blacklozenge$	= 14

d  $\ast = 8$ ;  $\oplus = 7$ ;  $\blacklozenge = 4$

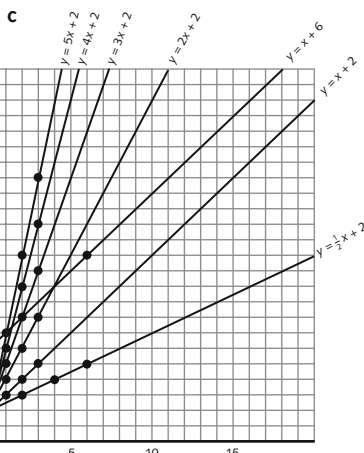
$\ast$ $\oplus$ $\oplus$ $\blacklozenge$	= 26
$\ast$ $\blacklozenge$ $\ast$ $\blacklozenge$	= 24
$\oplus$ $\oplus$ $\oplus$ $\oplus$	= 28
$\oplus$ $\blacklozenge$ $\blacklozenge$ $\ast$	= 23
$\ast$	= 30
$\oplus$	= 22
$\blacklozenge$	= 26
$\blacklozenge$	= 23

Lesson 3, Extension: Gradients

1 a

Line equation		$x = 0$	$x = 1$	$x = 2$	$x = 3$
$y = x + 2$	$y =$	2	3	4	5
$y = 2x + 2$	$y =$	2	4	6	8
$y = 3x + 2$	$y =$	2	5	8	11
$y = 4x + 2$	$y =$	2	6	10	14
$y = 5x + 2$	$y =$	2	7	12	17

- b When  $x = 0$ ,  $y$  is always 2.  
 $y = x + 2$  starts at 2 and goes up in ones.  
 $y = 2x + 2$  starts at 2 and goes up in twos.  
 $y = 3x + 2$  starts at 2 and goes up in threes.  
 $y = 4x + 2$  starts at 2 and goes up in fours.  
 $y = 5x + 2$  starts at 2 and goes up in fives.



- c  
 d As  $m$  increases, the line becomes steeper.  
 e The slope will be less steep when  $m$  is less than 1.

2

Line equation		$x = 0$	$x = 2$	$x = 4$	$x = 6$
$y = \frac{1}{2}x + 2$	$y =$	2	3	4	5

- The slope of the line is less steep.  
 f Answers will vary.  
 g Any line  $y = 2x + c$  will be parallel to  $y = 2x + 2$ .  
 h Plotted lines will vary but should be parallel to  $y = 2x + 2$ .

Unit 9, Week 3: Geometry - Properties of shape

Lesson 2, Support: Hexagon patterns

Open

Lesson 2, Extension: Circle designs

Open

Lesson 3, Support: Patterns in a circle

Open

Lesson 3, Extension: Egg tangrams

Open

Unit 10, Week 1: Number - Multiplication and division, incl. Decimals

Lesson 1, Support: Multiplying decimals by a 2-digit number using the grid method

- a 95.1  
 b 69.35  
 c 68.48  
 d 147.89  
 e 77.43  
 f 333.72  
 g 112.71  
 h 138.04

Lesson 2, Support: Multiplying decimals by a 2-digit number using the expanded written method

- a 50.55  
 b 132.25  
 c 114.75  
 d 116.64  
 e 268.83

Lesson 2, Extension: Multiplying decimals by a 2-digit number using the expanded written method

Open

Lesson 4, Extension: Solving word problems

Answers will vary.

Unit 10, Week 2: Number - Fractions

Lesson 1, Support: Equal fractions

- 1 a  $\frac{6}{8}$   
 $\frac{9}{12}$   
 $\frac{12}{16}$   
 $\frac{15}{20}$   
 b  $\frac{2}{4}$   
 $\frac{3}{6}$   
 $\frac{4}{8}$   
 $\frac{5}{10}$   
 c  $\frac{6}{10}$   
 $\frac{9}{15}$   
 $\frac{12}{20}$   
 $\frac{15}{25}$   
 d  $\frac{4}{6}$   
 $\frac{6}{9}$   
 $\frac{8}{12}$   
 $\frac{10}{15}$   
 2 a  $\frac{8}{10}$   
 $\frac{12}{15}$   
 $\frac{16}{20}$   
 $\frac{20}{25}$   
 b  $\frac{10}{12}$   
 $\frac{15}{18}$   
 $\frac{20}{24}$   
 $\frac{25}{30}$   
 c  $\frac{14}{20}$   
 $\frac{21}{30}$   
 $\frac{28}{40}$   
 $\frac{35}{50}$   
 d  $\frac{8}{14}$   
 $\frac{12}{21}$   
 $\frac{16}{28}$   
 $\frac{20}{35}$

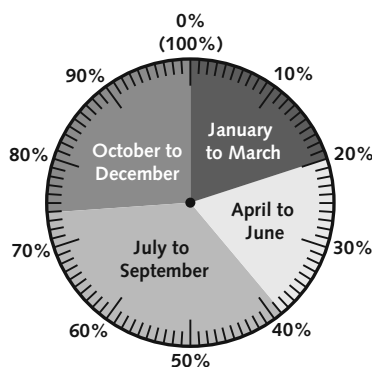
**Lesson 2, Extension: Charity spending**

1

Months	Fraction of Total Amount	Amount Spent
January to March	$\frac{1}{5}$	£11 360
April to June	$\frac{2}{16}$	£7 100
July to September	$\frac{7}{20}$	£19 880
October to December	$\frac{21}{80}$	£14 910

- 2 January to March      £12 496  
 April to June          £11 715  
 July to September      £21 868  
 October to December   £16 401

3



- 4 Street collections:      £7100  
 Charity shops:          £22 720  
 Donations:              £17 750  
 Sponsored events:      £710  
 Fun runs:                £8520  
 Sponsored events represent  $\frac{1}{80}$  of fundraising.

**Lesson 3, Extension: Fraction and decimal multiplication grid**

×	0.6	$\frac{2}{6}$	$\frac{4}{7}$	0.5	$\frac{5}{8}$
$\frac{3}{5}$	$\frac{9}{25}$	$\frac{1}{5}$	$\frac{12}{35}$	$\frac{3}{10}$	$\frac{3}{8}$
$\frac{2}{3}$	$\frac{6}{15}$	$\frac{2}{9}$	$\frac{8}{21}$	$\frac{1}{3}$	$\frac{5}{12}$
$\frac{2}{10}$	$\frac{3}{25}$	$\frac{1}{15}$	$\frac{4}{35}$	$\frac{1}{10}$	$\frac{1}{8}$
0.75	$\frac{9}{20}$	$\frac{1}{4}$	$\frac{3}{7}$	$\frac{3}{8}$	$\frac{15}{32}$

**Lesson 4, Support: Share it out**

- a  $\frac{1}{8}$                       d  $\frac{1}{6}$   
 b  $\frac{3}{16}$                     e  $\frac{3}{10}$   
 c  $\frac{1}{3}$

**Unit 10, Week 3: Measurement (volume and capacity)**

**Lesson 1, Support: Decision tree litres**

Box            1 2 3 4 5 6 7 8  
 Container   E F B G C A D H

**Lesson 2, Extension: Water-flow rates**

Open

**Lesson 3, Support: Volume of cuboids**

1

Cuboid	Length (cm)	Breadth (cm)	Height (cm)	Volume (cm <sup>3</sup> )
A	1	2	1	2
B	2	2	1	4
C	3	2	1	6
D	4	2	1	8
E	5	2	1	10

2

Cuboid	Length (cm)	Breadth (cm)	Height (cm)	Volume (cm <sup>3</sup> )
F	6	2	1	12
G	7	2	1	14

**Lesson 3, Extension: Investigating painted cubes**

1, 2, 3

Cube	Volume (cm <sup>3</sup> )	Number of faces painted blue				Total cubes
		3	2	1	0	
A	27	8	12 (12 × 1)	6 (6 × 1)	1 (13)	27 (3 <sup>3</sup> )
B	64	8	24 (12 × 2)	24 (6 × 4)	8 (23)	64 (4 <sup>3</sup> )
C	125	8	36 (12 × 3)	54 (6 × 9)	27 (33)	125 (5 <sup>3</sup> )
D	216	8	48 (12 × 4)	96 (6 × 16)	64 (43)	216 (6 <sup>3</sup> )

**Unit 11, Week 1: Number - Addition, subtraction, multiplication and division**

**Lesson 1, Extension: BODMAS challenge**

Answers will vary.

