PEARSON

Math Makes Sense 6

Practice and Homework Book

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PEARSON

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PEARSON

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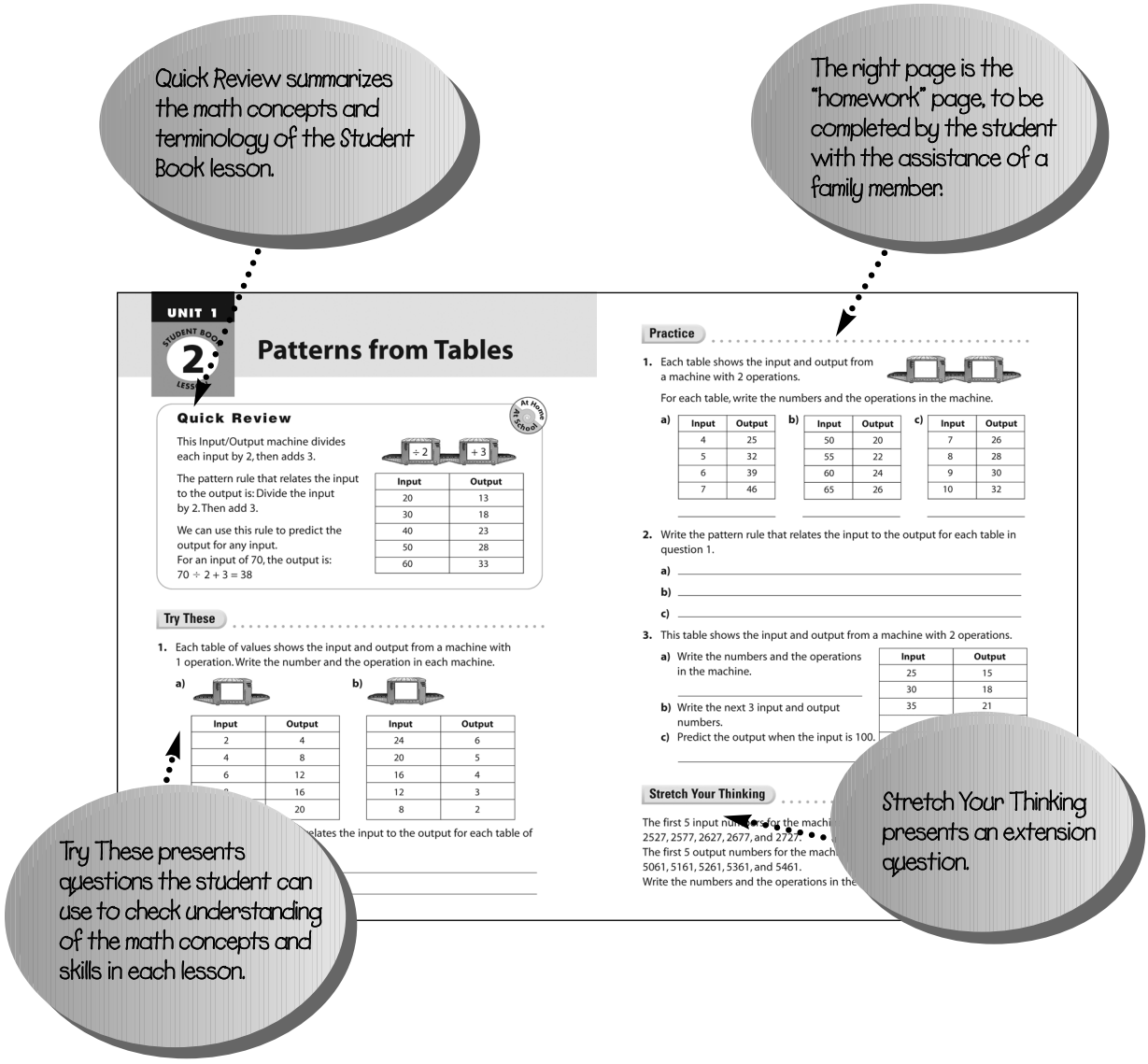
To the Teacher

This Practice and Homework Book provides reinforcement of the concepts and skills explored in the *Pearson Math Makes Sense 6* program.

There are two sections in the book. The first section follows the sequence of *Math Makes Sense 6 Student Book*. It is intended for use throughout the year as you teach the program. A two-page spread supports the content of each core lesson in the Student Book.

In each Lesson:



Math at Home

The second section of the book, on pages 113 to 124, consists of 3 pull-out **Math at Home** magazines. These fun pages contain intriguing activities, puzzles, rhymes, and games to encourage home involvement. The perforated design lets you remove, fold, and send home this eight-page magazine after the student has completed units 3, 6, and 8.

To the Family

This book will help your child practise the math concepts and skills that have been explored in the classroom. As you assist your child to complete each page, you have an opportunity to become involved in your child's mathematical learning.

The left page of each lesson contains a summary of the main concepts and terminology of the lesson. Use this page with your child to review the work done in class. The right page contains practice.

Here are some ways you can help:

- With your child, read over the Quick Review. Encourage your child to talk about the content and explain it to you in his or her own words.
- Read the instructions with (or for) your child to ensure your child understands what to do.
- Encourage your child to explain his or her thinking.
- Some of the pages require specific materials. You may wish to gather items such as a centimetre ruler, index cards, a measuring tape, scissors, cubes numbered from 1 to 6, and paper clips.

Many of the Practice sections contain games that will also improve your child's math skills. You may have other ideas for activities your child can share with the rest of the class.

The **Math at Home** pull-out pages 113 to 124 provide more fun activities.

UNIT 1

STUDENT BOOK 1 LESSON

Input/Output Machines

Quick Review

At Home At School

This is an **Input/Output machine**.
It can be used to make a growing pattern.

Each input is multiplied by 9 to get the output.
If you input 1, the output is 9.
If you input 2, the output is 18.

Input	Output
1	9
2	18
3	27
4	36
5	45

The pattern rule for the output is:

Start at 9. Add 9 each time.

Try These

1. Complete the table of values for each Input/Output machine.

a)

Input	Output
17	
16	
15	
14	
13	
12	
11	

b)

Input	Output
40	
36	
32	
28	
24	
20	
16	

2. Look at the tables of values in question 1. Write the pattern rule for each group of terms.

a) the output numbers in part a) _____

b) the input numbers in part b) _____

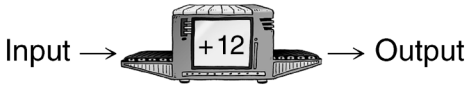
Practice

1. Complete the table of values for each Input/Output machine.

a)

Input	Output
93	
90	
87	
84	
81	

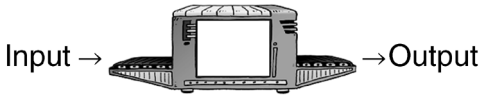
b)



Input	Output
305	
310	
315	
320	
325	

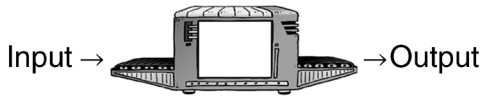
2. Look at the tables of values. Write the number and the operation in each machine.

a)



Input	Output
840	42
800	40
760	38
720	36
680	34

b)



Input	Output
11	143
20	260
29	377
38	494
47	611

Stretch Your Thinking

The table of values shows the Input/Output from a machine.

Input	Output
3456	1152
3531	1177
3606	1202
3681	1227
3756	1252

a) Write the number and operation for the machine. _____

b) Write the pattern rule for the input numbers.

_____

c) Write the pattern rule for the output numbers. _____

UNIT 1

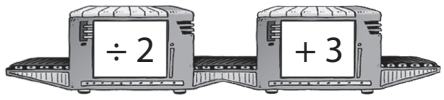
STUDENT BOOK 2 LESSON

Patterns from Tables

Quick Review

At Home At School

This Input/Output machine divides each input by 2, then adds 3.



The pattern rule that relates the input to the output is: Divide the input by 2. Then add 3.

We can use this rule to predict the output for any input.
For an input of 70, the output is:
$70 \div 2 + 3 = 38$

Input	Output
20	13
30	18
40	23
50	28
60	33

Try These

1. Each table of values shows the input and output from a machine with 1 operation. Write the number and the operation in each machine.

a)

Input	Output
2	4
4	8
6	12
8	16
10	20

b)

Input	Output
24	6
20	5
16	4
12	3
8	2

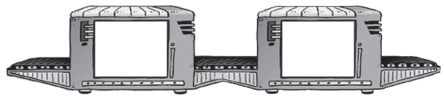
2. Write the pattern rule that relates the input to the output for each table of values in question 1.

a) _____

b) _____

Practice

1. Each table shows the input and output from a machine with 2 operations.



For each table, write the numbers and the operations in the machine.

a)

Input	Output
4	25
5	32
6	39
7	46

_____

b)

Input	Output
50	20
55	22
60	24
65	26

_____

c)

Input	Output
7	26
8	28
9	30
10	32

_____

2. Write the pattern rule that relates the input to the output for each table in question 1.

a) _____

b) _____

c) _____

3. This table shows the input and output from a machine with 2 operations.

Input	Output
25	15
30	18
35	21

a) Write the numbers and the operations in the machine.

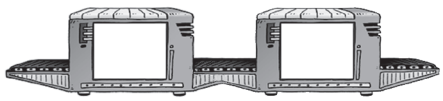
_____

b) Write the next 3 input and output numbers.

c) Predict the output when the input is 100.

_____

Stretch Your Thinking



The first 5 input numbers for the machine are:
2527, 2577, 2627, 2677, and 2727.
The first 5 output numbers for the machine are:
5061, 5161, 5261, 5361, and 5461.
Write the numbers and the operations in the machine.

UNIT 1

STUDENT BOOK 4 LESSON

Using Variables to Describe Patterns

Quick Review

At Home At School

The pattern rule for the output is:
Start at 5. Add 2 each time.
This suggests the input numbers are multiplied by 2.

Multiply input 3 by 2: $3 \times 2 = 6$
To get output 9, add 3.
The pattern rule that relates the input to the output is: Multiply by 2. Then add 3.

We can use a variable in an expression to represent this rule.
Let the letter n represent any input number.
Then, the expression $2n + 3$ relates the input to the output.

Input	Output
1	5
2	7
3	9
4	11
5	13

Input	Output
1	$2 \times 1 + 3 = 5$
2	$2 \times 2 + 3 = 7$
3	$2 \times 3 + 3 = 9$
4	$2 \times 4 + 3 = 11$
5	$2 \times 5 + 3 = 13$
⋮	⋮
n	$2 \times n + 3$

Try These

1. Complete each table of values, then write an expression that relates the input to the output.

a)

Input	Output
1	3
2	8
3	13
4	18
5	23
6	
7	
8	
9	

b)

Input	Output
1	9
2	14
3	19
4	24
5	29
6	
7	

c)

Input	Output
0	4
1	10
2	16
3	22
4	28
5	

Practice

1. Here is a pattern of triangles.

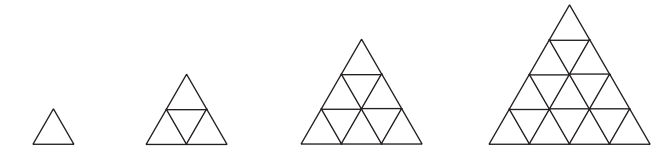


Figure 1 Figure 2 Figure 3 Figure 4

a) Complete the table.

b) Write the pattern rule.

_____

c) Write an expression for the pattern.

_____

d) Find the number of triangles in the 8th figure.

_____

Figure	Number of Triangles
1	
2	
3	
4	

2. For each table of values, write an expression to represent the pattern.

a)

Input	Output
1	1
2	5
3	9
4	13

_____

b)

Input	Output
2	4
3	9
4	14
5	19

_____

Stretch Your Thinking

a) Use the expression $7n + 10$ to complete the table.

b) Write and solve a story problem that matches the pattern.

Number	Amount ($)
0	
1	
2	
3	
4	

_____

_____

_____

UNIT 1

STUDENT BOOK 5 LESSON

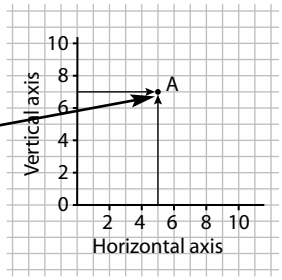
Plotting Points on a Coordinate Grid

At Home At School

Quick Review

➤ We use an **ordered pair** to describe the **coordinates** of a point on a grid.

The coordinates of point A are (5, 7).



The **origin** is the point where the horizontal and vertical axes meet.

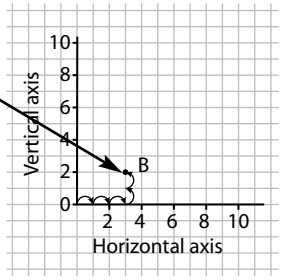
In an ordered pair:

- The first number tells the horizontal distance from the origin.
- The second number tells the vertical distance from the origin.

➤ The coordinates of point B are (3, 2).

To **plot** point B:

Start at 0, move 3 squares right, then move 2 squares up.



Try These

1. a) Name the letter on the grid represented by each ordered pair.

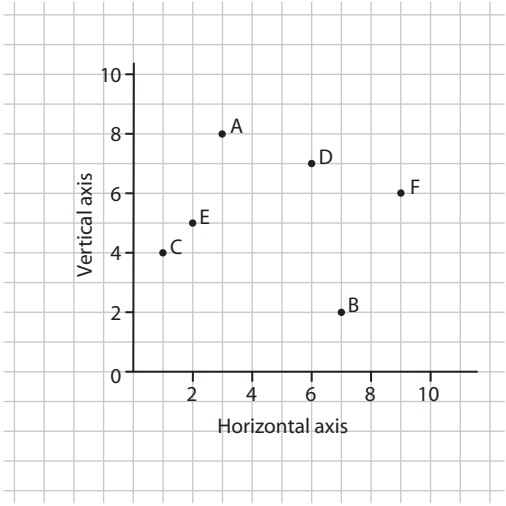
(2, 5) ____ (6, 7) ____ (1, 4) ____

(9, 6) ____ (7, 2) ____ (3, 8) ____

b) Plot each point on the grid.

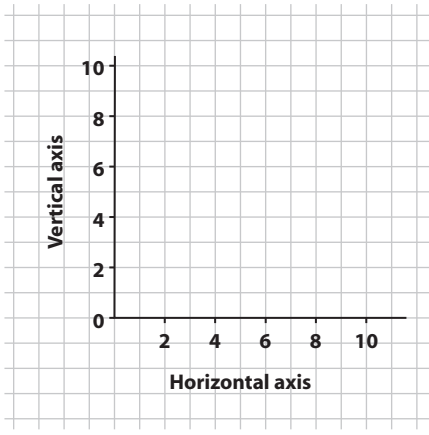
G(5, 4), H(10, 10), I(0, 9),

J(0, 2), K(8, 1), L(10, 4)



Practice

1. Plot each set of ordered pairs on the coordinate grid.
Join the points in order.
Join the last point to the first point.
Name each polygon you have drawn.



A: (8, 6), (6, 6), (6, 8), (8, 8)

_____

B: (0, 3), (4, 0), (6, 0), (2, 3)

_____

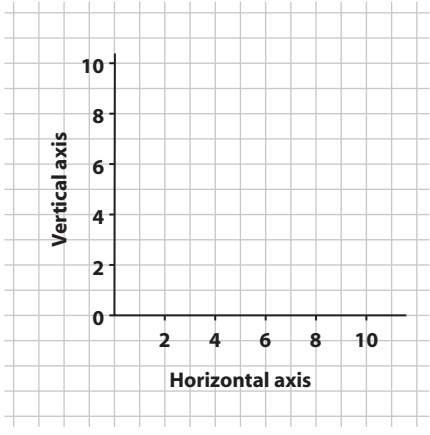
C: (1, 6), (1, 10), (4, 10), (4, 6)

_____

D: (7, 1), (6, 3), (8, 5), (10, 3), (9, 1)

_____

2. Plot 6 points on the grid.
Label the points A to F.
Record the ordered pairs.



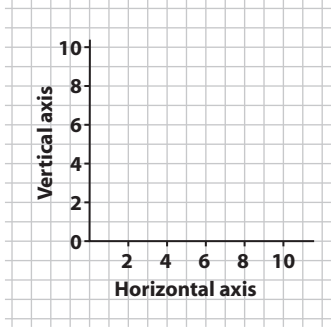
A: _____ B: _____

C: _____ D: _____

E: _____ F: _____

Stretch Your Thinking

(2, 5) and (7, 5) are 2 vertices of a parallelogram with area 10 square units.
Plot the points for the 2 given vertices.
What are the coordinates of the other vertices?
Give as many answers as you can.



_____

_____

_____

_____

UNIT 1

STUDENT BOOK 6 LESSON

Drawing the Graph of a Pattern

Quick Review

At Home At School

Here are some ways to represent a pattern.

➤ Model the pattern on grid paper.

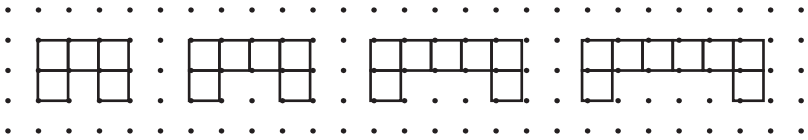
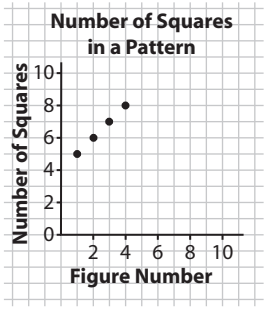


Figure 1 Figure 2 Figure 3 Figure 4

➤ Make a table.

Figure Number	Number of Squares	Ordered Pair
1	5	(1, 5)
2	6	(2, 6)
3	7	(3, 7)
4	8	(4, 8)

➤ Draw a graph.



Try These

1. Henry made this pattern.

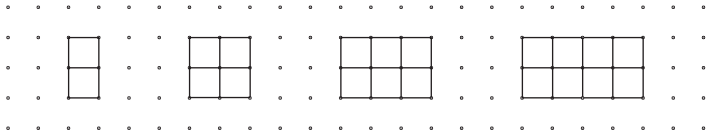
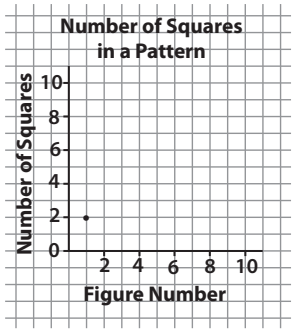


Figure 1 Figure 2 Figure 3 Figure 4

a) Complete the table.

Figure Number	Number of Squares	Ordered Pair
1	2	(1, 2)

b) Graph the pattern



Practice

1. a) Describe the relationship shown in the table.

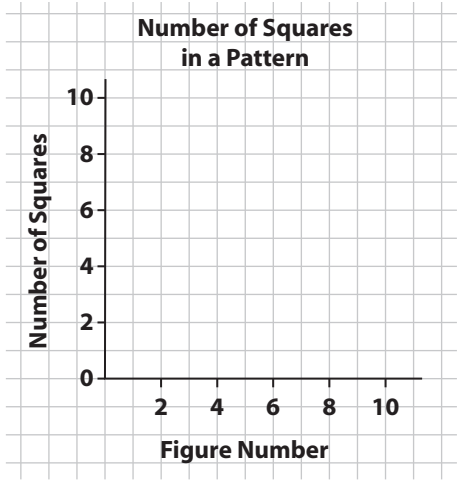
Figure Number	1	2	3	4	5
Number of Squares	1	3	5	7	9

_____

_____

b) Draw squares on the grid to model the pattern.

c) Graph the pattern.



d) How many squares are needed for Figure 10?

_____

e) Which figure has 29 squares?

_____

f) Which figure has 51 squares?

_____

2. Draw a pattern to model the data in the table.

Figure Number	1	2	3	4
Number of Triangles	1	2	4	8

Stretch Your Thinking

Use the table in question 2.

How many triangles are in Figure 10? _____

Which figure has 8192 triangles? _____

UNIT 1

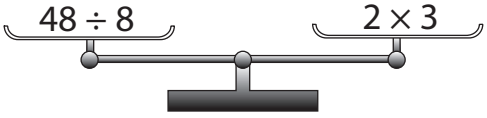
STUDENT BOOK 7 LESSON

Understanding Equality

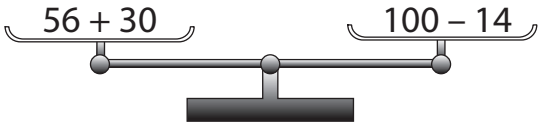
Quick Review

At Home At School

➤ Each of these scales is balanced.
The expression in one pan is equal to the expression in the other pan.