**Lesson 2, Support: Make it to twenty**

Answers will vary.

**Lesson 3, Extension: Make the puzzle**

Answers will vary.

**Lesson 4, Support: Another curious question**

100 000 seconds = 27.777 hours  
 Other answers will vary.

**Unit 11, Week 2: Ratio and proportion**

**Lesson 2, Support: Ratio generator**

Open

**Lesson 4, Support: Egg ratios and proportions**

- 1 a Sunday: 120; Monday: 125;  
 Tuesday: 120; Wednesday: 130;  
 Thursday: 140; Friday: 120;  
 Saturday: 130

- b Thursday  
 c Sunday, Tuesday and Friday

- 2 a S : M : L  
 Sunday 2 : 3 : 1  
 Monday 2 : 2 : 1  
 Tuesday 3 : 5 : 4  
 Wednesday 3 : 5 : 5  
 Thursday 1 : 2 : 1  
 Friday 2 : 5 : 5  
 Saturday 3 : 6 : 4

b Proportion of large eggs:

- Sunday =  $\frac{1}{6}$   
 Monday =  $\frac{1}{5}$   
 Tuesday =  $\frac{1}{3}$   
 Wednesday =  $\frac{5}{13}$   
 Thursday =  $\frac{1}{4}$   
 Friday =  $\frac{5}{12}$   
 Saturday =  $\frac{4}{13}$

3 Friday

4 Open

**Lesson 2, Extension: Paper sizes**

- 1 L (A4) = 297 mm,  
 W (A4) = 210 mm (allow ± 2 mm)  
 L (A4) : W (A4) = 1.4 : 1

- 2 L (A5) = 210 mm,  
 W (A5) = 148 mm (allow ± 2 mm)  
 L (A5) : W (A5) = 1.4 : 1

- 3 L (A6) = 148 mm,  
 W (A6) = 105 mm (allow ± 2mm)  
 L (A6) : W (A6) = 1.4 : 1

- 4 a Each ratio is 1.4 : 1.  
 b L (A7) = 105 mm,  
 W (A7) = 74 mm (allow ± 2 mm)

- 5 L (A3) : W (A3) = 1.4 : 1  
 L (A3) = 420 mm,  
 W (A3) = 297 mm (allow ± 2 mm)

**Lesson 3, Extension: Theme park ratios**

- 1 B : D : N : R : E : X = 10 : 7 : 10 : 11 : 10 : 9  
 2 longest : shortest = B : E = 8 : 3  
 3 fastest: slowest = N : E = 3 : 1  
 4 B : D = 1 : 2  
 5 B : D : N : R : E : X = 6 : 8 : 4 : 5 : 8 : 5  
 6 Total number of riders B = 24, D = 64,  
 N = 48, R = 80, E = 192, X = 160  
 B : D : N : R : E : X = 3 : 8 : 6 : 10 : 24 : 20



- 7 E because it takes the most people and is the shortest and slowest.  
(Accept any other reasoned answer.)  
8 Open

**Unit 11, Week 3: Geometry - Position and direction**

**Lesson 1: Extension: Locate the shapes**

- 1 a C (-5, -1), B (-2, 2), D (1, -1), E (-2, -4)  
b C (-5, -1), D (1, -1), F (4, -4), E (-2, -4)  
c C (-5, -1), A (-2, 5), D (1, -1), E (-2, -4)  
d C (-5, -1), B (-2, 2), F (4, -4), E (-2, -4)  
2 A (-2, 5), D (1, -1), C (-5, -1)  
3 F (4, -4), C (-5, -1) or B (-2, 2)  
4 G (4, 5)

**Lesson 2, Support: Points on the run**

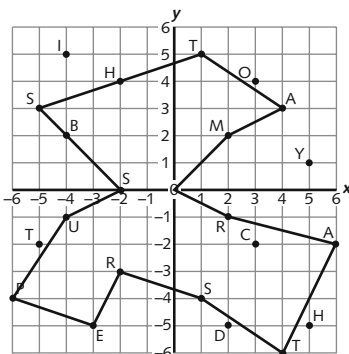
1

Checkpoint	(2, 2)	(4, 3)	(1, 5)	(-2, 4)	(-5, 3)
Code letter	M	A	T	H	S

Checkpoint	(-2, 0)	(-4, -1)	(-6, -4)	(-3, -5)	(-2, -3)
Code letter	S	U	P	E	R

Checkpoint	(1, -4)	(4, -6)	(6, -2)	(2, -1)
Code letter	S	T	A	R

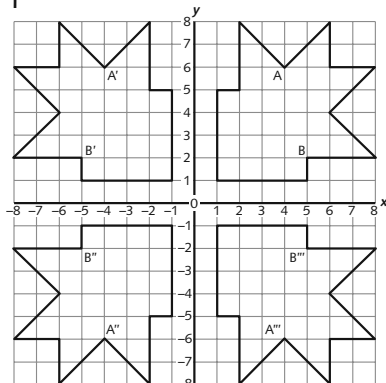
2



3 Open

**Lesson 4, Support: On reflection**

1

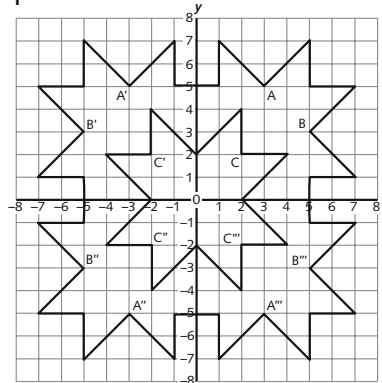


2

First quadrant	Second quadrant	Third quadrant	Fourth quadrant
A (4, 6)	A' (-4, 6)	A'' (-4, -6)	A''' (4, -6)
B (5, 2)	B' (-5, 2)	B'' (-5, -2)	B''' (5, -2)

**Lesson 4, Support: 4-quadrant pattern**

1



2

First quadrant	Second quadrant	Third quadrant	Fourth quadrant
A (3, 5)	A' (-3, 5)	A'' (-3, -5)	A''' (3, -5)
B (5, 3)	B' (-5, 3)	B'' (-5, -3)	B''' (5, -3)
C (2, 2)	C' (-2, 2)	C'' (-2, -2)	C''' (2, -2)

**Unit 12, Week 1: Number - Multiplication and division, incl. Decimals**

**Lesson 1, Support: Using divisibility tests**

- 1 3, 9, 25, 4, 2, 5, 8, 6, 5  
2 Multiples of 5: 625, 370, 680, 1200, 745, 400  
Multiples of 9: 774, 981, 585  
Multiples of 3: 141, 492, 675, 789, 486  
Multiples of 25: 2050, 750, 2475, 6700, 225, 550