48 ÷ 8 = 6 and
2 × 3 = 6
So, 48 ÷ 8 = 2 × 3



56 + 30 = 86 and
100 – 14 = 86
So, 56 + 30 = 100 – 14

➤ When we add 2 numbers, their order does not affect the sum.
This is called the **commutative property of addition**.
$7 + 5 = 5 + 7$
$a + b = b + a$

➤ When we multiply 2 numbers, their order does not affect the product.
This is called the **commutative property of multiplication**.
$6 \times 3 = 3 \times 6$
$a \times b = b \times a$

Try These

1. Rewrite each expression using a commutative property.

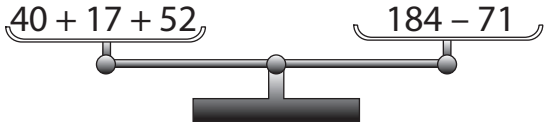
a) 9 + 6 _____

b) 7 × 4 _____

c) 751 + 242 _____

d) 27 × 8 _____

2. Are these scales balanced?
How do you know?

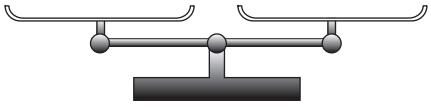


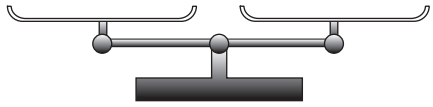
_____

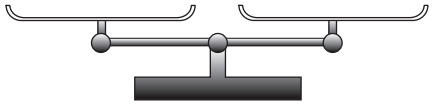
_____

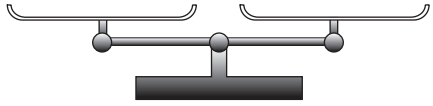
Practice

1. Work with a partner.
Write an expression in one pan of a balance scale.
Your partner writes a different expression to balance the scale.
Continue with each balance scale. Switch roles at each turn.

a) 

b) 

c) 

d) 

2. Draw a line to join pairs of expressions that balance.

a)

Expressions	
8×9	2×53
$522 \div 9$	$24 + 76$
$75 + 31$	$314 - 242$
10×10	29×2

b)

Expressions	
$764 - 320$	$4000 - 48$
76×52	$18 \div 3$
$36 \div 6$	5×25
$52 + 73$	4×111

Stretch Your Thinking

Write 3 equal expressions for each expression below.

a) $57 + 46 - 31$

_____

_____

_____

b) $45 \times 2 + 17$

_____

_____

_____

c) $425 \div 5 + 36$

_____

_____

_____

UNIT 1

STUDENT BOOK 8 LESSON

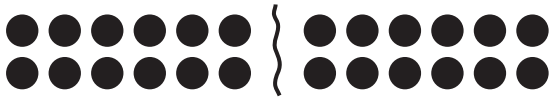
Keeping Equations Balanced

At Home At School

Quick Review

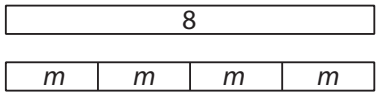
➤ We can model this equation with counters: $3 + 3 = 4 + 2$

Multiply each side by 2.
$6 \times 2 = 6 \times 2$

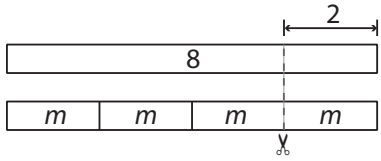


When each side of an equation is changed in the same way, the values remain equal. This is called the **preservation of equality**.

➤ Suppose we know $8 = 4m$.
We can model this equation with paper strips.



To preserve the equality, we can subtract the same number from each side.
$8 - 2 = 4m - 2$



So, $8 - 2 = 4m - 2$ is an **equivalent form** of $8 = 4m$.

Try These

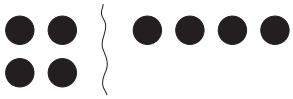
1. Model each equation with counters.
Use counters to model the preservation of equality. Record your work.

a) $3 + 2 = 1 + 4$

b) $18 \div 3 = 3 \times 2$

Practice

1. Use addition to preserve the equality of each equation.

a) 

_____

b)

_____

2. Use subtraction to preserve the equality of each equation in question 1.

a) _____

b) _____

3. **a)** Write an equation for each diagram.

i)

2			
n	*n*	*n*	*n*

_____

ii)

4	
y	*y*

_____

b) Use multiplication to preserve the equality of each equation. Record your work.

i) _____

ii) _____

Stretch Your Thinking

Apply the preservation of equality. Write an equivalent form of the equation. Use a different operation for each part.

a) $5y = 20$

_____

b) $20 \div 5 = 8 - 4$

_____

c) $8 \times 6 = 12 \times 4$

_____

d) $5 + 19 = 6s$

_____

UNIT 2

STUDENT BOOK 1 LESSON

Exploring Large Numbers

Quick Review

At Home At School

➤ Here are some ways to represent the number 26 489 215.
Standard Form: 26 489 215
Words: twenty-six million four hundred eighty-nine thousand two hundred fifteen
Expanded Form:
20 000 000 + 6 000 000 + 400 000 + 80 000 + 9000 + 200 + 10 + 5
Number-Word Form: 26 million 489 thousand 215
Place-Value Chart:

Millions Period			Thousands Period			Units Period		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
	2	6	4	8	9	2	1	5

➤ The place-value chart can be extended to the left to show greater whole numbers.

Trillions			Billions			Millions			Thousands			Units		
H	T	O	H	T	O	H	T	O	H	T	O	H	T	O

Try These

1. Write each number in standard form.

a) 7 million 481 thousand 624 _____

b) 3 000 000 000 + 200 000 000 + 600 000 + 20 000 + 9 _____

c) four million six hundred sixty-two thousand eighty-two _____

2. Write the value of each underlined digit.

a) 7<u>2</u> 348 675 125 _____ **b)** 494 <u>4</u>34 434 _____

Practice

1. Complete the chart.

Standard Form	Expanded Form	Number-Word Form
3 267 417		
	4 000 000 + 600 000 + 4000 + 90 + 2	
		625 million 227 thousand 282

2. Write each number in words.

a) 62 430 021 _____

_____

b) 5 602 347 189 _____

_____

c) 25 482 617 _____

_____

3. Find 2 large numbers in a newspaper or magazine.
Write each number in as many ways as you can.

a) _____

_____

b) _____

_____

Stretch Your Thinking

Represent and describe the number 1 trillion in as many ways as you can.

_____

_____

UNIT 2

STUDENT BOOK 2 LESSON

Numbers All Around Us

Quick Review

At Home At School

➤ We add, subtract, multiply, or divide with numbers to solve problems. Addition, subtraction, multiplication, and division are *operations*.

When the numbers in a problem are large, we use a calculator.

➤ This table shows the numbers of people who attended football games in October. What is the total number of people who attended the games? Use a calculator.

Date	Number of People
Oct. 5	2542
Oct. 12	1967
Oct. 19	2038
Oct. 26	1872

To find how many people attended the games, add:

2542 + 1967 + 2038 + 1872 = 8419

There were 8419 people who attended the football games.

➤ Estimate to check if the answer is reasonable.
2500 + 2000 + 2000 + 1900 = 8400
8419 is close to 8400, so the answer is reasonable.

Try These

1. Suki is stacking 48-kg boxes in a freight elevator.
The elevator can hold a maximum of 456 kg.
How many boxes can Suki stack in the elevator?

_____

_____

2. A package of dental floss has 175 m of floss.
Dr. Pierre bought 150 packages to give to his patients.
How many metres of dental floss is that?

_____

_____

Practice

1. A daily newspaper has a circulation of 3 679 000 copies per day. If 1 day's papers are distributed evenly among 13 cities, how many copies would each city receive?

2. Manny's dog spent 4 days in a veterinary hospital.
Manny paid $1585 for the surgery, $16.25 a day for board, and $49.75 for medicine. What was Manny's total bill?

3. Flight 168 carries 54 passengers, each with 2 suitcases.
Each suitcase has a mass of about 16 kg.
The airplane was built to carry 2250 kg of luggage.
Is the flight over or under the limit? Explain.

4. Edgar's corn field is 896 m long and 742 m wide.
What is the area of Edgar's corn field?

Stretch Your Thinking

Write a 2-step problem that requires 2 different operations to solve.
Estimate to check if the answer is reasonable.

UNIT 2

STUDENT BOOK 3 LESSON

Exploring Multiples

Quick Review

At Home At School

To find the **multiples** of a number, start at that number and count on by the number.

1	2	(3)	4	5	(6)	7	8	(9)	10
11	(12)	13	14	(15)	16	17	(18)	19	20
(21)	22	23	(24)	25	26	(27)	28	29	(30)
31	32	(33)	34	35	(36)	37	38	(39)	40

The multiples of 5 are:
5, 10, 15, 20, 25, 30, 35, 40, …

The multiples of 3 are:
3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, …

15 and 30 appear in both lists.
They are **common multiples** of 5 and 3.

Each common multiple of 5 and 3 is divisible by 5 and by 3.

Try These

1. List the first 6 multiples of each number.

a) 4 _____ **b)** 9 _____

c) 25 _____ **d)** 6 _____

e) 12 _____ **f)** 100 _____

2. Use the hundred chart.
Colour the multiples of 7.
Circle the multiples of 3.
What are the common multiples of 7 and 3 on the chart?

_____

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Practice

1. Write the first 10 multiples of each pair of numbers.
Circle the common multiples of each pair.

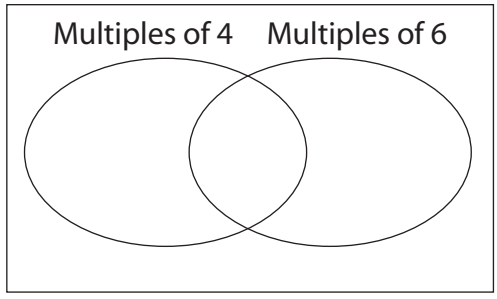
a) 6: _____

8: _____

b) 4: _____

7: _____

2. Sort these numbers in the Venn diagram.
20, 33, 36, 88, 64, 48,
68, 78, 84, 32, 76, 90,
12, 54, 65, 42, 66, 102



3. Find all the common multiples of 8 and 12 that are less than 100.

_____

4. Find the first 3 common multiples of each set of numbers.

a) 2, 3, and 9 _____ **b)** 2, 3, and 5 _____

c) 4, 5, and 10 _____ **d)** 6, 7, and 8 _____

5. Use a calculator. Find the first common multiple of each pair of numbers.

a) 16 and 18 _____ **b)** 12 and 16 _____

c) 12 and 15 _____ **d)** 11 and 12 _____

Stretch Your Thinking

Bethany wears jeans every 2 days. She wears running shoes every 3 days.
If she wears jeans with running shoes on May 1, what are the next 3 dates on which she will wear both jeans and running shoes?

_____

UNIT 2

STUDENT BOOK 4 LESSON

Prime and Composite Numbers

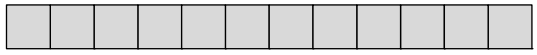
Quick Review

At Home At School

➤ You can make only 1 rectangle with 7 tiles.
7 has 2 factors: 1 and 7
7 is a **prime number**.
A prime number is a number greater than 1 that has exactly 2 factors: 1 and itself.

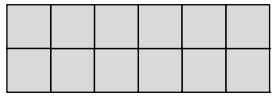
$1 \times 7 = 7$

➤ You can make 3 different rectangles with 12 tiles.

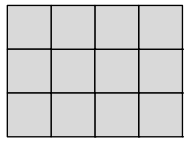


$1 \times 12 = 12$

12 has 6 factors: 1, 2, 3, 4, 6, and 12
The factors that are prime numbers are 2 and 3.
12 is a **composite number**.



$2 \times 6 = 12$



$3 \times 4 = 12$

A composite number is a number with more than 2 factors.
A composite number can be written as a product of prime factors:
$12 = 2 \times 2 \times 3$

Try These

1. List all the factors of each number.

a) 15 _____ **b)** 18 _____ **c)** 27 _____

d) 34 _____ **e)** 8 _____ **f)** 5 _____

2. Tell if each number in question 1 is prime or composite.

a) _____ **b)** _____ **c)** _____

d) _____ **e)** _____ **f)** _____

3. Write 2 numbers less than 50 that have exactly 3 factors.

_____

Practice

1. Play this game with a partner.
You will need 6 number cubes, each labelled 1 to 6.

- ➤ Each player's turn lasts until the total rolled on the number cubes is a prime number.
  The object of the game is to roll a prime number total using the least number of rolls.
- ➤ On each roll, you may choose to use from 2 to 6 number cubes.
  The number of rolls needed to reach a prime number is your score for that round.
- ➤ The player with the lower score at the end of 5 rounds wins.

2. Three numbers between 80 and 100 are prime numbers.

What numbers are they? _____

3. Eight numbers between 31 and 41 are composite numbers.

What numbers are they? _____

4. Use the table to sort the numbers from 30 to 50.

	Odd	**Even**
Prime		
Composite		

Stretch Your Thinking

Write the ages of 6 relatives.
Tell whether each age is a prime number or a composite number.

_____

_____

UNIT 2

STUDENT BOOK 5 LESSON

Investigating Factors

Quick Review

At Home At School

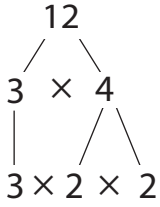
➤ When we find the same factors for 2 numbers, we find **common factors**.

The factors of 12 are: 1, 2, 3, 4, 6, 12
The factors of 16 are: 1, 2, 4, 8, 16

The common factors of 12 and 16 are 1, 2, and 4.

➤ Here are 2 ways to find the factors of 12 that are prime numbers.

• Draw a factor tree.



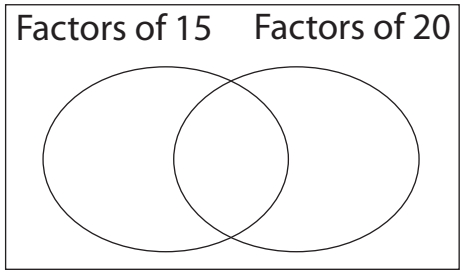
The factors of 12 that are prime numbers are 2 and 3.

• Use repeated division by prime numbers.

$$2\overline{)12}\quad 6$$
$$2\overline{)6}\quad 3$$
$$3\overline{)3}\quad 1$$

Try These

1. Use the Venn diagram to show the factors of 15 and 20.
What are the common factors? _____



2. Find all the factors of each number.

a) 36 _____

b) 45 _____

c) 60 _____

Practice

1. Find the common factors of each pair of numbers.

a) 30, 50 _____

_____

_____

b) 16, 42 _____

_____

_____

2. Find the factors of each number that are prime.

a) 45

Factors that are prime:

___ , ___

b) 32

Factor that is prime:

___

c) 70

Factors that are prime:

____, ____, ____

Stretch Your Thinking

Draw 3 different factor trees for 72.

UNIT 2

STUDENT BOOK 7 LESSON

Order of Operations

Quick Review

At Home At School

To make sure everyone gets the same answer when solving an expression, we use this order of operations:

- Do the operations in brackets.
- Multiply and divide, in order, from left to right.
- Then add and subtract, in order, from left to right.

➤ Solve: $12 + 20 \div 5$

$12 + 20 \div 5$

$= 12 + 4$

$= 16$

➤ Solve: $9 \times (6 - 4)$

$9 \times (6 - 4)$

$= 9 \times 2$

$= 18$

➤ Solve: $25 - 4 + 6$

$25 - 4 + 6$

$= 21 + 6$

$= 27$

Try These

1. Solve each expression.
Use the order of operations.

a) $15 + 7 \times 2 =$ ____ **b)** $34 - 6 \div 3 =$ ____ **c)** $35 + 15 \times 2 =$ ____

d) $30 \div (2 + 3) =$ ____ **e)** $44 \div 11 + 4 =$ ____ **f)** $(14 \div 7) \times 4 =$ ____

g) $24 + (16 \div 8) =$ ____ **h)** $(17 + 2) - 14 =$ ____ **i)** $3 \times 9 - 4 =$ ____

2. Use mental math to solve.

a) $2 \times 9 - 3 + 4 =$ ____ **b)** $5 + 150 \div 25 =$ ____

c) $30 + 30 \div 6 =$ ____ **d)** $(8 \times 9) - (8 \times 8) =$ ____

e) $24 \div 12 \times 9 =$ ____ **f)** $(200 + 400) \times 2 =$ ____

g) $18 \div 2 \times 2 =$ ____ **h)** $4 \times (3 \times 5) =$ ____

i) $12 + 6 - 2 =$ ____ **j)** $(50 + 100) \times 2 - 100 =$ ____

Practice

1. Solve each expression.

a) $48 \div 12 \div 2 =$ ____ **b)** $8 \times (10 - 4) =$ ____ **c)** $28 - 12 \div 4 =$ ____

d) $7 \times (3 + 2) =$ ____ **e)** $16 \div 2 \times 9 =$ ____ **f)** $15 \div (3 \times 5) =$ ____

2. Use brackets to make each number sentence true.

a) $2 \times 3 + 6 = 18$ **b)** $20 \times 15 - 2 = 260$

c) $5 + 4 \div 3 = 3$ **d)** $12 + 10 \div 11 = 2$

e) $6 + 8 \div 2 = 10$ **f)** $5 \times 4 \div 2 = 10$

3. Write a number sentence to show the order of operations you use to solve each problem.

a) Sandar bought 4 bags of chips at $2.99 each.
She used a $2.00 coupon to pay part of the cost.
How much did Sandar pay for the chips?

_____

b) The decorating committee needs 3 balloons for each of 15 tables.
They also need 20 balloons for each of the 4 walls of the room.
How many balloons does the committee need?

_____

Stretch Your Thinking

You and 3 friends order a pizza, 4 large drinks, and a loaf of cheese bread.
You split the cost evenly with your friends.
What order of operations would you use to find out
how much each person should pay?

_____

_____

_____

UNIT 2

STUDENT BOOK 8 LESSON

What Is an Integer?

Quick Review

At Home At School

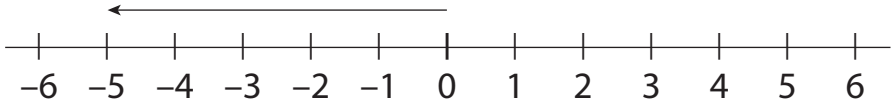
➤ Numbers such as +16 and –12 are **integers**.
+16 is a **positive integer**.
–12 is a **negative integer.**

We can use coloured tiles to represent integers.

□ represents +1. □□□□ represents +4.

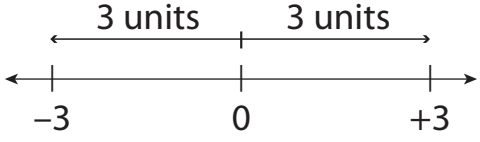
■ represents –1. ■■■■ represents –4.

➤ We can show integers on a number line.



The arrow on the number line represents –5.
–5 is a negative integer. We say, "Negative 5."

➤ +3 and –3 are **opposite integers**.
They are the same distance from 0 and are on opposite sides of 0.



Try These

1. Write the integers modelled by each set of tiles.

a) □□□□□□ _____ **b)** ■■■ _____ **c)** ■ _____

2. Write the opposite of each integer.

a) +7 _____ **b)** –23 _____ **c)** –9 _____

d) –16 _____ **e)** +38 _____ **f)** 24 _____

Practice

1. Write an integer to represent each situation.

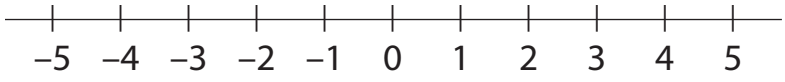
a) Sal withdrew $45 from his savings account. _____

b) Ethanol freezes at minus 114°C. _____

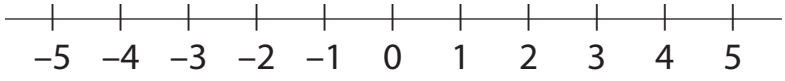
c) Justina earned $35 babysitting. _____

2. Write the opposite of each integer.
Mark each pair of integers on the number line.

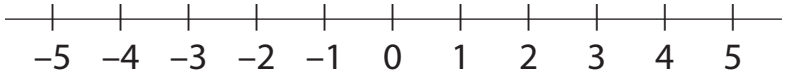
a) +4 _____



b) –2 _____



c) +1 _____



3. Explain.

a) If +9 represents 9 steps forward, what does –9 represent?

_____

b) If –5 represents 5 dollars spent, what does +5 represent?

_____

c) If +14 represents 14 floors up, what does –6 represent?

_____

Stretch Your Thinking

Find examples of unusual temperatures, such as boiling and freezing points of various liquids, on other planets. Record your findings.

_____

_____

_____

UNIT 2

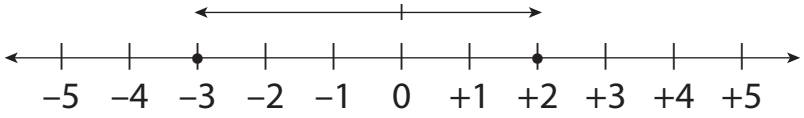
STUDENT BOOK 9 LESSON

Comparing and Ordering Integers

Quick Review

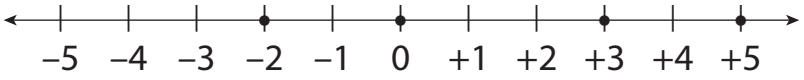
At Home At School

➤ We can use a number line to compare and order integers.
Compare +2 and –3.



+2 is to the right of –3 on a number line.
+2 is greater than –3, so we write: +2 > –3
–3 is less than +2, so we write: –3 < +2

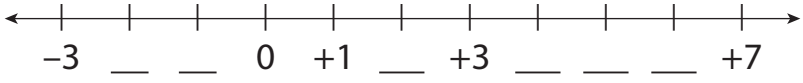
➤ To order the integers +3, –2, 0, and +5, draw a number line from –5 to +5.
Mark each integer on the number line.



The integers increase from left to right.
So, the integers from least to greatest are: –2, 0, +3, +5
The integers from greatest to least are: +5, +3, 0, –2

Try These

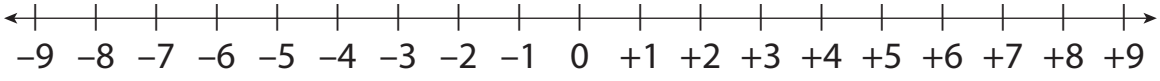
1. Fill in the missing integers.



2. Use > or < between the integers.
Use the number line to help you.

a) +9 _____ 0 **b)** +7 _____ +2 **c)** –2 _____ +8

d) –8 _____ –1 **e)** +4 _____ +8 **f)** +3 _____ –6



Practice

1. Circle the least integer in each set.

a) +12, +3, +8 **b)** 0, +5, –7 **c)** –8, +8, –9, +9

d) +6, –4, –2, 0 **e)** –10, –3, +3, 0 **f)** –5, +10, –20, +40

2. Order the integers in each set from least to greatest.

a) 0, +8, –8 _____ **b)** –5, +2, –9 _____

c) –20, +1, –1 _____ **d)** –27, –33, +30, –24 _____

3. Order the integers in each set from greatest to least.

a) +2, +4, –3 _____ **b)** –3, +1, –4 _____

c) +2, +7, –18 _____ **d)** 0, +20, –50, –60 _____

4. **a)** Which of these integers are greater than –7?

–2, +1, –9, –4 _____

b) Which of these integers are less than –8?

–4, –11, –14, +2 _____

5. **a)** Name 3 integers greater than –11.

_____

b) Name 3 integers less than –4.

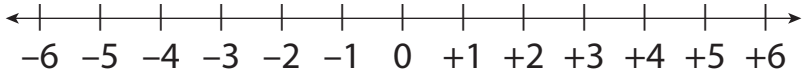
_____

Stretch Your Thinking

Use a number line. Find the integer that is:

a) halfway between –6 and +6 _____ **b)** 3 more than –4 _____

c) halfway between –5 and +1 _____ **d)** 1 less than +3 _____



UNIT 3

STUDENT BOOK 1 LESSON

Numbers to Thousandths and Beyond

Quick Review

At Home At School

➤ You can use a place-value chart to show decimals.

Tens	Ones	Tenths	Hundredths	Thousandths	Ten-Thousandths	Hundred-Thousandths	Millionths
2	4	3	0	4	9		

20 4 0.3 0.00 0.004 0.0009

We read this number as:
twenty-four and three thousand forty-nine ten-thousandths

We can write this number in:
• standard form: 24.3049
• expanded form:
2 tens + 4 ones + 3 tenths + 0 hundredths + 4 thousandths +
9 ten-thousandths = 20 + 4 + 0.3 + 0.004 + 0.0009

Try These

1. Use the place-value chart to show each number.

a) 5.3678 **b)** 0.002 54 **c)** 27.631 **d)** 0.000 004

	Tens	Ones	Tenths	Hundredths	Thousandths	Ten-Thousandths	Hundred-Thousandths	Millionths
a)								
b)								
c)								
d)								

2. Write 0.003 21 in words.

_____

Practice

1. Write each number in expanded form.

a) 1.3062 _____

_____

b) 32.459 62 _____

_____

_____

c) 0.000 72 _____

2. Write each number in standard form.

a) 2 and 32 ten-thousandths _____

b) 17 millionths _____

c) 4 hundred-thousandths _____

3. Write a number with a 7 in:

a) the hundred-thousandths position _____

b) the millionths position _____

c) the thousandths position _____

4. Write each number in words.

a) 0.562 37 _____

_____

b) 3.146 626 _____

_____

Stretch Your Thinking

Use the digits 0, 2, 3, 5, and 6. Make a number that is greater than 1 but less than 4. Find as many numbers as you can.

_____

_____

_____

UNIT 3

STUDENT BOOK 2 LESSON

Estimating Products and Quotients

Quick Review

At Home At School

➤ Here are 2 strategies you can use to estimate 5.81×7.

- **Front-end estimation**
  Write 5.81 as 5.
  Multiply: $5 \times 7 = 35$

  This is an underestimate because 5 is less than 5.81.

- **Decimal benchmarks**
  Since 5.81 is closer to 6 than to 5, write 5.81 as 6.
  Multiply: $6 \times 7 = 42$

  This is an overestimate because 6 is greater than 5.81.

➤ Here are 2 strategies you can use to estimate $284.76 \div 5$.

- **Front-end estimation**
  Write 284.76 as 200.
  Divide: $200 \div 5 = 40$

  This is an underestimate because 200 is less than 284.76.

- **Compatible numbers**
  Since 284.76 is close to 300, divide: $300 \div 5 = 60$

  This is an overestimate because 300 is greater than 284.76.

Try These

1. Estimate each product. Show your work.

a) 5.23×7 _____ **b)** 25.783×4 _____

c) 9.96×4 _____ **d)** 6.7×7 _____

2. Estimate each quotient. Show your work.

a) $15.9 \div 8$ _____ **b)** $18.12 \div 2$ _____

c) $42.035 \div 6$ _____ **d)** $159.4 \div 8$ _____

3. Estimate the area of a 3.68-cm-by-8-cm rectangle. _____

4. Estimate the side length of a square with perimeter:

a) 24.8 m _____ **b)** 29.0 m _____

Practice

1. Estimate each product or quotient.

a) 5.76×5 _____

b) 29.945×3 _____

c) 16.04×9 _____

d) $15.4 \div 3$ _____

e) $31.95 \div 8$ _____

f) $158.02 \div 2$ _____

2. Tell if each estimate in question 1 is an overestimate or an underestimate.

a) _____ **b)** _____ **c)** _____

d) _____ **e)** _____ **f)** _____

3. A jogger's heart pumps about 14.25 L of blood per minute.
Estimate the volume of blood pumped in 8 min. _____

4. Calvin sponsored Magda $4.75 for every kilometre she ran.
Magda ran 9 km. About how much did Calvin pay Magda? _____

5. Six friends equally shared the cost of a $23.59 pizza.
About how much did each person pay? _____

6. The table shows the masses of some Canadian coins.
Estimate the combined mass of:

a) 8 pennies _____ **b)** 9 nickels _____

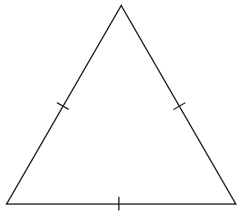
c) 7 dimes _____

Coin	Mass (g)
Penny	2.35
Nickel	3.95
Dime	1.75

Stretch Your Thinking

Estimate the perimeter of each regular polygon.

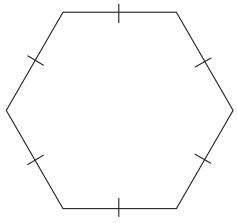
a)



6.37 m

_____

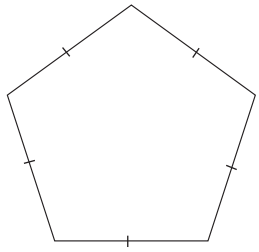
b)



4.587 cm

_____

c)



7.8 m

_____

UNIT 3

STUDENT BOOK 3 LESSON

Multiplying Decimals by a Whole Number

Quick Review

At Home At School

You can use what you know about multiplying whole numbers to multiply a decimal by a whole number.

Multiply: 2.936×4

➤ First estimate.
Since 2.936 is closer to 3 than to 2, write 2.936 as 3.
Multiply: $3 \times 4 = 12$
So, 2.936×4 is about 12.

➤ Record the numbers without the decimal point.
Multiply as you would with whole numbers.

➤ Use the estimate to place the decimal point in the product.
11.744 is close to 12, so 2.936×4 is 11.744.

$$\begin{array}{r} 2936 \\ \times\ \ 4 \\ \hline 24 \\ 120 \\ 3600 \\ 8000 \\ \hline 11.744 \end{array}$$

Try These

Multiply.

1. a) $\begin{array}{r} 5.18 \\ \times\ 5 \\ \hline \end{array}$ **b)** $\begin{array}{r} 1.734 \\ \times\ 8 \\ \hline \end{array}$ **c)** $\begin{array}{r} 0.143 \\ \times\ 4 \\ \hline \end{array}$ **d)** $\begin{array}{r} 9.431 \\ \times\ 2 \\ \hline \end{array}$

Practice

1. Use paper and pencil to find each product.

Record the products on the lines.

Then use the letters next to the products to solve this riddle.

Why did the jellybean go to school?

$0.396 \times 5 =$ _____ (S)

$0.148 \times 5 =$ _____ (O)

$0.176 \times 4 =$ _____ (B)

$2.534 \times 2 =$ _____ (D)

$1.935 \times 4 =$ _____ (M)

$0.132 \times 2 =$ _____ (E)

$3.005 \times 3 =$ _____ (I)

$0.524 \times 6 =$ _____ (H)

$1.637 \times 3 =$ _____ (A)

$1.004 \times 7 =$ _____ (T)

$8.145 \times 6 =$ _____ (C)

$0.941 \times 9 =$ _____ (W)

$2.123 \times 4 =$ _____ (N)

$4.113 \times 2 =$ _____ (R)

$1.254 \times 3 =$ _____ (U)

0.704	0.264	48.87	4.911	3.762	1.98	0.264	1.98	3.144	0.264

8.469	4.911	8.492	7.028	0.264	5.068	7.028	0.74	0.704	0.264		

4.911	1.98	7.74	4.911	8.226	7.028	9.015	0.264	

Stretch Your Thinking

What whole number would you multiply 6.374 by to get the product 25.496? _____

UNIT 3

STUDENT BOOK 4 LESSON

Multiplying a Decimal Less than 1 by a Whole Number

Quick Review

At Home At School

When you multiply a decimal less than 1 by a whole number, the product is less than the whole number.

➤ To multiply 0.0295 by 7, multiply the whole numbers: 295 × 7

$$\begin{array}{r} 295 \\ \times\ \ 7 \\ \hline 35 \\ 630 \\ 1400 \\ \hline 2065 \end{array}$$

Estimate to place the decimal point:
0.0295 is close to 0.03, or 3 hundredths.
3 hundredths multiplied by 7 is 21 hundredths.
21 hundredths are close to 20 hundredths, or 2 tenths.
Place the decimal point so the product is close to 2 tenths: 0.2065

So, 0.0295 × 7 = 0.2065

Try These

1. Multiply.

a) 0.7 × 5 = _____ **b)** 0.25 × 3 = _____ **c)** 0.12 × 5 = _____

2. Multiply as you would whole numbers. Estimate to place the decimal point.

a) 0.467 × 8 **b)** 0.086 × 9 **c)** 0.7634 × 7

3. Multiply.

a) 0.7 × 4 _____

0.07 × 4 _____

0.007 × 4 _____

b) 0.35 × 6 _____

0.035 × 6 _____

0.0035 × 6 _____

Practice

Play this game with a partner.
You will need 2 colours of counters, paper, and pencils.

- Take turns to choose one number from each column in the Number Box.
- Multiply the numbers. Cover the product on the game board with a counter.
- The first player to cover 5 products in a row, column, or diagonal wins.

Number Box	
2	0.032
3	0.148
4	0.675
5	0.009
6	0.253

0.192	0.506	1.012	0.027	0.128
0.592	2.025	0.296	2.7	0.036
3.375	0.064	4.05	0.444	1.35
0.16	0.74	0.018	0.759	0.045
0.888	1.265	0.054	0.096	1.518

Stretch Your Thinking

The product of a single-digit whole number and a decimal less than 1 is 0.24.
Find the factors.
Give as many answers as you can.

UNIT 3

STUDENT BOOK 5 LESSON

Dividing Decimals by a Whole Number

Quick Review

At Home At School

Here is one way to divide a decimal by a whole number.

Divide: 7.938 ÷ 2

➤ Record the numbers without the decimal point.
Divide as you would with whole numbers.

➤ Estimate to place the decimal point.
7.938 is close to 8.
8 ÷ 2 is 4.
The answer must be a little less than 4.
So, 7.938 ÷ 2 = 3.969

➤ Check by multiplying:
3.969 × 2 = 7.938
So, the answer is correct.

```
   3 9 6 9
2)7 9 3 8
- 6
  1 9
- 1 8
    1 3
  - 1 2
      1 8
    - 1 8
        0
```

Try These

1. Divide.

a) 0.924 ÷ 3 **b)** 5.138 ÷ 2 **c)** 3.045 ÷ 5 **d)** 7.896 ÷ 4

Practice

1. Divide.

a) 5.335 ÷ 5 **b)** 6.148 ÷ 4 **c)** 0.315 ÷ 7 **d)** 4.738 ÷ 2

2. Multiply to check each answer in question 1.

3. Renee paid $12.96 for 6 bags of chips.
How much did each bag cost? _____

4. Asmaa paid $9.96 for 3 pairs of socks.

Jagdeep paid $14.75 for 5 pairs of socks.

Which person got the better deal? Explain.

_____

_____

Stretch Your Thinking

What whole number would you divide 2.049 by to get the quotient 0.683? _____

UNIT 3

STUDENT BOOK 6 LESSON

Dividing Decimals

Quick Review

At Home At School

➤ Divide: 9.784 ÷ 5

Estimate first: Write 9.784 as 10.

10 ÷ 5 = 2

So, 9.784 ÷ 5 is a little less than 2.

Divide.

Use short division.

$$5\overline{)9^{4}.7^{2}\ 8^{3}\ 4^{4}\ 0}\quad 1\ 9\ 5\ 6\ 8$$

Sometimes you need to write zeros in the dividend so you can continue to divide until the remainder is 0.

Write the quotient to the nearest thousandth: 9.784 ÷ 5 is about 1.957.

➤ Divide: 18.4 ÷ 3

Divide as whole numbers. Use short division. Write zeros in the dividend.

$$3\overline{)1\ 8\ 4^{1}\ 0^{1}\ 0^{1}\ 0^{1}}\quad 6\ 1\ 3\ 3\ 3$$

Sometimes you never get a remainder of zero.

Estimate to place the decimal point.

18.4 is close to 18.

18 ÷ 3 is 6.

So, 18.4 ÷ 3 = 6.1333 . . .

The dots indicate that the decimal places go on forever.

Try These

1. Divide until the remainder is zero.

a) $4\overline{)6.3\ 7\ 4}$

b) $2\overline{)4\ 9.6\ 7}$

c) $5\overline{)0.4\ 7\ 3}$

d) $2\overline{)2\ 9.7\ 7}$

e) $5\overline{)4.5\ 7\ 3}$

f) $8\overline{)0.1\ 2\ 4}$

Practice

1. Divide until the remainder is zero.

a) $6\overline{)4.275}$

b) $8\overline{)45}$

c) $5\overline{)234}$

d) $2\overline{)0.007}$

e) $2\overline{)0.5}$

f) $4\overline{)27}$

2. Divide.

a) $3\overline{)7.37}$

b) $9\overline{)8.4}$

c) $3\overline{)2.14}$

3. Four students buy a box of popsicles for $4.29 and a bag of pretzels for $3.97. How much should each person contribute to the total cost?

4. Nataliya jogged 1.367 km in 6 min.
About how far did she jog each minute?
Give your answer in as many different units as you can.

5. Twelve friends shared 8 small pizzas equally.
How many pizzas did each person get?

Stretch Your Thinking

Write a story problem you can solve by dividing 11 by 7.

UNIT 3

STUDENT BOOK 7 LESSON

Dividing a Decimal Less than 1 by a Whole Number

Quick Review

At Home At School

Divide: 0.086 ÷ 5

➤ Estimate.
0.086 is close to 0.085.
0.085 is 85 thousandths.
Eighty-five thousandths divided by 5 is 17 thousandths.
So, 0.086 ÷ 5 is about 0.017.

➤ Calculate.

```
   0 0 1 7 2
5) 0.0 8 6 0
   - 5
     3 6
   - 3 5
       1 0
     - 1 0
         0
```

So, 0.086 ÷ 5 = 0.0172

Since 0.0172 is close to the estimate, 0.017, the answer is reasonable.

Try These

1. Divide.

a) 2) 0.0 3 7 0

b) 4) 0.3 6

c) 5) 0.0 0 7 4 0

d) 3) 0.3 6 9

Practice

1. Use paper and pencil to find each quotient.

Record the quotients on the lines.

Then use the letters next to the quotients to solve this riddle.

Why did the bottle insist on being at the front of the shelf?

0.072 ÷ 8 = _____ (I)

0.0024 ÷ 4 = _____ (W)

0.375 ÷ 5 = _____ (T)

0.054 ÷ 9 = _____ (S)

0.015 ÷ 6 = _____ (L)

0.039 ÷ 6 = _____ (O)

0.0016 ÷ 4 = _____ (A)

0.056 ÷ 7 = _____ (U)

0.198 ÷ 9 = _____ (N)

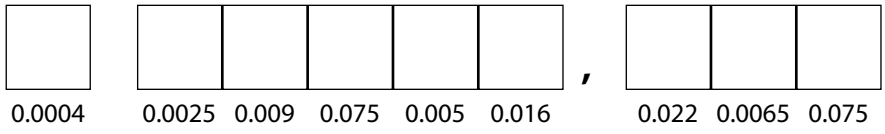
0.128 ÷ 8 = _____ (E)

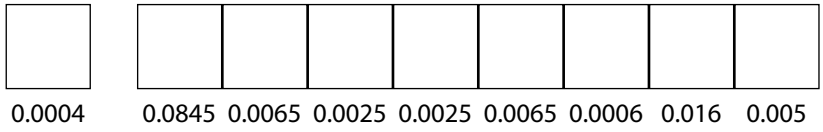
0.04 ÷ 8 = _____ (R)

0.049 ÷ 7 = _____ (C)

0.108 ÷ 3 = _____ (B)

0.169 ÷ 2 = _____ (F)





Stretch Your Thinking

What whole number would you divide 0.0764 by to get the quotient 0.01528? _____

UNIT 4

STUDENT BOOK 1 LESSON

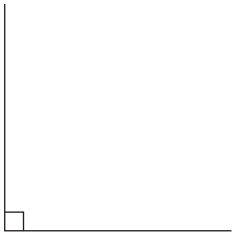
Naming Angles

Quick Review

At Home At School

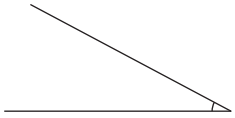
An angle is formed when 2 lines meet.

right angle

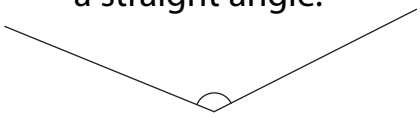


straight angle

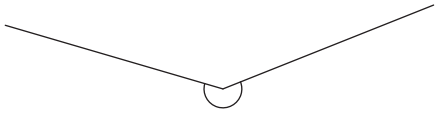
An **acute angle** is less than a right angle.