**Lesson 2, Support: Review multiplication and division of whole numbers**

- 1 Methods may vary but should be along these lines:  
Mental method  
 $5427 \div 9 = 603$   
 $67 \times 5 = 335$   
 $4998 \times 8 = 39984$   
 $5333 \times 3 = 15999$   
 $232 \times 3 = 696$   
 $9366 \div 3 = 3122$   
 $74 \times 25 = 1850$   
Written method  
 $48 \times 56 = 2688$   
 $3569 \div 6 = 594.83$   
 $768 \times 7 = 5376$   
 $4741 \div 11 = 431$

**Lesson 2, Extension: Review multiplication and division of whole numbers**

Open

**Lesson 3, Extension: Review multiplication and division involving decimal numbers**

Open

**Unit 12, Week 2: Number - Fractions, incl. Decimals and percentages**

**Lesson 1, Support: Sale prices**

Reduced by 10%		
Pencil	72p	
Pen		£1.08
Note pad	£3.15	
Ruler	45p	
Reduced by 20%		
Calendar	£3.36	
Colouring Pencils	£4.08	
Paints	£2.96	
Sticky notes	£1.84	
Reduced by 25%		
Book	£5.10	
Sketch pad	£9.75	
Fountain pen	£5.55	
Personal Organiser	£7.65	

**Lesson 2, Extension: Slide into place**

Open

**Lesson 3, Support: Point to it**

Open

**Lesson 3, Extension: Cover them up**

Open

**Unit 12, Week 3: Statistics**

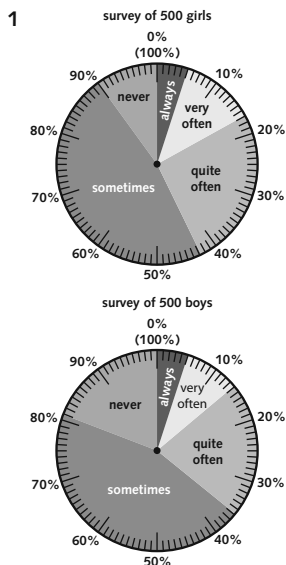
**Lesson 1, Support: Premier pie charts**

1

Preferred pie filling	Percentage of customers	Number of customers
Cajun chicken	25%	25
Santa Fe sausage	11%	11
Vegas vegetable	16%	16
Texan beef	48%	48

- 2 a false                      c false  
b true                         d true

**Lesson 1, Extension: Pie chart survey**



- 2 a true
- b true
- 3 Answers will vary.
- c true
- d false

**Lesson 4, Support: About means**

- 1 2 eggs
- 2 14 kg
- 3 33 m
- 4 £5.30
- 5 4

**Lesson 4, Extension: Investigating means**

- 1 a  $2220 \div 6 = 370$   
 $1 + 4 + 5 = 10$   
 $370 \div 10 = 37$
- b  $3330 \div 6 = 555$   
 $3 + 5 + 7 = 15$   
 $555 \div 15 = 37$
- c  $2886 \div 6 = 481$   
 $2 + 3 + 8 = 13$   
 $481 \div 13 = 37$   
 Answers will vary.
- 3 With 3 different digits the answer is always 37.

# Homework Guide 6

**Unit 1, Week 1: Number - Number and place value**

**Lesson 2: Get in order**

- Challenge 1 Answers will vary.
- Challenge 2 Answers will vary.
- Challenge 3 Answers will vary.

**Lesson 3: Round up or down?**

- Challenge 1

762 000	762 861	763 000
505 000	505 792	506 000
198 000	198 424	199 000
631 000	631 587	632 000
704 000	704 499	705 000
936 000	936 296	937 000
395 000	395 199	396 000
284 000	284 971	285 000

- Challenge 2, 3

3 873 000	3 873 297	3 874 000
7 241 000	7 241 735	7 242 000
8 274 000	8 274 447	8 275 000
1 495 000	1 495 499	1 496 000
7 254 000	7 254 230	7 255 000
7 386 000	7 386 244	7 387 000
9 346 000	9 346 741	9 347 000
4 962 000	4 962 839	4 963 000

- Challenge 3

3 870 000	3 900 000
7 240 000	7 200 000
8 270 000	8 300 000
1 500 000	1 500 000
7 250 000	7 300 000
7 390 000	7 400 000
9 350 000	9 300 000
4 960 000	5 000 000

**Unit 1, Week 2: Number - Addition and subtraction**

**Lesson 1: Rounding and adjusting**

- Challenge 1

a 30 873	d 129 602
b 45 677	e 269 820
c 63 724	f 317 682

  - Challenge 2

a 486 486	e 3 541 295
b 550 250	f 4 642 531
c 845 364	g 44 440 577
d 2 386 281	h 3 083 018

  
  - Challenge 3

a 3 878 352	d 5 771 372
b 4 585 204	e 6 536 346
c 5 371 004	f 7 344 107

**Lesson 3: Decimal buckets**

Answers will vary.

**Unit 1, Week 3: Geometry - Properties of shape**

**Lesson 1: Build the shape**

Challenge 1, 2, 3

Shape	Number of cubes needed
A	4
B	5
C	9
D	11

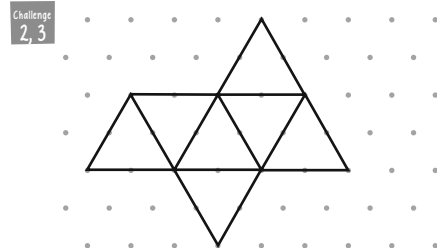
Challenge 2, 3

Shape	A	B	C	D
Number of cubes needed	22	20	18	20

- Challenge 3 57 cubes

**Lesson 4: Nets of 3-D shapes**

- Challenge 1, 2, 3
- a cuboid
  - b square-based pyramid
  - c cube
  - d triangular prism
  - e cuboid
  - f tetrahedron



- Challenge 3 Open

**Unit 2, Week 1: Number - Multiplication and division**

**Lesson 1: Multiplying ThHTO x O**

- Challenge 1
- |       |       |
|-------|-------|
| a 72  | g 90  |
| b 9   | h 9   |
| c 240 | i 6   |
| d 12  | j 5   |
| e 60  | k 110 |
| f 6   | l 6   |

- Challenge 2
- 1, 2 a 18 940
  - b 59 157
  - c 35 682
  - d 30 112

- Challenge 3
- Word problems will vary but the answers to the calculations are:  
 $6387 \times 6 = 38\,322$ ;  $3579 \times 9 = 32\,211$

**Lesson 2: Multiplication TO × TO using the expanded written method**

**Challenge 1** 1 a 18 c 180  
b 1800

2 a 56 c 5600  
b 560

3 a 32 c 3200  
b 320

**Challenge 2** a 2146 c 2664  
b 5382

**Challenge 3** a 

378
18   21
6   3   7

 b 

1960
35   56
5   7   8

c 

648
24   27
8   3   9

**Unit 2, Week 2: Number - Fractions**

**Lesson 2: Find the fraction**

**Challenge 1** Answers will vary.

**Challenge 2** Answers will vary.

**Challenge 3** Answers will vary.

**Lesson 3: Spin and add**

**Challenge 1** Answers will vary.

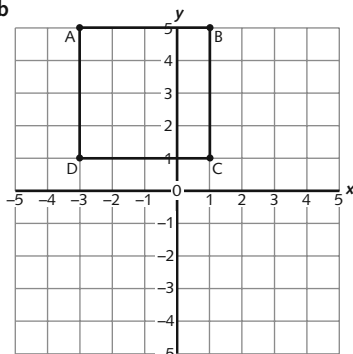
**Challenge 2** Answers will vary.