An **obtuse angle** is greater than a right angle, but less than a straight angle.



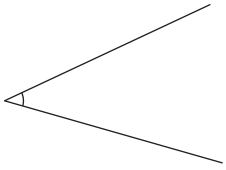
A **reflex angle** is greater than a straight angle.



Try These

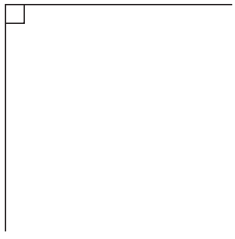
1. Name each angle as a right, acute, obtuse, straight, or reflex angle.

a)



_____

b)

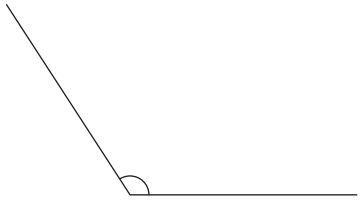


_____

c)

_____

d)



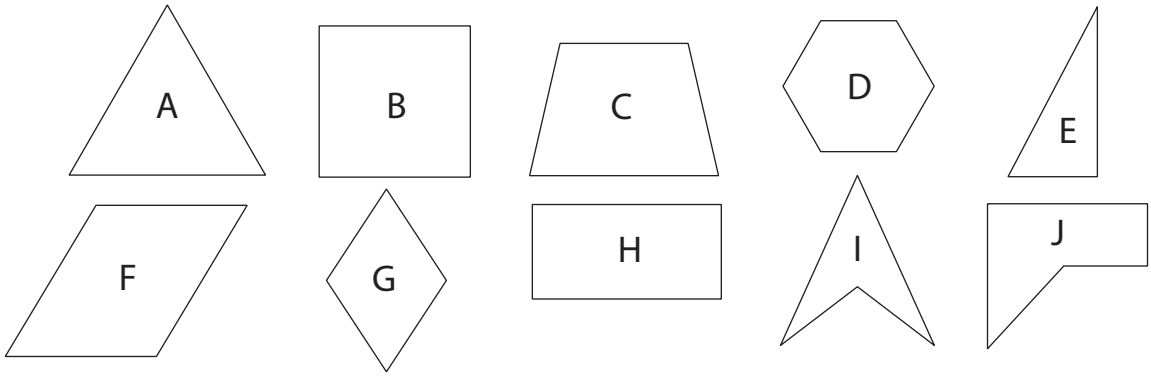
_____

Practice

1. List the shapes with:

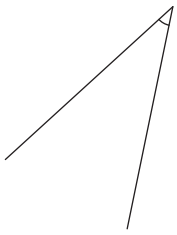
a) a right angle _____ **b)** an obtuse angle _____

c) an acute angle _____ **d)** a reflex angle _____



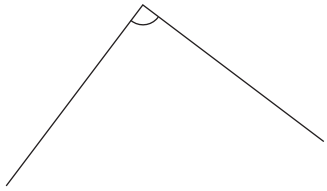
2. Name each angle.

a)



_____

b)

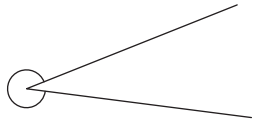


_____

c)

_____

d)



_____

Stretch Your Thinking

Think about the angles formed by the hour hand and the minute hand on a clock. Write a time when the angle is:

a) an acute angle _____ **b)** an obtuse angle _____

c) a right angle _____ **d)** a reflex angle _____

UNIT 4

STUDENT BOOK 2 LESSON

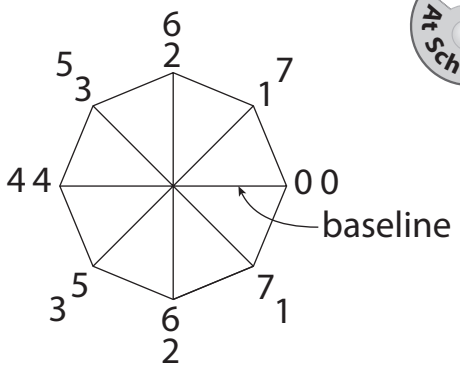
Exploring Angles

At Home At School

Quick Review

➤ A **protractor** measures angles.

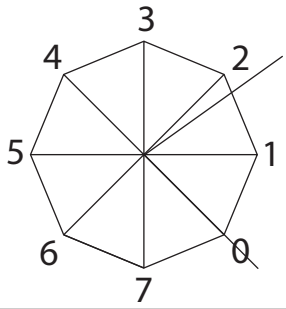
The protractor you made looks like this:



It is divided into 8 equal units. The units are labelled from 0 to 7 clockwise and counterclockwise.

To measure an angle, count how many units fit the angle.

This angle is about 2 units.

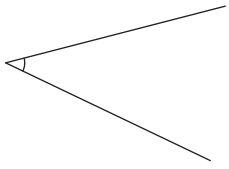


Try These

Use an 8-unit protractor.

1. Use your protractor to measure each angle.

a)



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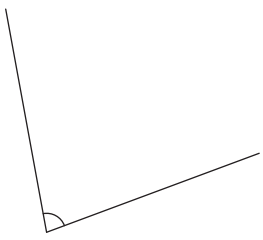
b)



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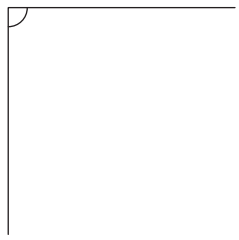
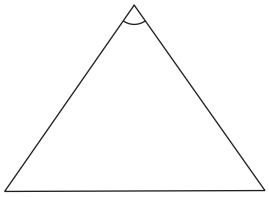
c)



_____

2. Use your protractor to measure the marked angle in each polygon below.

a)



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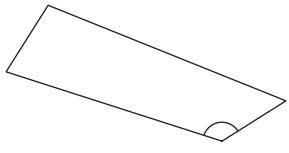
b)



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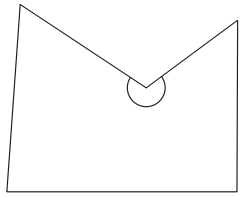
c)



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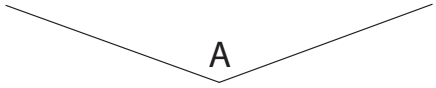
Practice

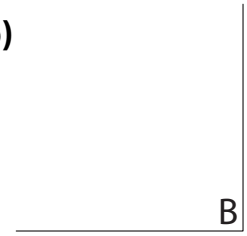
Use an 8-unit protractor.

1. Measure each angle. Record the measurements in the chart.

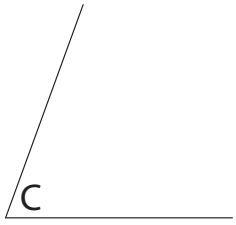
a)



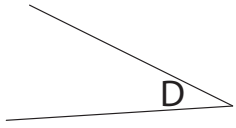
b)



c)



d)



Angle	Measure
A	
B	
C	
D	

2. Use the angle measures from question 1. Write <, >, or =.

a) D _____ A **b)** B _____ C **c)** A _____ C

3. Use a ruler. Estimate to draw each angle.

a) a $2\frac{1}{2}$-unit angle **b)** a 7-unit angle **c)** a 4-unit angle

4. Measure each angle you drew in question 3. Record the measures.

a) _____ **b)** _____ **c)** _____

Stretch Your Thinking

Explain how you can use your 8-unit protractor to measure a reflex angle.

UNIT 4

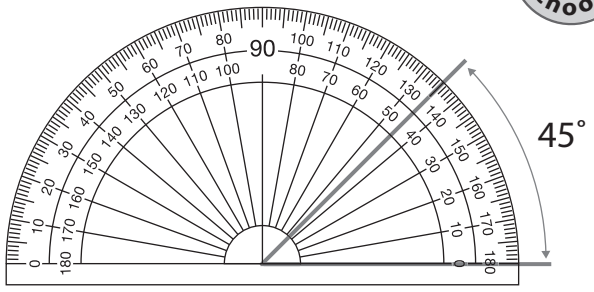
STUDENT BOOK 3 LESSON

Measuring Angles

At Home At School

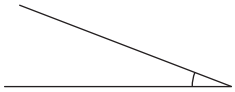
Quick Review

➤ A **standard protractor** shows angle measures from 0° to 180°, both clockwise and counterclockwise. The measure of this angle is 45°.



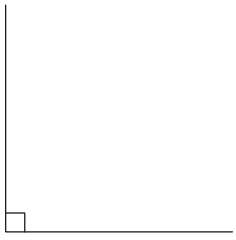
➤ Angles are named according to their measures in degrees.

Acute Angle



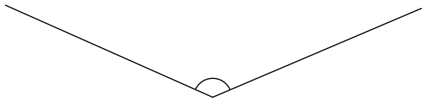
less than 90°

Right Angle



90°

Obtuse Angle



between 90° and 180°

Straight Angle

180°

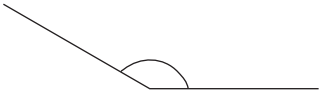
Reflex Angle

between 180° and 360°

Try These

1. Use a protractor to measure each angle. Record the measurements.

a)



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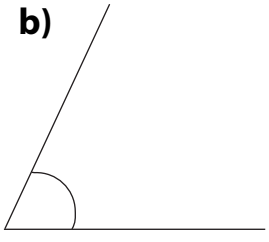
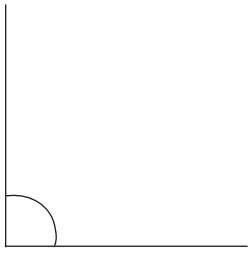
b)



_____

c)

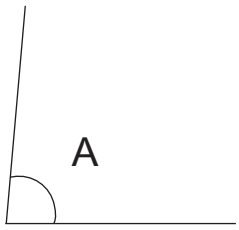


_____

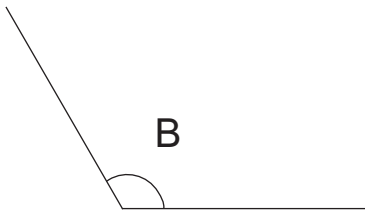
Practice

1. Measure each angle. Record the measurements in the chart.

a)

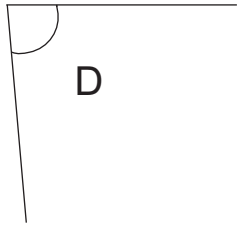


b)



c)

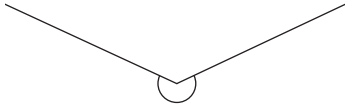
d)



Angle	Measure
A	
B	
C	
D	

2. Estimate the size of each angle.
Measure and record each angle size.

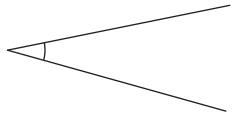
a)



Estimate: _____

Measure: _____

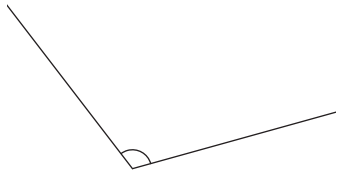
b)



Estimate: _____

Measure: _____

c)



Estimate: _____

Measure: _____

3. Name each angle in question 2 as acute, right, obtuse, or reflex.

a) _____ **b)** _____ **c)** _____

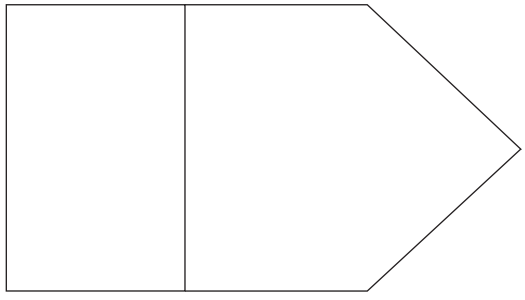
Stretch Your Thinking

How many of each kind of angle can you find in this picture?
Mark each kind in a different colour.

a) right angle _____

b) obtuse angle _____

c) acute angle _____



UNIT 4

STUDENT BOOK 4 LESSON

Drawing Angles

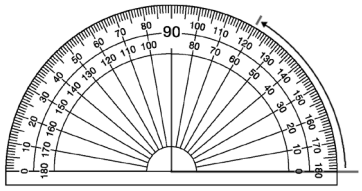
Quick Review

At Home At School

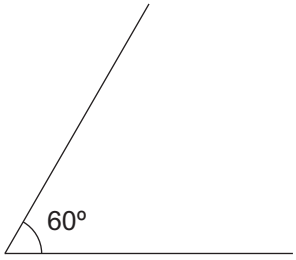
➤ We use a ruler and a protractor to construct an angle with a given measure.

Here is how to construct a 60° angle.

Draw one arm of the angle.



Place the centre of the protractor at one end of the arm so that the base line of the protractor lies along the arm. Find 60° and make a mark.



Remove the protractor.
Draw the arm.
Label the angle.

Try These

1. Use a ruler and protractor.
Draw an obtuse angle with each measure.

a) 135° **b)** 100° **c)** 167°

2. Use only a ruler. Estimate to draw each angle.

a) 75° **b)** 145° **c)** 50°

Practice

1. Use a ruler and protractor.
Draw an acute angle with each measure.

a) 55° **b)** 20° **c)** 38°

2. Use only a ruler. Estimate to draw each angle.

a) 90° **b)** 80° **c)** 150°

Stretch Your Thinking

Without using a protractor,
draw an angle that is close to 45°.
Explain how you did it.

UNIT 4

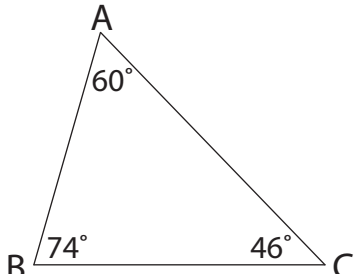
STUDENT BOOK 6 LESSON

Investigating Angles in a Triangle

Quick Review

At Home At School

➤ The sum of the **interior angles** in a triangle is 180°.



$60^\circ + 74^\circ + 46^\circ = 180^\circ$

➤ To find the measure of $\angle C$ in triangle ABC:

$\angle A + \angle B + \angle C = 180^\circ$

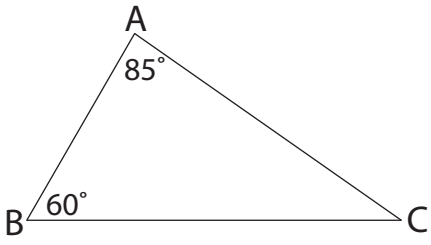
Since $\angle A = 85^\circ$ and $\angle B = 60^\circ$,

$85^\circ + 60^\circ + \angle C = 180^\circ$

$145^\circ + \angle C = 180^\circ$

$180^\circ - 145^\circ = 35^\circ$

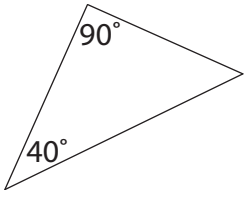
So, the measure of $\angle C$ is 35°.



Try These

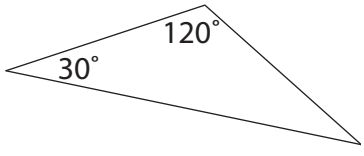
1. Determine the measure of the third angle without measuring.

a)



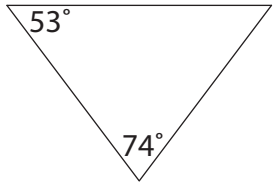
_____

b)



_____

c)



_____

2. Two angles of a triangle are given.
Find the measure of the third angle.
Show your work.

a) 70°, 60° ____ _____

b) 25°, 90° ____ _____

c) 110°, 40° ____ _____

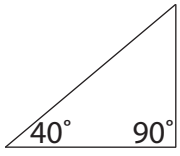
Practice

1. Determine if a triangle can be drawn with the angle measures given. If a triangle can be drawn, draw and label it.

a) 35°, 65°, 80° **b)** 55°, 50°, 50° **c)** 45°, 45°, 90° **d)** 95°, 45°, 50°

2. Determine the measure of the third angle without measuring.

a)



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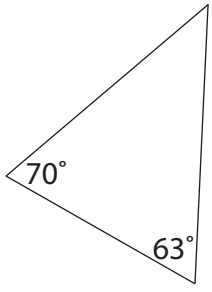
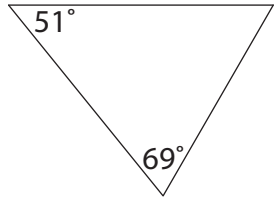
b)



_____

c)



_____

3. Two angles of a triangle are given. Find the measure of the third angle.

a) 62°, 85° _____ **b)** 60°, 25° _____ **c)** 37°, 90° _____

Stretch Your Thinking

Can you construct triangle DEF? Explain.

∠D = 109°
∠E = 60°
∠F = 12°

_____

_____

UNIT 4

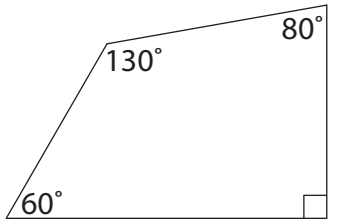
STUDENT BOOK 7 LESSON

Investigating Angles in a Quadrilateral

Quick Review

At Home At School

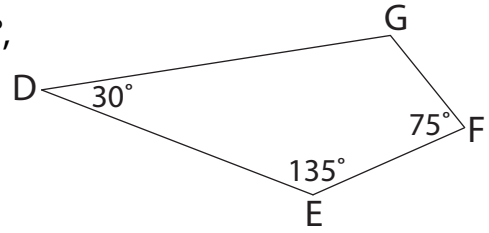
➤ The sum of the interior angles in a quadrilateral is 360°.



130° + 80° + 90° + 60° = 360°

➤ To find the measure of ∠G in quadrilateral DEFG:

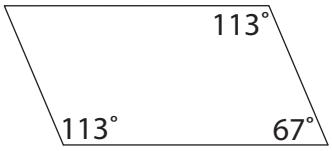
∠D + ∠E + ∠F + ∠G = 360°
Since ∠D = 30°, ∠E = 135°, and ∠F = 75°,
30° + 135° + 75° + ∠G = 360°
240° + ∠G = 360°
360° − 240° = 120°
So, the measure of ∠G is 120°.



Try These

1. Determine the measure of the fourth angle without measuring.

a)



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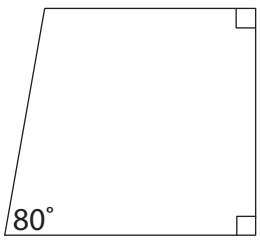
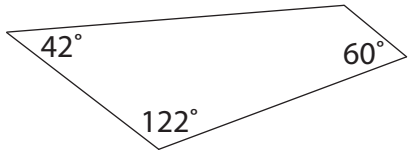
b)



_____

c)



_____

2. Three angles of a quadrilateral are given.
Find the measure of the fourth angle.

a) 25°, 70°, 110° _____

b) 42°, 38°, 100° _____

c) 90°, 90°, 41° _____

d) 115°, 95°, 63° _____

e) 107°, 36°, 49° _____

f) 116°, 72°, 49° _____

Practice

1. Determine if a quadrilateral can be drawn with the angle measures given. If a quadrilateral can be drawn, draw and label it.

a) 90°, 75°, 60°, 135° **b)** 50°, 45°, 70°, 120° **c)** 125°, 70°, 85°, 80°

2. Find the measure of the fourth angle in each quadrilateral.

Quadrilateral	∠J	∠K	∠L	∠M
A	149°	80°	26°	
B	120°	75°	97°	
C	76°	75°	84°	
D	150°	100°	70°	
E	37°	83°	151°	

Stretch Your Thinking

Is it possible to make a quadrilateral with 3 obtuse angles and 1 right angle? Explain.

UNIT 5

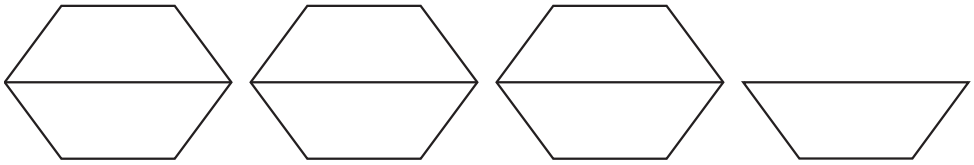
STUDENT BOOK 1 LESSON

Mixed Numbers

Quick Review

At Home At School

Tyla arranged 7 trapezoids.