**Challenge 3** Answers will vary.

**Unit 2, Week 3: Geometry - Position and direction**

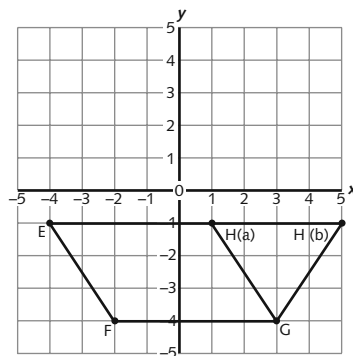
**Lesson 2: The case of the missing coordinates**

**Challenge 1, 2, 3** a, b



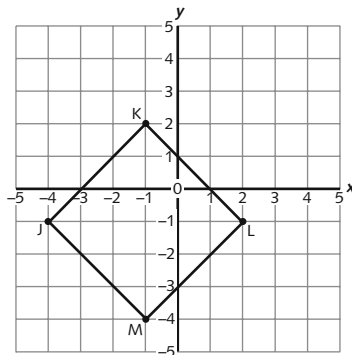
D (-3, 1)

**Challenge 2, 3** 1



2 a H (1, -1) b H (5, -1)

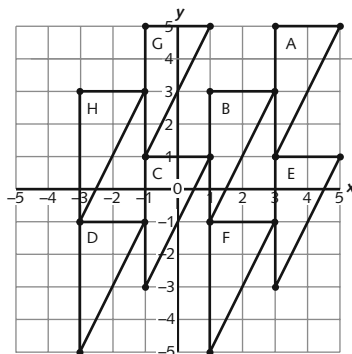
**Challenge 3**



K (-1, 2), M (-1, -4)

**Lesson 3: Translating shapes**

**Challenge 1, 2, 3**



Triangle	A	B	C	D
x-coordinate	3	1	-1	-3
y-coordinate	5	3	1	-1

**Challenge 2, 3**

Triangle	A	E	B	F
x-coordinate	3	3	1	1
y-coordinate	5	1	3	-1

**Challenge 3**

Triangle	A	G	B	H
x-coordinate	3	-1	1	-3
y-coordinate	5	5	3	3

**Unit 3, Week 1: Number - Addition and subtraction**

**Lesson 2: Addition and subtraction practice**

**Challenge 1** Answers will vary.

**Challenge 2** Answers will vary.

**Challenge 3** Answers will vary.

**Lesson 3: Decimal snake**

**Challenge 1** +611.42 +2264.07 -506.29  
-2291.07 +3896.91

**Challenge 2** +11 409.34 +16136.65 -11 643.73  
+22 646.62 -12 024.55

**Challenge 3** -28 438.83 +67 999.53 -57 001  
+45 001.18 -64 109.88

**Unit 3, Week 2: Number - Decimals**

**Lesson 2: Multiply and divide**

**Challenge 1** a  $530 \times 10 = 5300$   
 $530 \times 100 = 53\ 000$   
 $530 \div 10 = 53$   
 $530 \div 100 = 5.30$

b  $870 \times 10 = 8700$   
 $870 \times 100 = 87\ 000$   
 $870 \div 10 = 87$   
 $870 \div 100 = 8.70$

c  $47 \times 10 = 470$   
 $47 \times 100 = 4700$   
 $47 \div 10 = 4.7$   
 $47 \div 100 = 0.47$

d  $94 \times 10 = 940$   
 $94 \times 100 = 9400$   
 $94 \div 10 = 9.4$   
 $94 \div 100 = 0.94$

**Challenge 2** a  $75 \times 100 = 7500$   
 $75 \times 1000 = 75\ 000$   
 $75 \div 100 = 0.75$   
 $75 \div 1000 = 0.075$

b  $91 \times 100 = 9100$   
 $91 \times 1000 = 91\ 000$   
 $91 \div 100 = 0.91$   
 $91 \div 1000 = 0.091$

c  $483 \times 100 = 48\ 300$   
 $483 \times 1000 = 483\ 000$   
 $483 \div 100 = 4.83$   
 $483 \div 1000 = 0.483$

d  $729 \times 100 = 72900$   
 $729 \times 1000 = 729\ 000$   
 $729 \div 100 = 7.29$   
 $729 \div 1000 = 0.729$

**Challenge 3** a  $6251 \times 100 = 625\ 100$   
 $6251 \times 1000 = 6\ 251\ 000$   
 $6251 \div 100 = 62.51$   
 $6251 \div 1000 = 6.251$

b  $27\ 872 \times 100 = 2\ 787\ 200$   
 $27\ 872 \times 1000 = 27\ 872\ 000$   
 $27\ 872 \div 100 = 278.72$   
 $27\ 872 \div 1000 = 27.872$

c  $8495 \times 100 = 849\ 500$   
 $8495 \times 1000 = 8\ 495\ 000$   
 $8495 \div 100 = 84.95$   
 $8495 \div 1000 = 8.495$

d  $41\ 328 \times 100 = 4\ 132\ 800$   
 $41\ 328 \times 1000 = 41\ 328\ 000$   
 $41\ 328 \div 100 = 413.28$   
 $41\ 328 \div 1000 = 41.328$

**Lesson 4: Spin and round**

- Challenge 1 Answers will vary.
- Challenge 2 Answers will vary.
- Challenge 3 Answers will vary.

**Unit 3, Week 3: Measurement (length)**

**Lesson 1: Height of buildings in London**

Building	Height (m)	Height (km)
BT Tower	193	<b>0.193</b>
Canary Wharf Tower	244	<b>0.244</b>
The Pinnacle	288	<b>0.288</b>
St Paul's Cathedral	112	<b>0.112</b>
The Shard	306	<b>0.306</b>
Big Ben	96	<b>0.096</b>

- Challenge 2, 3  
1 a 235 m                      c 253 m  
   b 348 m                      d 445 m
- 2 140 m
- Challenge 3  
a 2.44 m                      c 1.12 m  
b 0.96 m                      d 1.93 m

**Lesson 4: Driving in the Rockies**

Town	miles	× 8	÷ 5	km
Calgary	85	680	136	136
Lake Louise	35	280	56	56
Radium Hot Springs	90	720	144	144

Town	km	÷ 8	× 5	miles
Radium Hot Springs	104	13	65	65
Castle Mountain	110	13.75	68.75	68.75
Banff	136	17	85	85

Challenge 3 207.75 miles, 332.4 km

**Unit 4, Week 1: Number - Multiplication and division**

**Lesson 1: Division ThHTO ÷ O with a remainder**

- Challenge 1  
a 56, 24, 64, 48, 88, 32  
b 35, 49, 63, 42, 35, 77
- Challenge 2  
a 871.2                      c 806.38  
b 1841.75                      d 1256.33
- Challenge 3  
a, b Answers will vary.

**Lesson 3: Dividing ThHTO by 11 and 12 using the formal written method of short division**

- Challenge 1  
1 121, 7700, 132, 5500  
2 144, 1080, 96, 7200
- Challenge 2  
Methods may vary but should be along these lines.  
Mental method  
6688 ÷ 11 = 608  
3696 ÷ 12 = 308  
2266 ÷ 11 = 206  
4872 ÷ 12 = 406  
1210 ÷ 11 = 110  
Written method  
7183 ÷ 11 = 653  
3768 ÷ 12 = 314  
5172 ÷ 12 = 431  
3564 ÷ 11 = 324

- Challenge 3  
a Jess pays £334 per month.  
b Each person pays £429.50.

**Unit 4, Week 2: Number - Fractions, incl. Decimals and percentages**

**Lesson 1: Fraction and decimal pelmanism**

- Challenge 1 Open
- Challenge 2 Open
- Challenge 3 Open

**Lesson 4: Find the percentage**

- Challenge 1  
6400: 50% = 3200                      25% = 1600  
          10% = 640                      40% = 2560  
          30% = 1920                      70% = 4480
- 7300: 10% = 730                      25% = 1825  
          80% = 5840                      20% = 1460  
          60% = 4380                      90% = 6570
- Challenge 2  
8500: 75% = 6375                      15% = 1275  
          85% = 7225                      45% = 3825  
          60% = 5100                      25% = 2125
- 9400: 28% = 2632                      46% = 4324  
          57% = 5358                      14% = 1316  
          71% = 6674                      83% = 7802
- Challenge 3  
6530: 50% = 3265                      75% = 4897.5  
          15% = 979.5                      65% = 4244.5  
          5% = 326.5                      85% = 5550.5
- 7250: 8% = 580                      27% = 1957.5  
          36% = 2610                      84% = 6090  
          52% = 3770                      17% = 1232.5

**Unit 4, Week 3: Measurement (time)**

**Lesson 2: Team times**

	Red Team		
	Runner 1	Runner 2	Runner 3
Start time (p.m.)	2:30	2:30	2:30
Running time	50 min	<b>55 min</b>	62 min
Finishing time (p.m.)	<b>3:20</b>	3:25	<b>3:32</b>

	Blue Team		
	Runner 1	Runner 2	Runner 3
Start time (p.m.)	2:30	2:30	2:30
Running time	<b>58 min</b>	47 min	<b>64 min</b>
Finishing time (p.m.)	3:28	<b>3:17</b>	3:34

- Challenge 2, 3  
1 a Red Team: 2 h 47 min  
   b Blue Team: 2 h 49 min
- 2 65 min
- Challenge 3  
a Runner 1: 48 minutes  
b Runner 3: 65 minutes

**Shared activity**

Blue 2, Red 1, Red 2, Blue 1, Red 3, Blue 3  
17 minutes

**Lesson 3: Calculating the average speed**

Average speed (km/h)
20
18
9
80
60

Average speed (km/h)
60
80
45
60
76
72

Challenge 3 12.5 m/h

**Unit 5, Week 1: Number - Addition, subtraction, multiplication and division incl. Number and place value**

**Lesson 1: Negative spins**

Answers will vary.

**Lesson 3: BODMAS**

Answers will vary.

### Unit 5, Week 2: Number - Algebra

#### Lesson 1: Triangles

Challenge 1 a 12 cm<sup>2</sup>    b 28 cm<sup>2</sup>    c 36 cm<sup>2</sup>

Challenge 2 a 96 cm<sup>2</sup>    b 161 cm<sup>2</sup>    c 171 cm<sup>2</sup>

Challenge 3 a 306 cm<sup>2</sup>    b 250 cm<sup>2</sup>    c 103.5 cm<sup>2</sup>

#### Lesson 2: Number sequences

Challenge 1 a-d Possible answers include:  
2, 4, 6, 8, 10, 12... The rule is add 2.  
2, 4, 8, 16, 32, 64... The rule is double the number.  
e Value of 10th terms will depend on rules chosen.

Challenge 2 a-d Possible answers include:  
3, 7, 11, 15, 19, 23...  
The rule is add 4.  
3, 7, 15, 31, 63, 127...  
The rule is double preceding term and add 1.

e nth terms will depend on rules chosen.  
f Value of 100th terms will depend on rules chosen.

Challenge 3 a-d Possible answers include:  
3, 8, 13, 18, 23, 28...  
The rule is add 5.  
3, 8, 18, 38, 78, 158...  
The rule is double preceding term and add 2.  
e nth terms will depend on rules chosen.  
f Value of 100th terms will depend on rules chosen.

### Unit 5, Week 3: Geometry - Properties of shape

#### Lesson 2: Finding unknown angles

Triangle	Size of angle (°)		
A	90	45	45
B	63	63	54

Triangle	Size of angle (°)		
A	90	45	45
B	63	63	54
C	90	63	27
D	135	27	18

Triangle	Size of angle (°)		
E	90	45	45
F	63	90	27
G	59	45	76
H	90	59	31
I	117	45	18

#### Lesson 4: Angles in patterns of shapes

Challenge 1, 2  $\angle w = 70^\circ$ ,  $\angle x = 70^\circ$ ,  
 $\angle y = 40^\circ$ ,  $\angle z = 180^\circ$

Challenge 2, 3  $90^\circ, 45^\circ, 112.5^\circ, 112.5^\circ$

Challenge 3 a white rhombus:  $50^\circ, 50^\circ, 130^\circ, 130^\circ$   
b grey rhombus:  $65^\circ, 65^\circ, 115^\circ, 115^\circ$

### Unit 6, Week 1: Number - Multiplication and division

#### Lesson 1: Multiplication HTO $\times$ TO using partitioning

Challenge 1 1 a 56    d 5600  
b 560    e 56 000  
c 5600

2 a 54    d 5400  
b 540    e 54 000  
c 5400

3 a 24    d 2400  
b 240    e 24 000  
c 2400

Challenge 2 a 36 477    c 55 332  
b 9916

Challenge 3 a  $365 \times 28 = 10\ 220$   
 $182.50 \times 7 = 1277.50$   
Total =  $\pounds 11\ 497.50$   
b 12 hours = 10 116 km  
106 218 km in a week

#### Lesson 2: Multiplication HTO $\times$ TO using the grid method

Challenge 1 a 2800    f 56 000  
b 40 000    g 16 000  
c 8100    h 30 000  
d 48 000    i 4200  
e 2700

Challenge 2 Answers will vary.

Challenge 3 a  $387 \times 18 = 6966$   
b  $438 \times 17 = 7446$   
c  $637 \times 37 = 23\ 569$

### Unit 6, Week 2: Number - Multiplication and division, incl. Decimals

#### Lesson 1: Multiplying decimals using mental methods

Challenge 1 1 a 9    c 0.09  
b 0.9  
2 a 16    c 0.16  
b 1.6  
3 a 81    c 0.81  
b 8.1  
4 a 49    c 0.49  
b 4.9  
5 a 2.5    c 0.25  
b 2.5

Challenge 2 a 0.8    i 0.4  
b 0.09    j 0.7  
c 0.9    k 28.8  
d 0.07    l 2.16  
e 0.3    m 27.2  
f 0.04    n 57.6  
g 0.08    o 4.02  
h 1

Challenge 3 Answers will vary.

#### Lesson 2: Multiplying decimals by a 1-digit number using the grid method

Challenge 1 x 4:    x 7:  
24    0.21  
0.8    42  
0.28    5.6  
16    0.07

Challenge 2 a 281.75    c 283.68  
b 347.76    d 437.01

Challenge 3 a  $\pounds 11.67$     c  $\pounds 28.08$   
b  $\pounds 638.80$     d  $\pounds 302.40$

### Unit 6, Week 3: Measurement (mass)

#### Lesson 2: Prehistoric masses

Challenge 1, 2, 3

Dinosaur	Mass (kg)	Mass (t)	Mass to nearest tonne (t)
A megalosaurus	900	0.9	1
B stegosaurus	1800	1.8	2
C allosaurus	2000	2	2
D iguanodon	4500	4.5	5
E triceratops	5400	5.4	5
F tyrannosaurus	6400	6.4	6
G diplodocus	10 600	10.6	11

Challenge 2, 3

Mammal	Polar bear	Giraffe	Lion	Moose	Bison
Mass (kg)	475	800	175	386	630
Mass (t)	0.475	0.8	0.175	0.386	0.63

Challenge 3 1 8 giraffes  
2 31.5 t

#### Lesson 3: All about eggs

Challenge 1, 2, 3

	a	b	c	d	e
Mass of egg (g)	55	68	57	64	73
Size of egg	medium	large	medium	large	very large

Challenge 2, 3 a lowest mass 378 g    greatest mass 432 g  
b No answer

Challenge 3 15 eggs

### Unit 7, Week 1: Number - Fractions

#### Lesson 1: Operation fractions

- Challenge 1** Answers will vary.  
**Challenge 2** Answers will vary.  
**Challenge 3** Answers will vary.