Her arrangement shows 7 halves of a hexagon: $\frac{7}{2}$

It also shows 3 whole hexagons plus 1 half: $3\frac{1}{2}$

$\frac{7}{2}$ and $3\frac{1}{2}$ represent the same amount.

They are equivalent. $\frac{7}{2} = 3\frac{1}{2}$

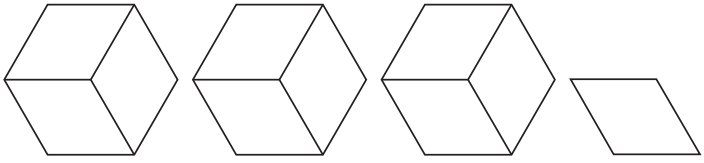
An **improper fraction** shows an amount greater than 1 whole.
$\frac{7}{2}$ is an improper fraction.

A **mixed number** has a whole number part and a fraction part.
$3\frac{1}{2}$ is a mixed number.

Try These

1. Write an improper fraction and a mixed number for each picture.

a)



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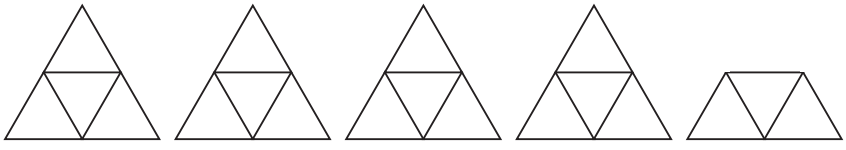
b)



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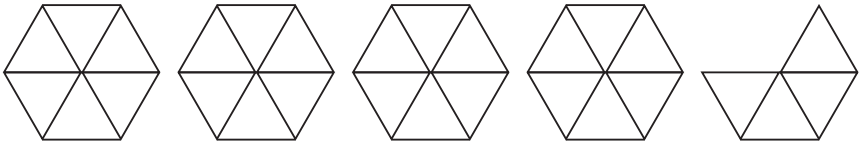
c)



_____

Practice

1. Draw pictures to show each improper fraction.
Write the mixed number.

$\frac{5}{2}$ _____	$\frac{7}{3}$ _____

2. Draw pictures to show each mixed number.
Write the improper fraction.

$4\frac{1}{4}$ _____	$2\frac{6}{8}$ _____

3. Sofia took piano lessons for 18 months.
How many years is that? Show your work.

_____

_____

Stretch Your Thinking

Henry drank 4 glasses of juice. Ethan drank $\frac{9}{2}$ glasses of juice.
Who drank more juice? Explain how you know.

_____

_____

_____

UNIT 5

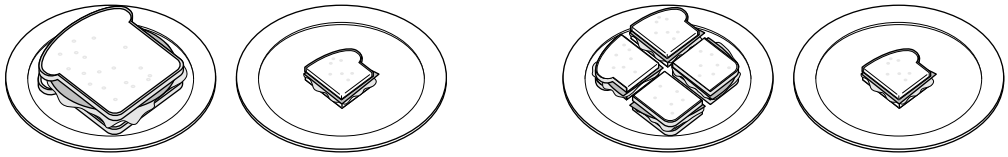
STUDENT BOOK 2 LESSON

Converting between Mixed Numbers and Improper Fractions

Quick Review

At Home At School

➤ These plates have $1\frac{1}{4}$ sandwiches. These plates have $\frac{5}{4}$ sandwiches.



$1\frac{1}{4}$ and $\frac{5}{4}$ represent the same amount.

$1\frac{1}{4}$ is a **mixed number**.

$\frac{5}{4}$ is an **improper fraction**.

➤ To write $2\frac{7}{8}$ as an improper fraction, multiply the whole number by the denominator and add the numerator.

$2 \times 8 = 16$
$16 + 7 = 23$
So, $\frac{23}{8} = 2\frac{7}{8}$

➤ To write $\frac{13}{2}$ as a mixed number, divide the numerator by the denominator.

$13 \div 2 = 6$ R1
So, $6\frac{1}{2} = \frac{13}{2}$

Try These

1. Write each mixed number as an improper fraction.

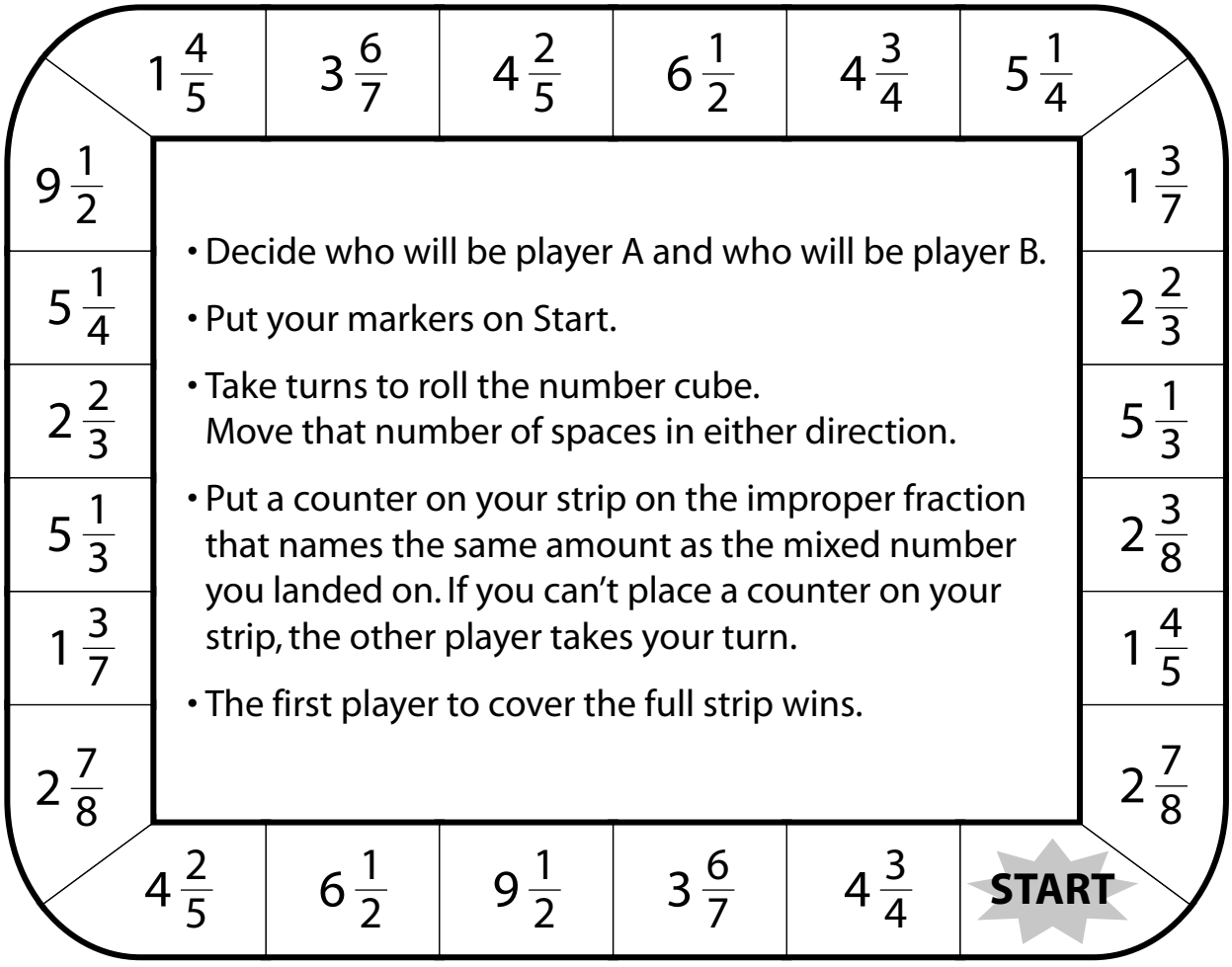
a) $3\frac{7}{9} =$ ____ **b)** $4\frac{3}{4} =$ ____ **c)** $7\frac{6}{11} =$ ____ **d)** $1\frac{19}{20} =$ ____

2. Write each improper fraction as a mixed number.

a) $\frac{8}{5} =$ ____ **b)** $\frac{39}{7} =$ ____ **c)** $\frac{48}{9} =$ ____ **d)** $\frac{16}{3} =$ ____

Practice

Play this game with a partner.
You will need 1 number cube, 2 game markers, and 24 small counters.



Player A	$\frac{22}{5}$	$\frac{8}{3}$	$\frac{13}{2}$	$\frac{16}{3}$	$\frac{9}{5}$	$\frac{19}{4}$	$\frac{19}{2}$	$\frac{27}{7}$	$\frac{19}{8}$	$\frac{21}{4}$	$\frac{23}{8}$	$\frac{10}{7}$
Player B	$\frac{22}{5}$	$\frac{8}{3}$	$\frac{13}{2}$	$\frac{16}{3}$	$\frac{9}{5}$	$\frac{19}{4}$	$\frac{19}{2}$	$\frac{27}{7}$	$\frac{19}{8}$	$\frac{21}{4}$	$\frac{23}{8}$	$\frac{10}{7}$

Stretch Your Thinking

Sadie says she has $\frac{7}{4}$ dollars. How much money does she have? Explain.

UNIT 5

STUDENT BOOK 3 LESSON

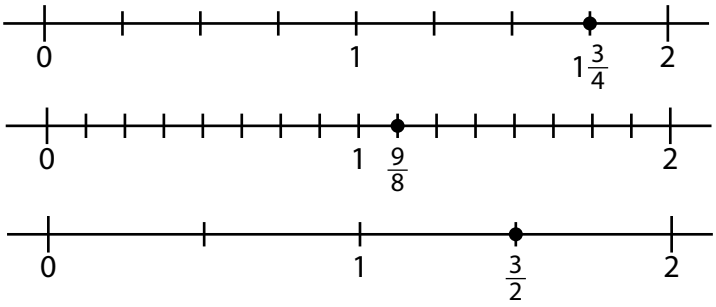
Comparing Mixed Numbers and Improper Fractions

Quick Review

At Home At School

You can compare and order mixed numbers and improper fractions.

➤ Order $1\frac{3}{4}$, $\frac{9}{8}$, and $\frac{3}{2}$ from least to greatest. Use number lines of equal length.



The order from least to greatest is $\frac{9}{8}$, $\frac{3}{2}$, $1\frac{3}{4}$.

➤ Compare $3\frac{3}{4}$ and $\frac{17}{12}$.

Write $3\frac{3}{4}$ as an improper fraction: $\frac{15}{4}$

Write $\frac{15}{4}$ as an equivalent fraction with denominator 12:

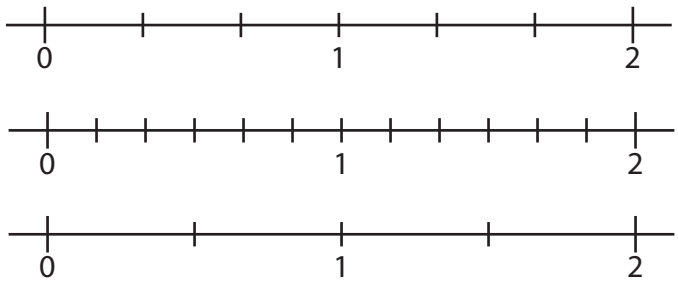
$\frac{15}{4} = \frac{45}{12}$

Compare $\frac{45}{12}$ and $\frac{17}{12}$: $\frac{45}{12} > \frac{17}{12}$

So, $3\frac{3}{4} > \frac{17}{12}$

Try These

1. Use these number lines to order $\frac{5}{3}$, $1\frac{1}{6}$, and $\frac{3}{2}$ from least to greatest.



_____

_____

2. Write $>$, $<$, or $=$.

a) $1\frac{7}{8}$ ____ $\frac{7}{4}$ **b)** $\frac{21}{5}$ ____ $4\frac{1}{5}$ **c)** $\frac{13}{4}$ ____ $3\frac{5}{6}$

Practice

1. Write $>$, $<$, or $=$.

a) $\frac{11}{7}$ ____ $\frac{10}{9}$ **b)** $\frac{21}{8}$ ____ $\frac{31}{12}$ **c)** $\frac{17}{7}$ ____ $2\frac{3}{4}$

d) $1\frac{1}{2}$ ____ $\frac{24}{16}$ **e)** $\frac{24}{5}$ ____ $\frac{48}{10}$ **f)** $3\frac{4}{5}$ ____ $\frac{78}{25}$

2. Use a mixed number to complete each question.

a) $\frac{9}{4} =$ ____ **b)** $\frac{19}{11} >$ ____ **c)** $\frac{25}{12} <$ ____

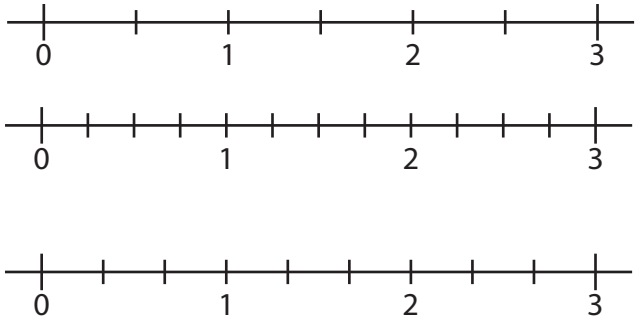
d) $\frac{41}{3} <$ ____ **e)** $\frac{30}{10} <$ ____ **f)** $\frac{14}{3} >$ ____

3. Order the numbers in each set from greatest to least.

a) $\frac{8}{3}, 1\frac{11}{12}, \frac{7}{4}$ _____ **b)** $\frac{10}{6}, \frac{8}{8}, 1\frac{1}{3}$ _____

c) $\frac{9}{5}, \frac{11}{10}, 1\frac{7}{20}$ _____ **d)** $2\frac{8}{12}, \frac{13}{6}, \frac{9}{8}$ _____

4. Use these number lines to order $\frac{5}{2}$, $2\frac{1}{4}$, and $\frac{6}{3}$ from greatest to least.



_____

_____

5. Write each time period as a mixed number and as an improper fraction.

a) 3 h 30 min: ____ h; ____ h **b)** 1 h 20 min: ____ h; ____ h

c) 2 h 45 min: ____ h; ____ h **d)** 7 h 10 min: ____ h; ____ h

Stretch Your Thinking

Jeremiah thinks $27\frac{8}{9}$ is equivalent to $\frac{251}{8}$. Is he correct?
Explain how you know.

_____

_____

UNIT 5

STUDENT BOOK 4 LESSON

Exploring Ratios

Quick Review

At Home At School

A **ratio** is a comparison of 2 quantities with the same unit.

Here are 3 squares and 5 circles.

□ □ □ ○ ○ ○ ○ ○

Here are some ways to compare the shapes.

➤ Part-to-Part Ratios
- squares to circles is 3 to 5 or 3 : 5.
- circles to squares is 5 to 3 or 5 : 3.

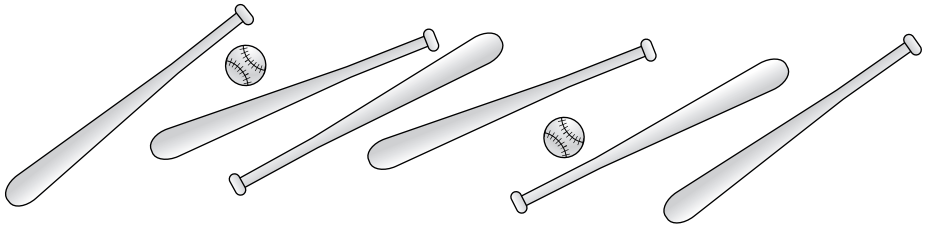
The numbers 3 and 5 are the **terms of the ratio**.

➤ Part-to-Whole Ratios
- squares to shapes is 3 to 8 or 3 : 8 or $\frac{3}{8}$.
- circles to shapes is 5 to 8 or 5 : 8 or $\frac{5}{8}$.

You can write a part-to-whole ratio as a fraction.

Try These

1. Write each ratio in as many ways as you can.



a) balls to bats _____

b) bats to balls _____

c) balls to all toys _____

d) bats to all toys _____

Practice

1. Use the numbers in the box to write each ratio.

25	16	13	38
17	30	49	3
24	45	7	14

a) odd numbers to even numbers _____

b) numbers less than 20 to all numbers _____

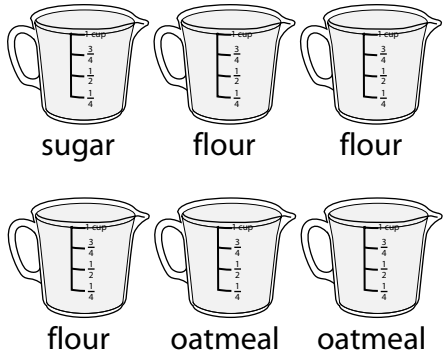
c) multiples of 5 to multiples of 7 _____

d) prime numbers to composite numbers _____

2. Write a word that has each ratio of vowels to consonants.

a) 2 : 5 _____ **b)** 1 : 4 _____ **c)** 4 : 6 _____

3. What is being compared in each ratio?



a) 1 to 2 _____

b) 2 : 6 _____

c) 2 : 3 _____

d) $\frac{1}{6}$ _____

e) $\frac{3}{6}$ _____

4. Draw some acorns and some oak leaves. Write as many ratios as you can for your drawing.

_____ _____ _____

_____ _____ _____

Stretch Your Thinking

Ask 5 people to name the sport they enjoy watching the most.
Write as many ratios as you can to compare the responses.
Tell what each ratio compares.

_____

_____

_____

_____

UNIT 5

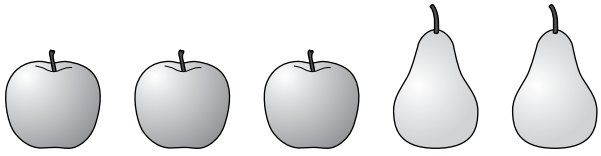
STUDENT BOOK 5 LESSON

Equivalent Ratios

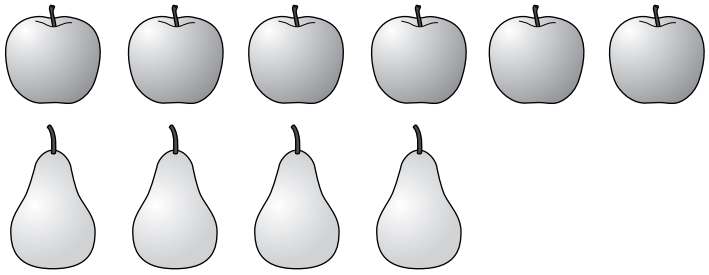
Quick Review

At Home At School

➤ The ratio 3 : 2 means that for every 3 apples there are 2 pears.



The ratio 6 : 4 means that for every 6 apples there are 4 pears.
3 : 2 and 6 : 4 are equal. 3 : 2 and 6 : 4 are **equivalent ratios**.



➤ You can use a table and patterns to find equivalent ratios.
The numbers in the Apples column are multiples of 3.
The numbers in the Pears column are multiples of 2.
The ratios of apples to pears are:
3 : 2, 6 : 4, 9 : 6, 12 : 8, 15 : 10, …

Apples	Pears	Ratio
3	2	3 : 2
6	4	6 : 4
9	6	9 : 6
12	8	12 : 8
15	10	15 : 10

Try These

1. Write 2 equivalent ratios for each ratio.

a) 5 : 3 _____ _____ **b)** 7 : 4 _____ _____ **c)** 3 : 9 _____ _____

d) 4 : 11 _____ _____ **e)** 2 : 6 _____ _____ **f)** 8 : 5 _____ _____

Practice

1. Play this game with a partner.
You will need 2 sheets of paper and a clock or watch with a second hand.

- ➤ Player A chooses a ratio and writes as many equivalent ratios as she can, as Player B times 30 s.
- ➤ Both players check Player A's ratios.
  Player A gets 1 point for each correct ratio.
- ➤ Players switch roles and play again, using a different ratio.
- ➤ The player with the most points after 5 rounds wins.

Ratios	
3 : 7	7 : 4
2 : 5	2 : 9
6 : 3	12 : 11
4 : 3	10 : 15
8 : 6	3 : 8

2. Write an equivalent ratio with 30 as one of the terms.

a) 15 : 7 _____ **b)** 8 : 5 _____ **c)** 2 : 6 _____ **d)** 3 : 14 _____

e) 11 : 5 _____ **f)** 3 : 2 _____ **g)** 4 : 10 _____ **h)** 18 : 15 _____

3. List all the ratios that are equivalent to 4 : 7 and have a first term that is less than 25. _____

4. Jillian is planting 4 roses for every 3 daisies in her garden.
Complete the table to show how many daisies Jillian needs for 8, 12, and 16 roses.
Write each ratio.