#### Lesson 4: Fraction $\times$ fraction

- Challenge 1** Answers will vary.  
**Challenge 2** Answers will vary.  
**Challenge 3** Answers will vary.

### Unit 7, Week 2: Ratio and proportion

#### Lesson 2: Money ratios

- Challenge 1**  
 1 a £750 : £250  
 b £400 : £600  
 c £800 : £200  
 d £700 : £300  
 e £100 : £900  
 2 Answers will vary.
- Challenge 2**  
 1 a £200 : £100  
 b £120 : £180  
 c £250 : £50  
 d £210 : £90  
 e £30 : £270  
 f £220 : £80  
 2 Answers will vary.
- Challenge 3**  
 1 a £500 : £2500  
 b £150 : £2850  
 c £2800 : £200  
 d £450 : £2550  
 e £1700 : £1300  
 f £2200 : £800  
 2 Answers will vary.

#### Lesson 3: Tile ratios

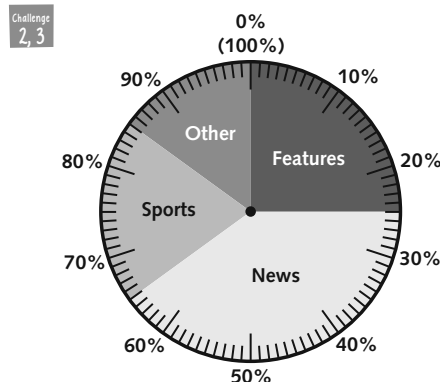
<b>Pack size tiles</b>	32	48	880	2048	1152
<b>Black tiles</b>	12	18	330	768	432

- Challenge 2**  
 a 2 : 1  
 b 2 : 1  
 c 6 out of 18, so 1 : 3  
 d 8 out of 40 are white; 2 out of 40 are black; 30 out of 40 are grey.  
 grey : white : black = 15 : 4 : 1  
 e black: 10; white: 40; grey: 150
- Challenge 3**  
 a 60 grey tiles  
 b 204 black tiles  
 c 370 white tiles

### Unit 7, Week 3: Statistics

#### Lesson 1: Newspaper pie charts

- Challenge 1, 2, 3**  
 a Echo  
 b Metro  
 c Post
- Key:**  
 Features blue  
 News green  
 Sport yellow  
 Other red



- Challenge 3** Sport is the same for all three, but the Metro has more features.

#### Lesson 4: Mainly means

- Challenge 1, 2, 3**  
 1 a 14  
 b 18  
 2 a 7 and 15  
 b 12 and 20
- Challenge 2, 3**  
 a 7, 12 and 20  
 b 7, 15 and 20  
 c 12, 18 and 24  
 d 12, 15 and 24, or 7, 20 and 24  
 e 12, 15 and 18, or 7, 18 and 20  
 f 15, 18 and 24
- Challenge 3** Carla scored 83

### Unit 8, Week 1: Number - Multiplication and division

#### Lesson 1: Division HTO $\div$ TO using the expanded written method

- Challenge 1**  
 1 a 140  
 b 1400  
 2 a 135  
 b 1350  
 3 a 147  
 b 1470
- Challenge 2**  
 a 34  
 b 37  
 c 36  
 d 34
- Challenge 3**  
 a £56 per night  
 b £38 per month

#### Lesson 2: Division ThHTO $\div$ TO using the expanded written method

- Challenge 1**  
 1 a 230  
 b 2300  
 c 23 000
- 2 a 232  
 b 2320  
 c 23 200

- 3 a 90  
 b 900  
 c 9000

- Challenge 2**  
 a 265  
 b 653  
 c 289  
 d 367

- Challenge 3**  
 a  $\pounds 8379 \div 18 = \pounds 465.50$   
 $10\% \times \pounds 465.50 = \pounds 46.55$   
 monthly payment =  $\pounds 512.05$   
 b  $\pounds 9456 \div 16 = \pounds 591$   
 $25\% \times \pounds 591 = \pounds 147.75$   
 monthly payment =  $\pounds 738.75$   
 total cost =  $\pounds 738.75 \times 16 = \pounds 11\,820$

### Unit 8, Week 2: Number - Multiplication and division, incl. Decimals

#### Lesson 2: Dividing decimals using the expanded written method of long division

- Challenge 1**  
 a 100  
 b 10  
 c 100  
 d 7650  
 e 0.36  
 f 1  
 g 0.2  
 h 100  
 i 0.06
- Challenge 2**  
 a 4.97  
 b 4.18

- Challenge 3**  $78.12 \div 18$

#### Lesson 4: Solving word problems

	5	34	102	453	40	6732	1
$\div 10$	0.5	3.4	10.2	45.3	4	673.2	0.1
$\div 100$	0.05	0.34	1.02	4.53	0.4	67.32	0.01

- Challenge 2**  
 a 19 suits can be made.  
 b £0.16 or 16p  
 c £3.68 per metre  
 d £2.72  
 e A tub of 36 buttons at 28p each costs 5p more per button.  
 f  $\pounds 611.20 + \pounds 13.60 = \pounds 631.01$
- Challenge 3** Answers will vary.

### Unit 8, Week 3: Measurement (perimeter and area)

#### Lesson 2: Surface area of cuboids

- Challenge 1, 2, 3**  
 A 16 cm<sup>2</sup>  
 B 24 cm<sup>2</sup>
- Challenge 2, 3**  
 1 C 28 cm<sup>2</sup>  
 D 40 cm<sup>2</sup>  
 E 52 cm<sup>2</sup>  
 2 F 64 cm<sup>2</sup>
- Challenge 3** Open

**Lesson 3: Pinboard areas**

Challenge 1, 2, 3  
 1 cm<sup>2</sup> 2 cm<sup>2</sup> 2 cm<sup>2</sup> 2.5 cm<sup>2</sup>  
 3 cm<sup>2</sup> 3 cm<sup>2</sup> 2 cm<sup>2</sup> 2 cm<sup>2</sup>

Challenge 3  
 Open

**Unit 9, Week 1: Number - Addition and subtraction**

**Lesson 1: Mental subtraction**

Challenge 1  
 Open

Challenge 2  
 Open

Challenge 3  
 Open

**Lesson 3: Add in brackets**

Challenge 1  
 Answers will vary.

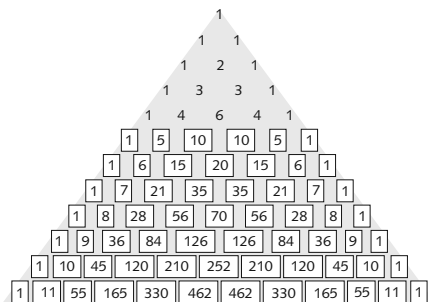
Challenge 2  
 Answers will vary.

Challenge 3  
 Answers will vary.

**Unit 9, Week 2: Algebra**

**Lesson 1: Pascal's triangle**

Challenge 1, 2, 3  
 1 The triangle is symmetrical and each new row has one more number in it. Each number is the sum of the two numbers above it. (The edges are all '1's, because they only have one number above them.)  
 Remaining rows should be completed:



- 2 The first diagonals are the counting numbers, 1, 2, 3, 4, 5...
- 3 The second diagonals are the triangular numbers, 1, 3, 6, 10, 15

Challenge 2, 3  
 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048  
 The number doubles each time. (The numbers are powers of 2.)

Challenge 3  
 In the first 15 rows there is a symmetrical pattern of triangles with bases of 1, 3 and 7 even numbers. Row 16 will be the start of a bigger triangle with a base of 15 even numbers. The pattern is 'double the previous base number and add one'. Row 32 will be the start of a triangle with a base of 31 numbers.

**Lesson 2: Brick walls**

Challenge 1  
 $x = 4$        $y = \frac{12}{11}$  or  $1\frac{1}{11}$   
 $x = 13$  or  $6\frac{1}{7}$

Challenge 3  
 $y = 8$        $x = 4$

**Unit 9, Week 3: Geometry - Properties of shape**

**Lesson 1: Calculating the radius and the diameter**

Challenge 1, 2, 3  
 1, 2

Circle	A	B	C
Diameter (cm)	3	2	4
Radius (cm)	1.5	1	2

Challenge 2, 3  
 a 5 cm      c 12.8 cm  
 b 9 cm      d 7.4 cm

Challenge 3  
 Open

**Lesson 4: Lines and angles**

Challenge 1, 2, 3  
 1, 2 A midpoint line = 3.9 cm  
 parallel side = 7.8 cm  
 B midpoint line = 2.1 cm  
 parallel side = 4.2 cm

Challenge 2, 3  
 PS = SR = TU  
 PT = TQ = SU  
 QU = UR = TS  
 $\angle QPR = \angle QTU = \angle TUS = \angle USR$   
 $\angle QRP = \angle QUT = \angle UTS = \angle TSP$   
 $\angle PQR = \angle PTS = \angle TSU = \angle SUR$

Challenge 3  
 $\angle PQR$  Perimeter = 24 cm  
 $\angle STU$  Perimeter = 12 cm  
 The outer triangle is twice the perimeter of the inner triangle

**Unit 10, Week 1: Number - Multiplication and division, incl. Decimals**

**Lesson 2: Multiplying decimals by a 2-digit number using the expanded written method**

Challenge 1  
 x 6:      x 7:  
 54      0.56  
 1.2      42  
 0.42      5.6  
 2.4      0.49  
 5.4      4.2

Challenge 2  
 a 94.64      c 108  
 b 166.56      d 199.06

Challenge 3  
 a £132.26  
 b £298.30  
 c £121.68  
 d £474.32

**Lesson 4: Solving word problems**

Challenge 1  
 a 0.48      e 26.8  
 b 6.45      f 10  
 c 2.10      g 12.99  
 d 2.5      h 0.1

Challenge 2  
 a £352.08  
 b  $£77.76 + £174.34 = £252.10$   
 c one ball of wool = £0.73; 54 balls of wool = £39.42  
 d £31.83  
 e 37 rolls

Challenge 3  
 Problems will vary, but answers are:  
 a £35.92  
 b £178.74

**Unit 10, Week 2: Number - Fractions**

**Lesson 2: Spin a fraction**

Challenge 1  
 Answers will vary.

Challenge 2  
 Answers will vary.

Challenge 3  
 Answers will vary.

**Lesson 3: Multiplication grid**

Challenge 1

x	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{1}{5}$	$\frac{2}{6}$	$\frac{1}{8}$
$\frac{2}{5}$	$\frac{2}{10}$	$\frac{4}{15}$	$\frac{2}{25}$	$\frac{4}{30}$	$\frac{2}{40}$
$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{12}$	$\frac{1}{20}$	$\frac{2}{24}$	$\frac{1}{32}$
$\frac{1}{6}$	$\frac{1}{12}$	$\frac{2}{18}$	$\frac{1}{30}$	$\frac{2}{36}$	$\frac{1}{48}$
$\frac{2}{10}$	$\frac{2}{20}$	$\frac{4}{30}$	$\frac{2}{50}$	$\frac{4}{60}$	$\frac{2}{80}$
$\frac{1}{7}$	$\frac{1}{14}$	$\frac{2}{21}$	$\frac{1}{35}$	$\frac{2}{42}$	$\frac{1}{56}$

Challenge 2

x	$\frac{3}{4}$	$\frac{3}{8}$	$\frac{1}{9}$	$\frac{4}{10}$	$\frac{4}{7}$
$\frac{3}{5}$	$\frac{9}{20}$	$\frac{9}{40}$	$\frac{3}{45}$	$\frac{12}{50}$	$\frac{12}{35}$
$\frac{5}{6}$	$\frac{15}{24}$	$\frac{15}{48}$	$\frac{5}{54}$	$\frac{20}{60}$	$\frac{20}{42}$
$\frac{2}{12}$	$\frac{6}{48}$	$\frac{6}{96}$	$\frac{2}{108}$	$\frac{8}{120}$	$\frac{8}{84}$
$\frac{6}{8}$	$\frac{18}{32}$	$\frac{18}{64}$	$\frac{6}{72}$	$\frac{24}{80}$	$\frac{24}{56}$
$\frac{2}{10}$	$\frac{6}{40}$	$\frac{6}{80}$	$\frac{2}{90}$	$\frac{8}{100}$	$\frac{8}{70}$

Challenge 3

x	$1\frac{1}{2}$	$\frac{3}{8}$	$2\frac{2}{3}$	$\frac{4}{5}$	$2\frac{3}{4}$
$\frac{6}{10}$	$\frac{18}{20}$	$\frac{18}{80}$	$1\frac{18}{30}$	$\frac{24}{50}$	$1\frac{13}{20}$
$2\frac{1}{7}$	$3\frac{3}{14}$	$\frac{45}{56}$	$5\frac{15}{21}$	$1\frac{25}{35}$	$5\frac{25}{28}$
$\frac{4}{6}$	1	$\frac{12}{48}$	$1\frac{14}{18}$	$\frac{16}{30}$	$1\frac{5}{6}$
$1\frac{5}{8}$	$2\frac{7}{16}$	$\frac{39}{64}$	$4\frac{8}{24}$	$1\frac{12}{20}$	$4\frac{15}{32}$
$\frac{7}{12}$	$\frac{21}{24}$	$\frac{21}{96}$	$1\frac{20}{36}$	$\frac{28}{60}$	$1\frac{29}{48}$

**Unit 10, Week 3: Measurement (volume and capacity)**

**Lesson 1: Converting capacities**

Challenge 1, 2, 3

Container	Capacity (ml)	Capacity (l)
A	100	0.1
B	1400	1.4
C	250	0.25
D	500	0.5

Challenge 2, 3

Amount in jug E	Containers used
0.35 l	A + C
1.9 l	B + D
2.15 l	B + C + D
0.85 l	A + C + D

Challenge 3

- a 3.8 l                      c 2.1 l  
b 5.2 l                      d 1.75 l

**Lesson 4: Calculating volume**

Challenge 1, 2, 3

Cuboid	Length (cm)	Breadth (cm)	Height (cm)	Volume (cm <sup>3</sup> )
A	8	4	5	160
B	6	3	10	180

Challenge 2, 3

	l	b	h	V
A	12 mm	6 mm	5 mm	360 mm <sup>3</sup>
B	6 cm	12 cm	3 cm	216 cm <sup>3</sup>
C	7 m	6 m	4 m	168 m <sup>3</sup>

Challenge 3

Open

**Unit 12, Week 1: Number - Addition, subtraction, multiplication and division**

**Lesson 2: How many numbers?**

Challenge 1

Answers will vary.

Challenge 2

Answers will vary.