Roses	Daisies	Ratio
4	3	

Stretch Your Thinking

Mr. Tanaka has 56 students in his choir. The ratio of boys to girls is 3 : 4.
How many boys and how many girls are in Mr. Tanaka's choir? Explain.

_____

_____

UNIT 5

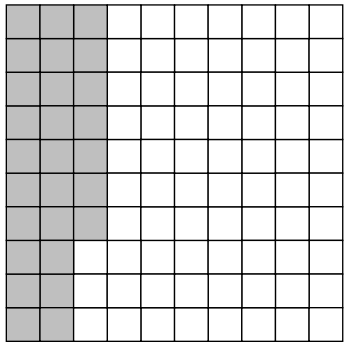
STUDENT BOOK 7 LESSON

Exploring Percents

Quick Review

At Home At School

This hundredths grid has 100 small squares.
Each square represents $\frac{1}{100}$ of the grid.
Twenty-seven squares are shaded.



You can describe the shaded part of the grid.

- 27 out of 100 squares are shaded.
- $\frac{27}{100}$ of the grid is shaded.
- 0.27 of the grid is shaded.
- 27% of the grid is shaded.

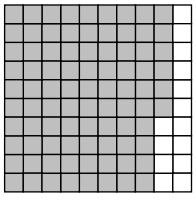
Percent means "per hundred" or "out of 100."

This is a **percent** symbol. You read 27% as 27 percent.

Try These

1. Write a fraction with hundredths, a decimal, and a percent to describe the shaded part of each grid.

a)



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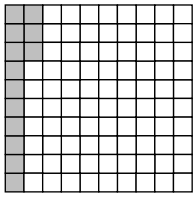
b)



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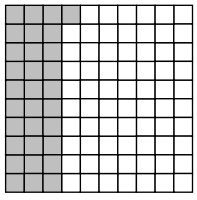
c)



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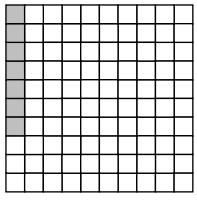
d)



_____

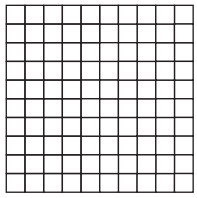
2. Write a fraction with hundredths, a decimal, and a percent to describe the unshaded part of each grid in question 1.

a) _____ **b)** _____ **c)** _____ **d)** _____

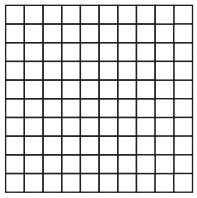
Practice

1. Colour each hundredths grid to show the percent.

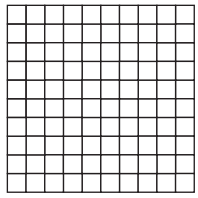
a) 42%



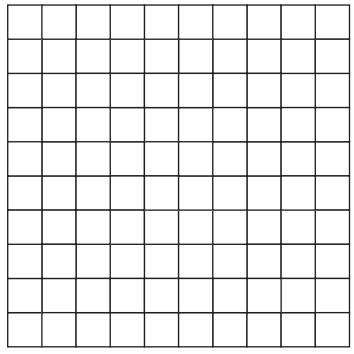
b) 75%



c) 6%



2. **a)** Use the hundredths grid. Colour 35% blue, 7% red, 40% green, and the rest orange.



b) Write a fraction and a decimal to describe each colour.

blue _____ red _____

green _____ orange _____

c) What percent is orange? _____

3. Write as a percent and as a decimal.

a) $\frac{43}{100}$ _____ _____ **b)** $\frac{16}{100}$ _____ _____ **c)** $\frac{100}{100}$ _____ _____

d) $\frac{3}{100}$ _____ _____ **e)** $\frac{82}{100}$ _____ _____ **f)** $\frac{11}{100}$ _____ _____

4. Write as a fraction and as a decimal.

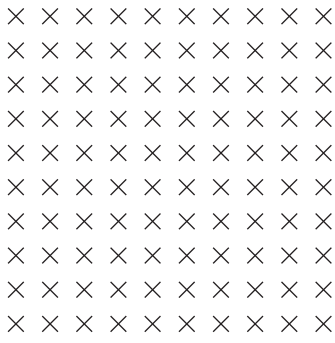
a) 19% _____ _____ **b)** 1% _____ _____ **c)** 93% _____ _____

d) 7% _____ _____ **e)** 100% _____ _____ **f)** 47% _____ _____

Stretch Your Thinking

Draw a rectangle and an oval around groups of Xs so that all of the following statements are true.

- 64% of the Xs are not inside either figure.
- 8% of the Xs are inside both figures.
- 20% of the Xs are inside the rectangle only.
- 8% of the Xs are inside the oval only.



UNIT 5

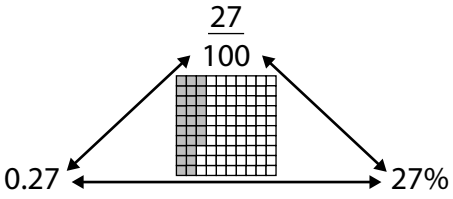
STUDENT BOOK 8 LESSON

Relating Fractions, Decimals, and Percents

At Home At School

Quick Review

Fractions, decimals, and percents are 3 ways to describe parts of a whole.



➤ $\frac{3}{10}$ of this shape is shaded.

$\frac{3}{10} \xrightarrow{\times 10} \frac{30}{100} = 30\%$

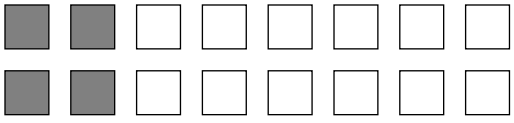
$\frac{3}{10} \xrightarrow{\times 10} = 0.30$

30% of the shape is shaded.

➤ $\frac{1}{4}$ of the squares are shaded.

$\frac{1}{4} \xrightarrow{\times 25} \frac{25}{100} = 25\%$

$\frac{1}{4} \xrightarrow{\times 25} = 0.25$



25% of the squares are shaded.

Try These

1. Write each fraction as a percent and as a decimal.

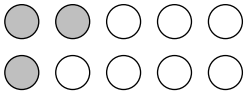
a) $\frac{9}{100}$ _____ _____ **b)** $\frac{7}{10}$ _____ _____ **c)** $\frac{4}{25}$ _____ _____

d) $\frac{1}{5}$ _____ _____ **e)** $\frac{7}{50}$ _____ _____ **f)** $\frac{11}{20}$ _____ _____

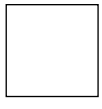
2. What percent is shaded?

a)

_____

b) 

_____

c) 

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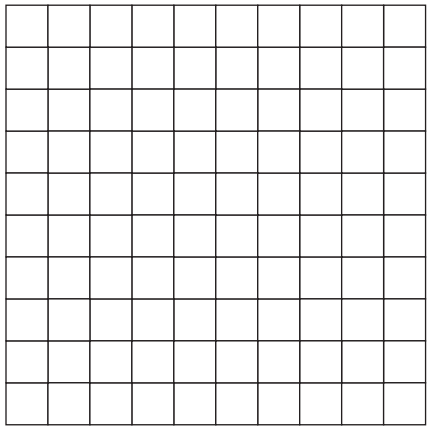
Practice

1. a) Use the hundredths grid to make a design. Follow these rules:



- ➤ You can use only red, black, green, and blue.
- ➤ You must colour at least $\frac{7}{10}$ of the squares.
- ➤ You must use:
  - red for at least 6% of the squares.
  - black for at least 5% of the squares.
  - green and blue together for at least 0.4 of the squares.

b) Complete the chart to describe the colours in your design.

Colour	Red	Black	Green	Blue	No Colour
Number of Squares					
Fraction					
Decimal					
Percent of Grid					

c) What is the greatest percent of blank squares you could have in your design? Explain.

_____

_____

d) What is the sum of your decimals? _____ Percents? _____

What do you think the sum of your fractions would be? _____

Stretch Your Thinking

What percent of Canada's 10 provinces begin with a vowel? With a consonant? Explain.

_____

_____

UNIT 6

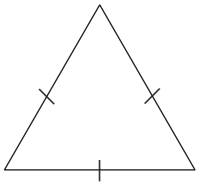
STUDENT BOOK 1 LESSON

Exploring Triangles

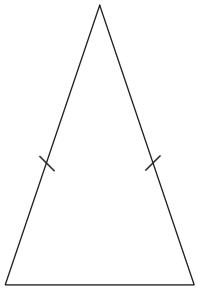
Quick Review

At Home At School

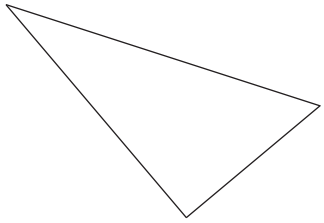
➤ We can name triangles by the number of equal sides.



An **equilateral triangle** has 3 equal sides.
It has three 60° angles.
It has 3 lines of symmetry.



An **isosceles triangle** has 2 equal sides.
It has 2 equal angles.
It has 1 line of symmetry.



A **scalene triangle** has no equal sides, no equal angles, and no lines of symmetry.

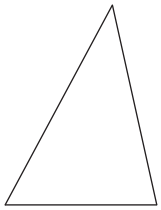
Try These

1. Name each triangle as equilateral, isosceles, or scalene.

a)

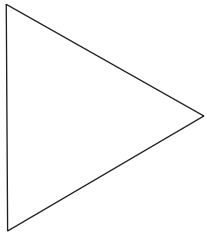
_____

b)



_____

c)



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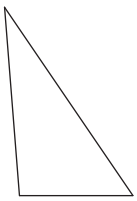
d)



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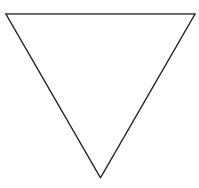
e)



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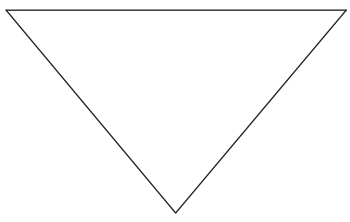
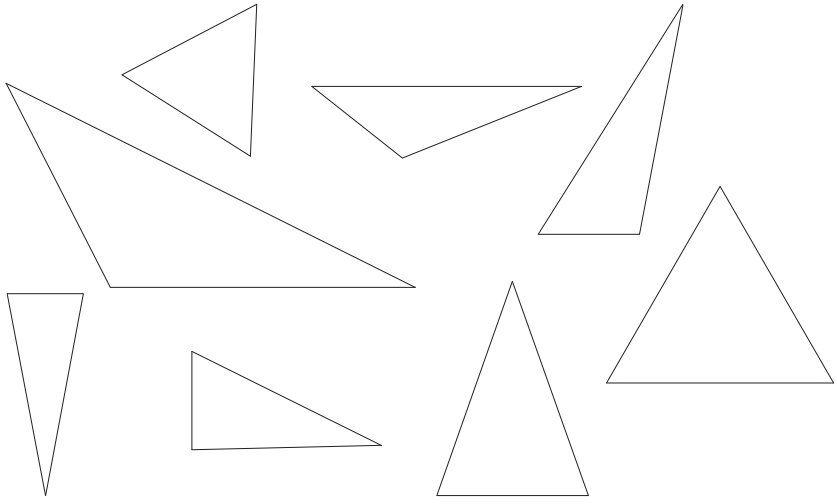
f)



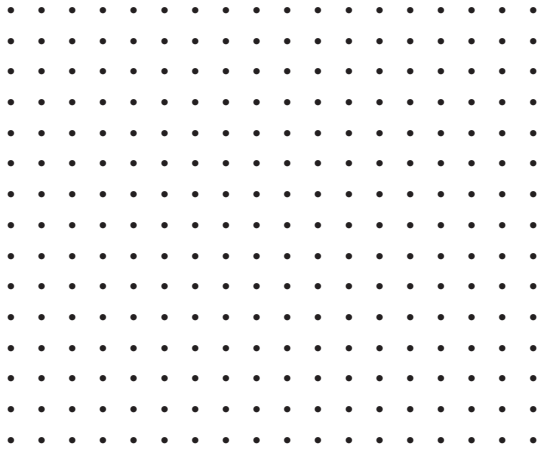
_____

Practice

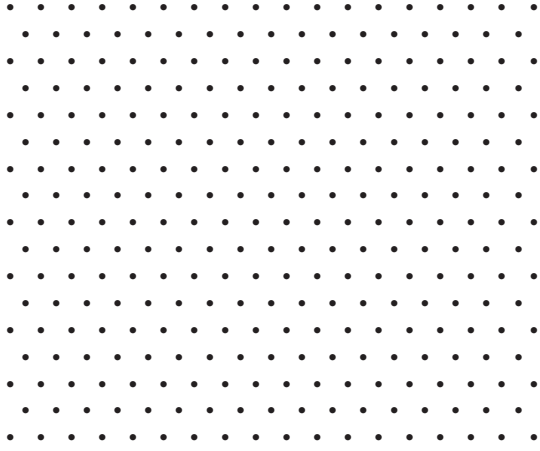
1. Write an S inside the triangles that are scalene.
Write an I inside the triangles that are isosceles.
Write an E inside the triangles that are equilateral.



2. **a)** Draw 3 different isosceles triangles.



b) Draw 3 different equilateral triangles.



Stretch Your Thinking

Explain why it is not possible to make an equilateral triangle on a geoboard.

UNIT 6

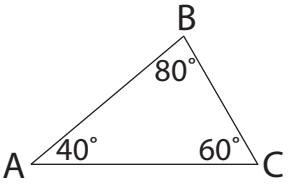
STUDENT BOOK 2 LESSON

Naming and Sorting Triangles by Angles

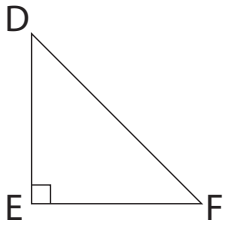
Quick Review

At Home At School

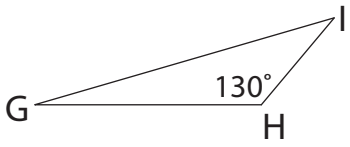
An **acute triangle** has all angles less than 90°.



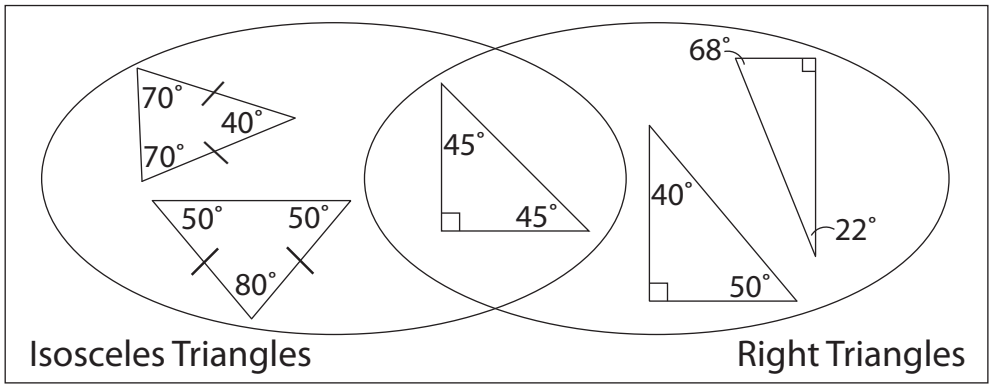
A **right triangle** has one 90° angle.



An **obtuse triangle** has one angle greater than 90°.



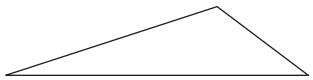
We can sort triangles in a Venn diagram.



Try These

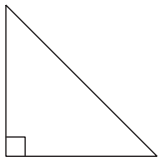
1. Name each triangle as an acute, a right, or an obtuse triangle.

a)



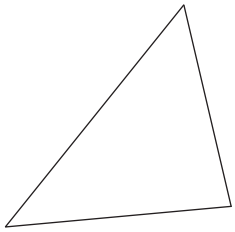
_____

b)



_____

c)



_____

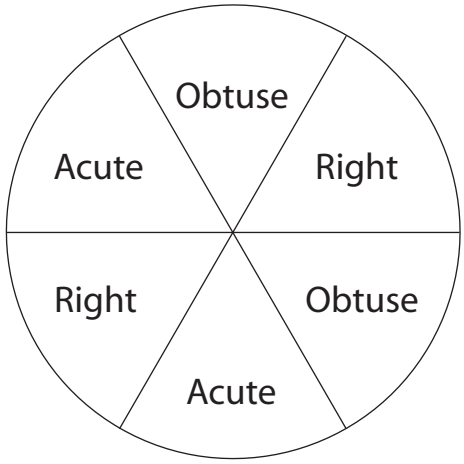
2. Which triangle in question 1 is isosceles? How do you know?

_____

Practice

1. Play this game with a partner.
You will need pencils and an open paper clip to use as a pointer.

- ➤ Player A spins the pointer and draws whichever triangle the pointer lands on.
- ➤ Player B takes a turn. Player B's triangle can touch, but not overlap.
- ➤ Continue taking turns. If you are unable to draw a triangle, you lose your turn.
- ➤ The last person to successfully draw a triangle is the winner.



Stretch Your Thinking

Can you draw each triangle?

a) A triangle with an obtuse angle and 2 equal sides. _____

b) A triangle with a right angle and no equal sides. _____

c) A triangle with 3 acute angles and 2 of the angles are equal. _____

d) A triangle with 3 right angles. _____

e) A triangle with 3 equal sides and 1 obtuse angle. _____

UNIT 6

STUDENT BOOK 3 LESSON

Drawing Triangles

Quick Review

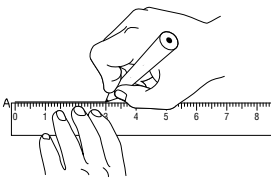
At Home At School

You can use a ruler and a protractor to construct a triangle.
Construct triangle ABC with these measures:

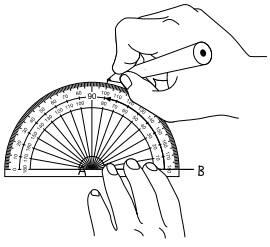
- AB = 3 cm
- ∠A = 80°
- AC = 2.5 cm

Sketch the triangle first.
Label each side and angle.

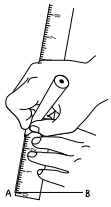
Draw side AB. Make it 3 cm long.



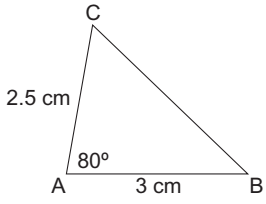
Measure an 80° angle at A.



Draw side AC. Make it 2.5 cm long.



Join C to B to make side BC.



Try These

1. Use a ruler and protractor.
Construct triangle EFG.
Side EF is 7 cm long.
Angle F is 90°.
Side FG is 5.3 cm long.

2. What is the measure of:

a) angle E? _____ **b)** angle G? _____

3. How long is side EG? _____

Practice

1. Construct each triangle using a ruler and a protractor.
Label each triangle with the measures of all the sides and angles.

a) Triangle JKL
- JL = 4 cm
- $\angle L = 60°$
- JK = 4 cm

b) Triangle XYZ
- XY = 5.8 cm
- $\angle X = 90°$
- $\angle Y = 25°$

c) Triangle TUV
- UV = 6.2 cm
- $\angle T = 70°$
- $\angle U = 45°$

d) Triangle PQR
- $\angle P = 70°$
- PQ = 3.5 cm
- $\angle Q = 70°$

Stretch Your Thinking

Suppose you double the side lengths of a regular triangle.
What happens to the measure of the angles? Explain.

UNIT 6

STUDENT BOOK 4 LESSON

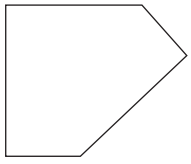
Investigating Polygons

Quick Review

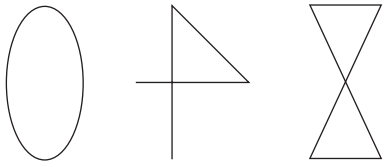
At Home At School

➤ A polygon is a closed shape with sides that are straight line segments. Exactly 2 sides meet at each vertex. The sides intersect only at the vertices.