Challenge 3

Answers will vary.

**Lesson 4: Blinking maths**

Challenge 1

Answers will vary.

Challenge 2

Answers will vary.

Challenge 3

Answers will vary.

**Unit 12, Week 2: Ratio and proportion**

**Lesson 2: Map ratios**

Challenge 1, 2, 3

- 1 100 000 cm = 1 km  
2 a 5 km                      c 23 km  
   b 12 km  
3 a 8 cm                      b 14 cm

Challenge 2, 3

- a 1 km                      c 5.5 cm  
b 3.5 cm

Challenge 3

- 1 220 cm  
2 60 km on Day 1, 50 km on Day 2

**Lesson 3: Café ratios**

Challenge 1, 2, 3

- 1 S : M : L = 2 : 3 : 4  
2 S : M : L = 6 : 7 : 8  
3 Large

Challenge 2, 3

- a L : V : C : F = 5 : 6 : 5 : 4  
b 40 cakes

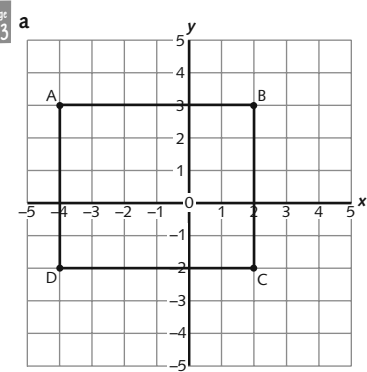
Challenge 3

L = 15; V = 18; C = 15; F = 12

**Unit 12, Week 3: Geometry - Position and direction**

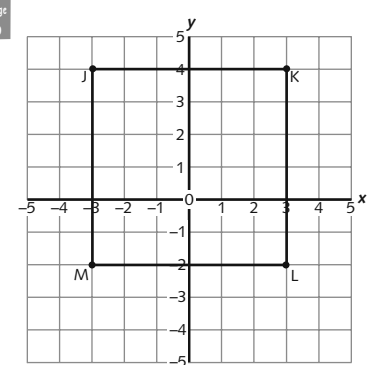
**Lesson 2: Missing coordinates**

Challenge 1, 2, 3



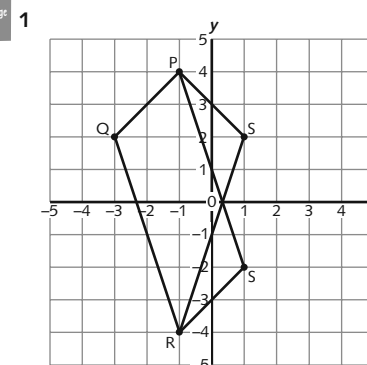
b D (-4, -2)

Challenge 2, 3



K (3, 4), M (-3, -2)

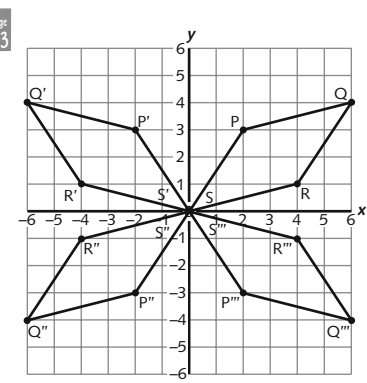
Challenge 3



- 2 a S (1, -2)                      b S (1, 2)

**Lesson 4: 4-quadrant reflection**

Challenge 1, 2, 3



Challenge 2, 3

First quadrant	Second quadrant	Third quadrant	Fourth quadrant
P (2, 3)	P' (-2, 3)	P'' (-2, -3)	P''' (2, -3)
Q (6, 4)	Q' (-6, 4)	Q'' (-6, -4)	Q''' (6, -4)
R (4, 1)	R' (-4, 1)	R'' (-4, -1)	R''' (4, -1)

Challenge 3

The point S, in the shape PQRS, is located at the origin (0, 0) and therefore it is not under reflection into any quadrant.

**Unit 12, Week 1: Number - Multiplication and division, incl. Decimals**

**Lesson 1: Using divisibility tests**

Challenge 1

- a Answers will vary but should show four even numbers between 570 and 630.  
b Answers will vary but should show four multiples of 5 between 300 and 400.  
c Answers will vary but should show four three-digit numbers where the sum of the digits is 9.  
d Answers will vary but should show four multiples of 25 between 600 and 3000.

Challenge 2

- a 4254; 3750; 516; 6306  
b 472; 4256; 2088; 680; 2680

Challenge 3

- a 3.75; 5.25; 7.00; 7.50, 1.5, 3.5  
b 3.78; 4.32; 7.11; 4.86; 2.43, 9.99

**Lesson 2: Review multiplication and division of whole numbers**

Challenge 1

Start 3 18 180 45 135 1.35 2.7 13.5 135 45 9 Finish

Challenge 2

- 1, 2 Methods may vary but should be along these lines:  
Mental method  
2333 × 3 = 6999  
46 × 50 = 2300  
1628 ÷ 4 = 407  
6024 ÷ 12 = 502  
Written method  
7639 × 7 = 53 473  
67 × 42 = 2814  
7383 ÷ 36 = 205.08  
6372 ÷ 8 = 796.5

Challenge 3

Period of time	1 day	1 week	1 fortnight	Month of October	One year
Distance run	26 km	182 km	364 km	806 km	9490 km

**Unit 12, Week 2: Number - Fractions, incl. Decimals and percentages**

**Lesson 1: Going down**

Challenge 1

- Monday £54  
Tuesday £48.60  
Wednesday £43.74



**Challenge 2**  
 Monday £600  
 Tuesday £480  
 Wednesday £384

**Challenge 3**  
 Monday £900  
 Tuesday £675  
 Wednesday £506.25

Jacket: £60 - £43.74 = £16.26  
 Laptop: £750 - £384 = £366  
 TV: £1200 - £505.25 = £693.75

**Lesson 3: Fraction to decimal**

**Challenge 1** Answers will vary.

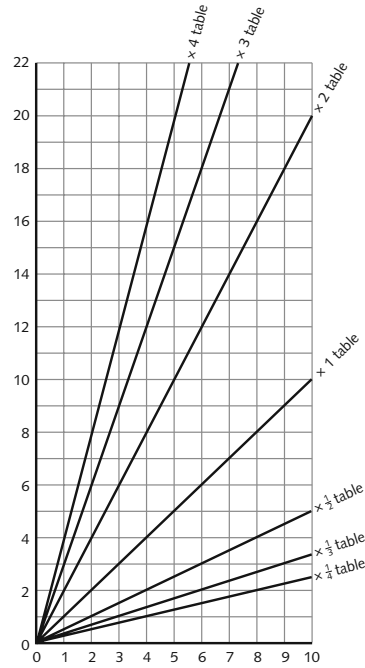
**Challenge 2** Answers will vary.

**Challenge 3** Answers will vary.

**Unit 12, Week 3: Statistics**

**Lesson 2: Multiplication line graphs**

**Challenge 1, 2, 3** Graphs of multiplication tables



**Challenge 2, 3**

	$\frac{1}{2}$ times table	$\frac{1}{4}$ times table
0	(0, 0)	(0, 0)
1	(1, $\frac{1}{2}$ )	(1, $\frac{1}{4}$ )
2	(2, 1)	(2, $\frac{1}{2}$ )
3	(3, $1\frac{1}{2}$ )	(3, $\frac{3}{4}$ )
4	(4, 2)	(4, 1)

**Challenge 3**  $\frac{1}{3}$  times table

**Lesson 4: Ways with means**

**Challenge 1, 2, 3** Open

**Challenge 2, 3** Open