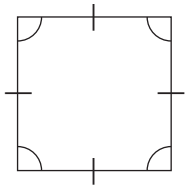
This shape is a polygon.



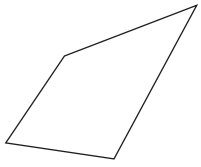
These shapes are **non-polygons**.



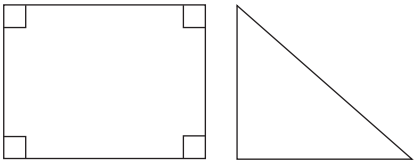
➤ A **regular polygon** has all sides and all angles equal.
It also has line symmetry.



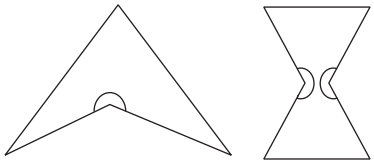
An **irregular polygon** does not have all sides equal and all angles equal.



➤ A **convex polygon** has all angles less than 180°.

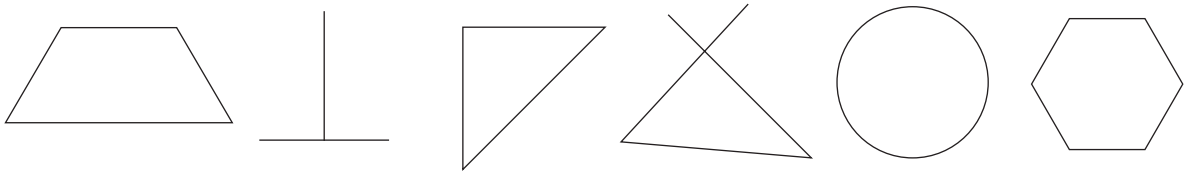


A **concave polygon** has at least one angle greater than 180°.



Try These

1. Circle each polygon.

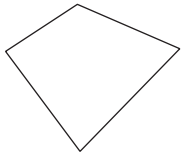


Practice

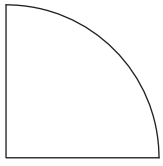
1. Match each shape to its description.

a)

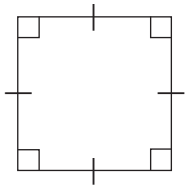
regular polygon

b) 

non-polygon

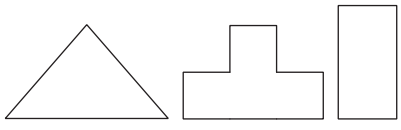
c) 

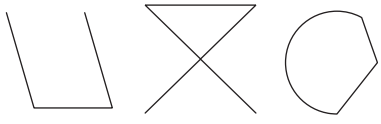
concave quadrilateral

d) 

convex quadrilateral

2. Draw a different shape that belongs in each set.

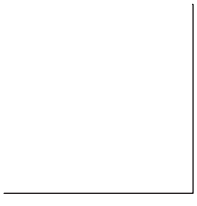
a) 

b) 

Stretch Your Thinking

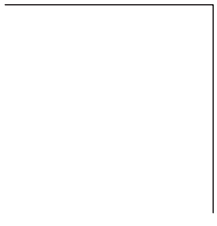
Complete each polygon.

a) a convex polygon



b) a concave polygon

c) a regular polygon



UNIT 6

STUDENT BOOK 5 LESSON

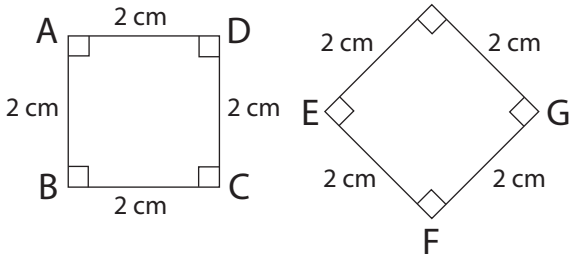
Congruence in Regular Polygons

Quick Review

At Home At School

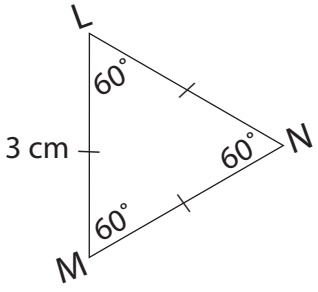
Here are 2 ways to show 2 squares are **congruent**.

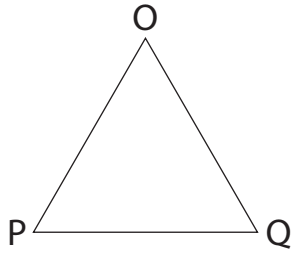
- Place one square on top of the other.
  If they match exactly, they are congruent.
- Compare the side and angle measures.
  If all sides are equal and all angles are equal, the squares are congruent.



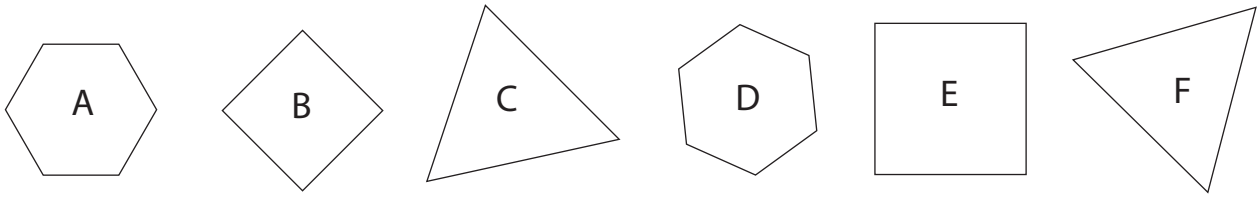
Try These

1. Triangles LMN and OPQ are congruent.
Write the measure of each angle and the length of each side in OPQ.



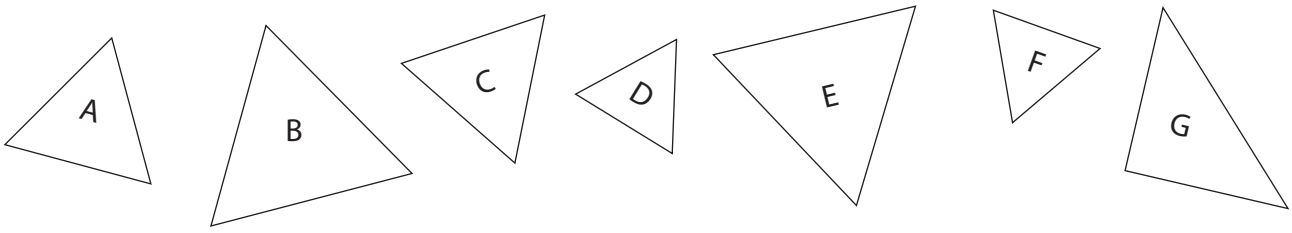


2. Which of these polygons are congruent? Explain how you know.

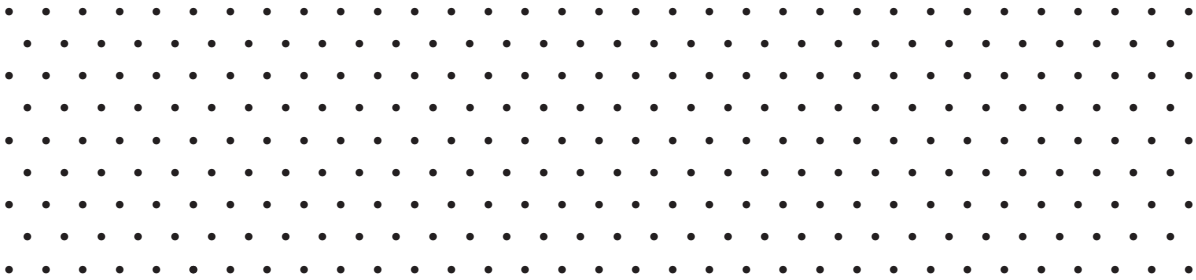


Practice

1. Find pairs of congruent triangles. Join each pair with a line.

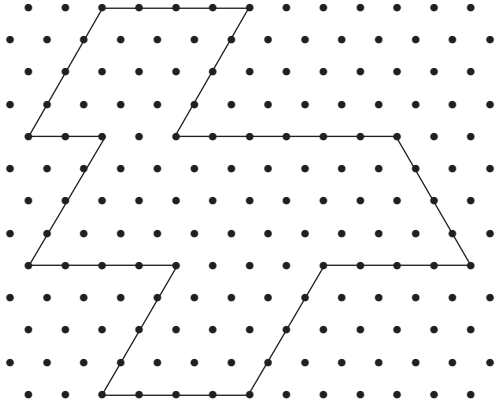


2. Draw 3 congruent regular triangles.
Label the angle measures and side lengths of each.



Stretch Your Thinking

Draw lines to divide this shape into 9 congruent triangles.



UNIT 6

STUDENT BOOK 7 LESSON

Perimeters of Polygons

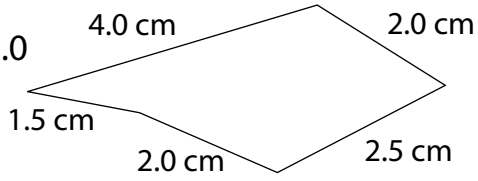
Quick Review

At Home At School

➤ We can find the perimeter of any polygon by adding the side lengths.
For this pentagon:

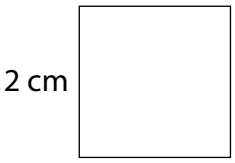
Perimeter $= 4.0 + 1.5 + 2.0 + 2.5 + 2.0$
$= 12$

The perimeter is 12 cm.



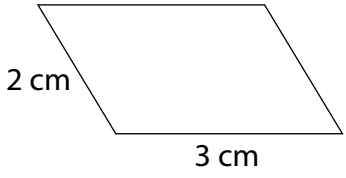
➤ We can use a formula to find the perimeter of some polygons.

Square



$P = s \times 4$
$P = 2 \times 4$
$= 8$

Parallelogram



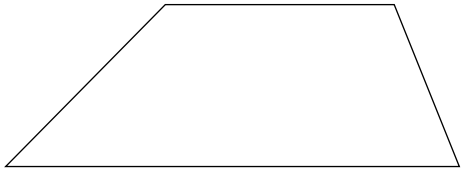
$P = 2 \times (\ell + s)$
$P = 2 \times (3 + 2)$
$= 2 \times 5$
$= 10$

The perimeters of the polygons are 8 cm and 10 cm.

Try These

1. Find the perimeter of each polygon.

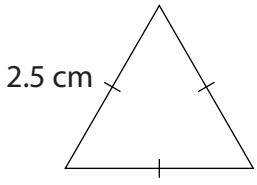
a)



_____

_____

b)

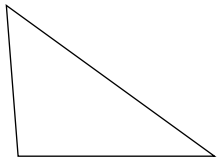


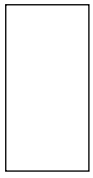
_____

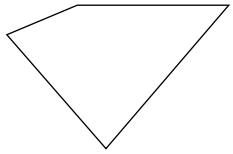
_____

Practice

1. Find the perimeter of each polygon.

a) 

b) 

c) 

_____ _____ _____

_____ _____ _____

2. Kerry skates laps around the playground.
The playground is 150 m long and 50 m wide.
How many laps will it take Kerry to skate 1 km? _____

_____

3. The perimeter of an equilateral triangle is 5.1 m. How long are its sides?
Give your answer in as many different units as you can.

_____

_____

4. The perimeter of an atlas is 1.4 m.
How long might each side be? _____

_____

5. Suppose the side lengths of a rectangle are halved.
What would happen to the perimeter?

_____

Stretch Your Thinking

One side of Kirby's rectangular
garden measures 5 m.
The perimeter of the garden is 27 m.
Draw a sketch of Kirby's garden.
Label the side lengths.

UNIT 6

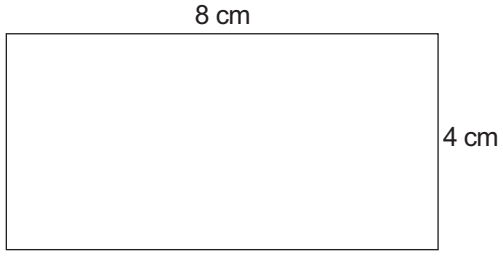
STUDENT BOOK 8 LESSON

Area of a Rectangle

Quick Review

At Home At School

Here is one way to find the area of a rectangle.



➤ Multiply the length by the width.
$8 \times 4 = 32$
So, the area of the rectangle is 32 cm^2.

Rule: To find the area of a rectangle, multiply the length by the width.

Formula: Area = length $\times$ width
$A = \ell \times w$

Try These

Find the area of each rectangle.
Complete the chart.

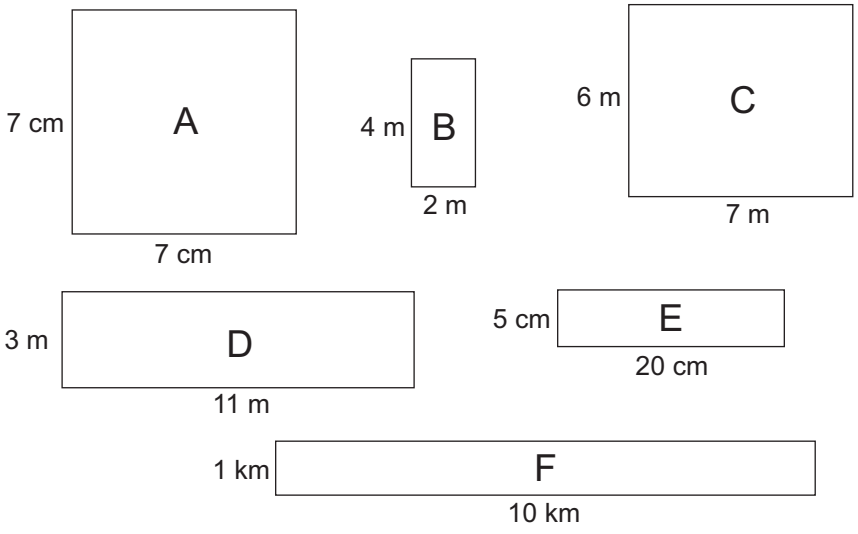
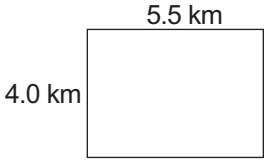


Figure	Area
A	
B	
C	
D	
E	
F	

Practice

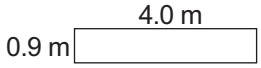
1. Find the area of each rectangle.

a)



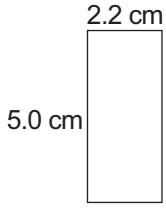
Area = _____

b)



Area = _____

c)



Area = _____

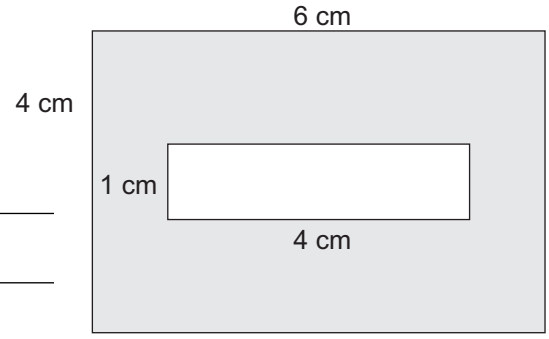
2. Measure the length and width of each object to the nearest unit. Use these dimensions to find the area. Record your work in the chart.

Object	Length	Width	Area
a tabletop			
the classroom floor			
a sheet of paper			
a page from a magazine			

3. Draw a rectangle with an area of 12 cm^2. Label the side lengths.

Stretch Your Thinking

Find the area of the shaded part of the rectangle. Show all your work.



_____

_____

_____

_____

UNIT 6

STUDENT BOOK 9 LESSON

Volume of a Rectangular Prism

Quick Review

At Home At School

You can use a formula to find the volume of a rectangular prism. The volume is the product of the prism's length, width, and height.

Volume = length × width × height

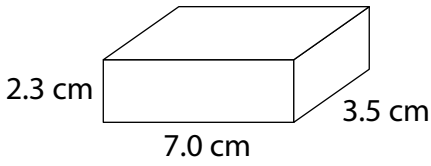
$V = \ell \times w \times h$

This rectangular prism is 7.0 cm long, 3.5 cm wide, and 2.3 cm high.

Volume = 7.0 cm × 3.5 cm × 2.3 cm

= 24.5 cm^2 × 2.3 cm

= 56.35 cm^3

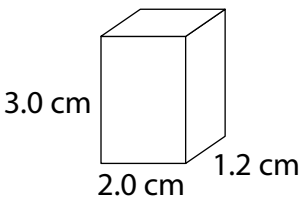


The volume of the prism is 56.35 cm^3.

Try These

1. Find the volume of each rectangular prism.

a)



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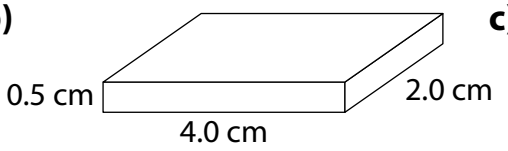
b)



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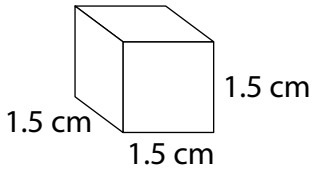
c)



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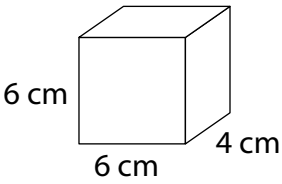
d)



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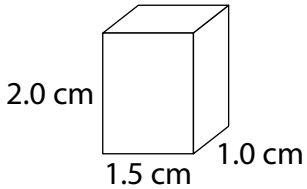
e)



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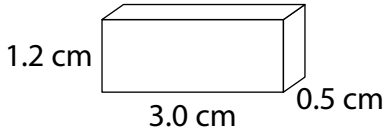
f)

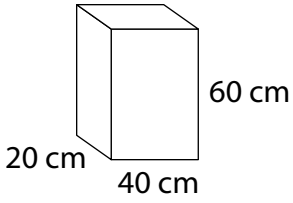


_____

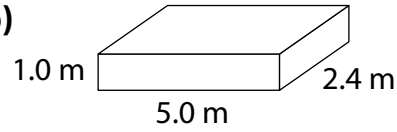
Practice

1. Find the volume of each box.

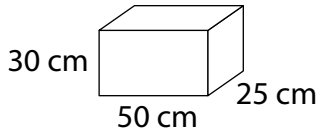
a)



b)



c)



_____ _____ _____

2. Work with a partner.

a) Find 4 small boxes. Label the boxes A, B, C, and D.

b) Measure the dimensions of each box. Estimate, then calculate, each volume. Record your results in the table.

Box	Length	Width	Height	Estimated Volume	Actual Volume
A					
B					
C					
D					

3. Complete each table.

a)

Length (cm)	Width (cm)	Height (cm)	Volume (cm^3)
6	9	3	
8		2	80
4	3		48
	5	5	125

b)

Length (cm)	Width (cm)	Height (cm)	Volume (cm^3)
5.3	4.0	7.1	
6.0	3.2		96
	2.0	1.1	22
12.0		4.0	120

Stretch Your Thinking

Jocelyn built a rectangular prism with 36 centimetre cubes.
What might be the dimensions of the prism? Give as many answers as you can.

_____

_____

UNIT 7

STUDENT BOOK 1 LESSON

Using a Questionnaire to Gather Data

Quick Review

At Home At School

Here are some guidelines for writing questions for a questionnaire.

➤ The question should be understood in the same way by all people.

Instead of asking: Do you play video games a lot? ☐ Yes ☐ No
Ask: How many hours a week do you spend playing video games? _____

➤ Each person should find an answer he would choose.

Instead of asking: What's your favourite subject? ☐ Math ☐ Science
Ask: What's your favourite subject?
☐ Math ☐ Science ☐ Other _____

➤ The question should be **fair**. It should not influence a person's answer. If it does, it is a **biased question**.

Instead of asking: Do you prefer boring documentaries or hilarious sitcoms?
Ask: What kind of TV shows do you prefer? ☐ Documentaries
☐ Sitcoms ☐ Dramas ☐ Reality Shows ☐ Other _____

Try These

1. Write better questions.

a) Do you get a lot of sleep on school nights? ☐ Yes ☐ No

_____

b) What is your favourite reality show? ☐ Survivor ☐ The Amazing Race

_____

_____

c) Do you prefer greasy potatoes or healthy carrots?

_____

_____

Practice

1. Which question is unbiased? Explain.

a) Which beverage do you prefer to drink with lunch?
☐ Juice ☐ Water ☐ Other (please specify) _____

b) Do you prefer drinking refreshing juice or plain water with your lunch?

_____

_____

2. Which question would not be understood in the same way by all people? Explain.

a) Do you get up early on the weekend?

b) What time do you get up on the weekend?

_____

_____

3. Suppose you want to know what winter activity your classmates like best.

a) Write a question you could ask.

b) How do you know if your question is a fair question?

_____

_____

_____

_____

_____

Stretch Your Thinking

A radio station wants to find out what kind of music they should play.
Write a questionnaire the station could use to help them make their decision.

_____

_____

UNIT 7

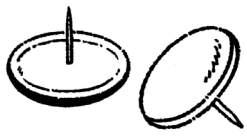
STUDENT BOOK 2 LESSON

Conducting Experiments to Gather Data

Quick Review

At Home At School

➤ Solomon wanted to answer this question:
Is a thumbtack more likely to land pointed end up or pointed end sideways?



To find out, Solomon dropped 10 thumbtacks a total of 10 times. He recorded the results in a tally chart.

Pointed End Up	Pointed End Sideways
𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 |||	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||

From the data, Solomon concluded that a thumbtack is more likely to land with the pointed end up than with the pointed end sideways.

Try These

1. a) Repeat Solomon's experiment.
Record your results in the tally chart.

b) How do your results compare with Solomon's?

Pointed End Up	Pointed End Sideways

_____

_____

2. Is a penny more likely to come up heads or tails?
Flip a penny 30 times. Record the results in the tally chart.

Heads	Tails

What conclusion can you make?

_____

Practice

1. Rudy and Janet experimented with 3 different wind-up cars to answer this question: Which car travels the greatest distance?
They wound up each car 4 times and measured how far each went.

Car	Trial 1	Trial 2	Trial 3	Trial 4
Car #1	4.2 m	5.1 m	4.8 m	5.0 m
Car #2	6.3 m	6.8 m	7.0 m	6.7 m
Car #3	5.9 m	5.7 m	6.4 m	5.9 m

What answer would you give to the question above? Explain.

2. How long does it take a Grade 6 student to multiply 27×49: less than 30 s, 30–60 s, or more than 60 s?

a) Predict the answer to the question above. Explain.

b) Design an experiment you can use to check your prediction.

c) Conduct the experiment. Record the results in a chart.

d) What conclusions can you make from your data?

Stretch Your Thinking

Write a question you would like answered. Which method would you use to collect data to answer your question?

UNIT 7

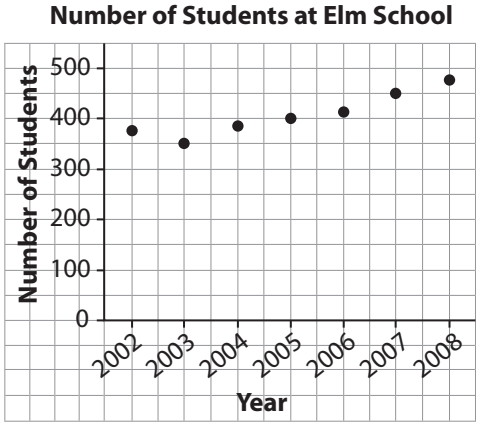
STUDENT BOOK 3 LESSON

Interpreting Graphs

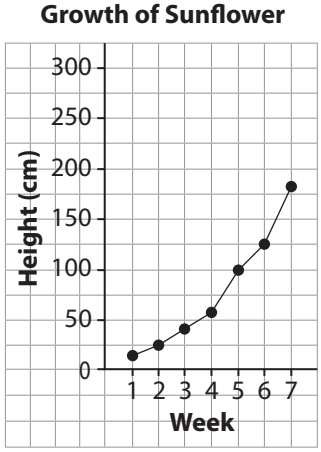
Quick Review

At Home At School

➤ This graph is a series of points that are not joined.
It shows **discrete data**.
There are gaps between values.
Usually, discrete data represent things that can be counted.



➤ This graph shows consecutive points joined by line segments.
This is called a **line graph**.
It shows **continuous data**.
Continuous data can include any value between data points.
Time, money, temperature, and measurements are continuous.



Try These

1. Would you use a series of points or a line graph to display each set of data?

a) the diameter of a maple tree over 10 years _____

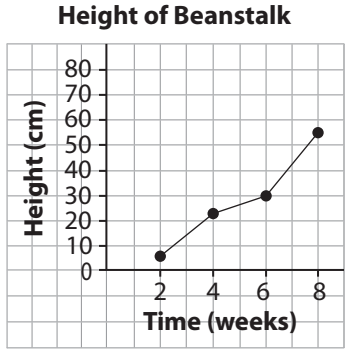
b) the number of hot dogs sold on Hot Dog Day _____

c) the length of a snake as it grows _____

d) the population of Richmond, BC, from 2005 to 2008 _____

Practice

1. **a)** What does this line graph show?



_____

b) About how tall was the beanstalk at each time?

•2 weeks _____ •4 weeks _____

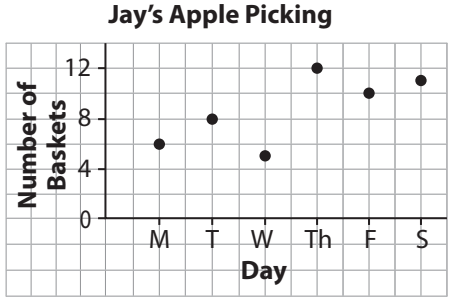
•6 weeks _____ •8 weeks _____

c) What conclusions can you make from the graph?

_____

_____

2. **a)** Use the graph. How many baskets of apples did Jay pick on each day?



• Monday ___

• Thursday ___

• Altogether ___

b) What conclusions can you make from the graph?

_____

_____

_____

Stretch Your Thinking

Describe a set of data for which you would use:

a) a line graph _____

b) a series of points _____

_____

UNIT 7

STUDENT BOOK 4 LESSON

Drawing Graphs

Quick Review

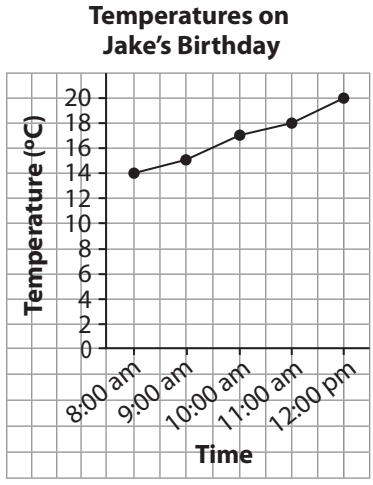
At Home At School

➤ This table shows the changes in temperature from 8:00 am to 12:00 pm on Jake's birthday.

Time	Temperature (°C)
8:00 am	14
9:00 am	15
10:00 am	17
11:00 am	18
12:00 pm	20

To display these data:

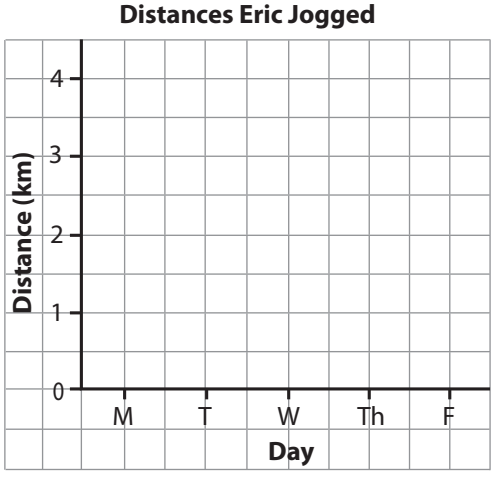
- Draw and label 2 axes.
- Choose an appropriate scale for each axis.
- Mark points for the data.
- Both time and temperature are continuous. So, join consecutive pairs of points.
- Give the graph a title.



Try These

1. Eric jogged every day from Monday to Friday. He recorded the distances in a chart. Display these data in a graph.

Day	Distance (km)
Monday	1.0
Tuesday	1.5
Wednesday	2.0
Thursday	2.5
Friday	3.5

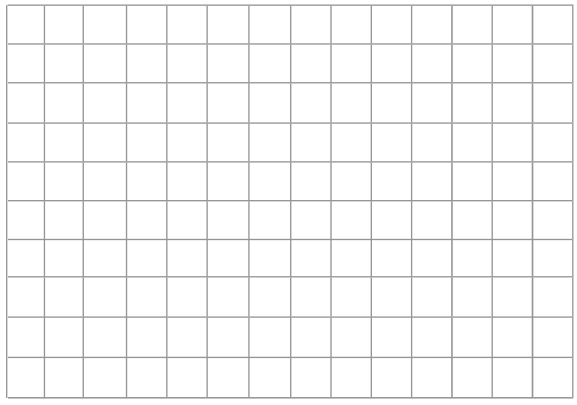


Practice

1. Sammi measured the mass of her dog on the first of the month for 6 months.

Month	January	February	March	April	May	June
Mass (kg)	3	3.5	4	5	5.5	6

a) Draw a graph to display these data.



b) How did you choose the scale on the vertical axis?

_____

_____

_____

c) Did you join the points? Explain.

_____

d) What do you know from looking at the graph?

_____

_____

Stretch Your Thinking

Would you use a line graph or a series of points to display each set of data? Explain your choices.

a) The number of lunches sold in the school cafeteria every day for a month

_____

b) The volume of water in a bathtub as it fills

_____

UNIT 7

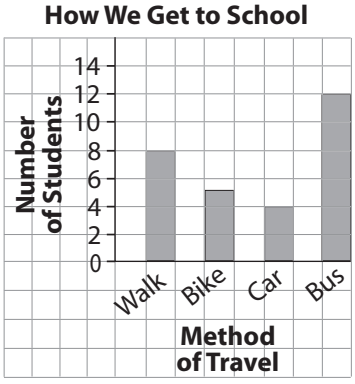
STUDENT BOOK 5 LESSON

Choosing an Appropriate Graph

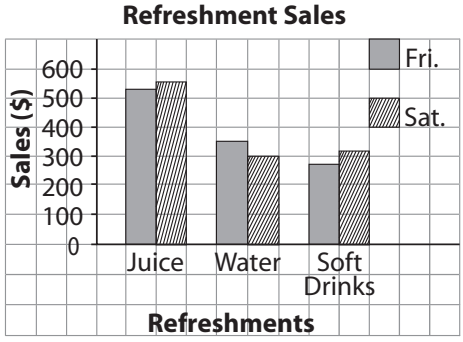
Quick Review

At Home At School

When you decide which type of graph to use, choose a graph that best represents the data.



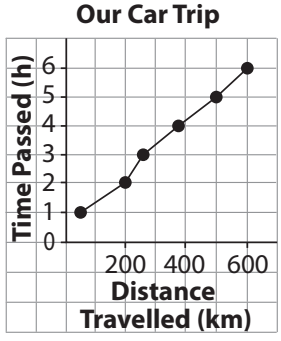
Bar Graph



Double Bar Graph

Favourite Kinds of TV Shows	
Comedy	
Sports	
Reality	
Drama	
	= 10 votes

Pictograph



Line Graph

Try These

1. Draw a graph to display these data.

Our Favourite Seasons

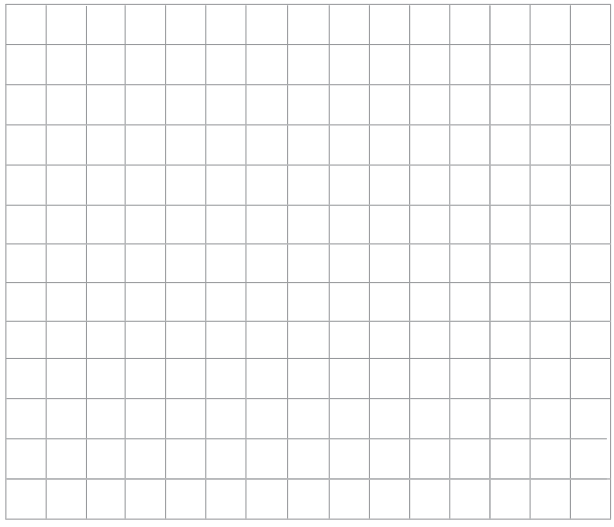
Season	Number of Girls	Number of Boys
Spring	6	4
Summer	9	12
Fall	6	7
Winter	5	6

Practice

1. Draw a graph to display each set of data.

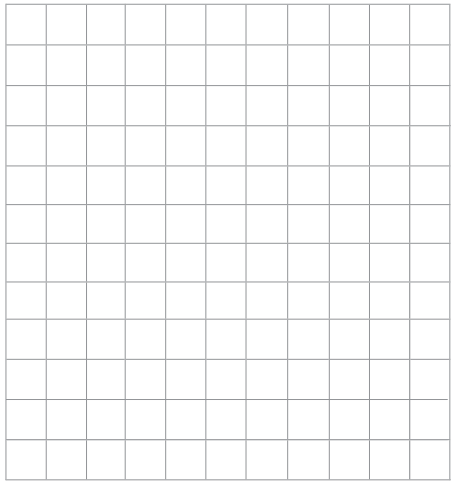
a) Students Who Wear Glasses

Grade	Number of Students
1	2
2	4
3	8
4	7
5	3
6	9



b) Albert's Height

Age (years)	Height (cm)
2	80
3	89
4	94
5	100
6	108
7	114



Stretch Your Thinking

How do you decide which type of graph to use to display data?

UNIT 7

STUDENT BOOK 6 LESSON

Theoretical Probability

Quick Review

At Home At School

➤ This table shows the possible outcomes when 2 dice are rolled and the numbers are added.

+	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

From the table:
- There are 36 possible outcomes.
- 18 outcomes are odd sums.
- 18 outcomes are even sums.

We say: The **probability** of getting an odd sum is 18 out of 36.
We write the probability of an odd sum as a fraction: $\frac{18}{36}$

This probability is a **theoretical probability**.

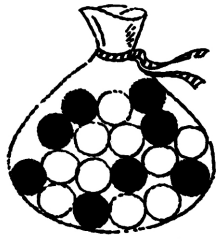
Theoretical probability = $\frac{\text{Number of favourable outcomes}}{\text{Number of possible outcomes}}$

The probability of an odd sum is $\frac{18}{36}$. The probability of an even sum is $\frac{18}{36}$.

Since $\frac{18}{36} = \frac{18}{36}$, the probability of getting an odd sum or an even sum is equally likely.

Try These

1. A bag contains 10 white marbles and 8 black marbles.
A marble is picked at random.
What is the probability
that a black marble is picked? _____



2. 16 girls and 13 boys put their names in a bag.
One name is drawn from the bag. What is the probability
that a boys name will be drawn? _____

Practice

1. A box contains 8 red apples, 10 green apples, and 12 yellow apples. Without looking, you pick an apple from the box.

a) What are the possible outcomes?

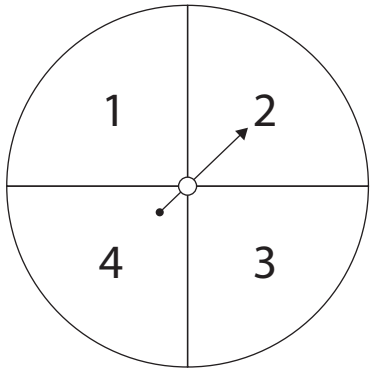
_____

b) How many apples are in the box? _____

c) What is the theoretical probability that the apple is:

i) red? _____ **ii)** green? _____ **iii)** yellow? _____

2. Suppose you spin the pointer on this spinner. What is the probability of each outcome?



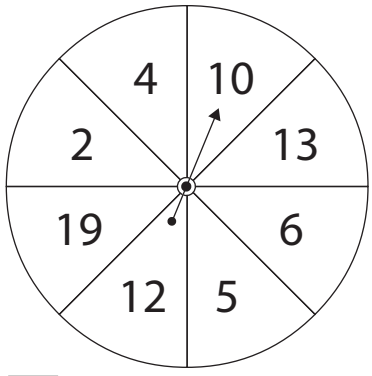
a) The pointer lands on 1. _____

b) The pointer lands on 2. _____

c) The pointer lands on 3 or 4. _____

d) The pointer does not land on 3. _____

3. Rafik spins the pointer on this spinner.



a) List the possible outcomes. _____

b) What is the probability of each outcome?

i) The pointer lands on a prime number? _____

ii) The pointer lands on a composite number? ___

iii) The pointer lands on a number greater than 10? ___

Stretch Your Thinking

Draw and colour marbles in the bag so that the probability of picking a green marble is greater than the probability of picking a red marble, but less than the probability of picking an orange marble.

UNIT 7

STUDENT BOOK 7 LESSON

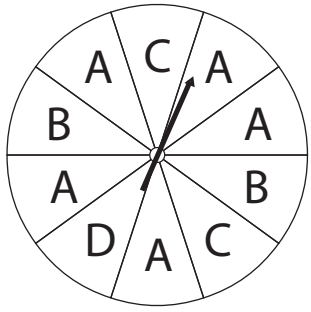
Experimental Probability

Quick Review

At Home At School

➤ Saul spun the pointer on this spinner 10 times.
The theoretical probability of landing on the letter A is $\frac{5}{10}$, or $\frac{1}{2}$.
Here are Saul's results.

Letter	A	B	C	D
Number of Times	6	1	2	1



The **experimental probability** is the likelihood that something occurs based on the results of an experiment.

$$\text{Experimental probability} = \frac{\text{Number of times an outcome occurs}}{\text{Number of times the experiment is conducted}}$$

The experimental probability of landing on the letter A is $\frac{6}{10}$, or $\frac{3}{5}$.
This is different from the theoretical probability.

➤ Saul combined the results from 10 experiments.

Letter	A	B	C	D
Number of Times	51	19	8	22

The experimental probability of landing on the letter A is $\frac{51}{100}$.
The experimental probability is close to the theoretical probability.
The more trials we conduct, the closer the experimental probability may come to the theoretical probability.

Try These

1. Look at the table of Saul's individual results.
What is the experimental probability of landing on:

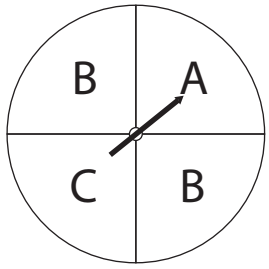
i) B? _____ **ii)** C? _____ **iii)** D? _____ **iv)** B or C? _____ **v)** A or D? _____

2. Look at the table of Saul's combined results.
What is the experimental probability of landing on:

i) B? _____ **ii)** C? _____ **iii)** D? _____ **iv)** B or D? _____

Practice

1. Tatiana spins the pointer on this spinner several times.
Here are her results.



A	B	C
𝍸 𝍸 ||	𝍸 𝍸 𝍸 𝍸	𝍸 |||

a) How many times did Tatiana spin the pointer? _____

b) What fraction of the spins were A? _____ B? _____ C? _____

2. A coin is tossed 100 times.
Heads showed 43 times and tails showed 57 times.

a) What are the possible outcomes? _____

b) What is the experimental probability of the tosses showing:

i) heads? _____ **ii)** tails? _____

c) What is the theoretical probability of the tosses showing:

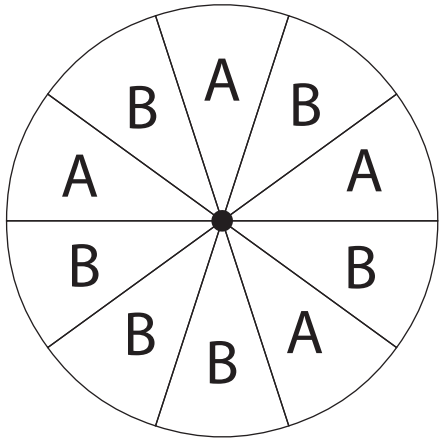
i) heads? _____ **ii)** tails? _____

Stretch Your Thinking

a) What is the theoretical probability of the pointer landing on:

i) A? _____ **ii)** B? _____

b) Use an opened paper clip as a pointer.
Spin it 100 times. Record the results.



A	B

c) What is the experimental probability of the pointer landing on:

i) A? _____ **ii)** B? _____

UNIT 8

STUDENT BOOK 1 LESSON

Drawing Shapes on a Coordinate Grid

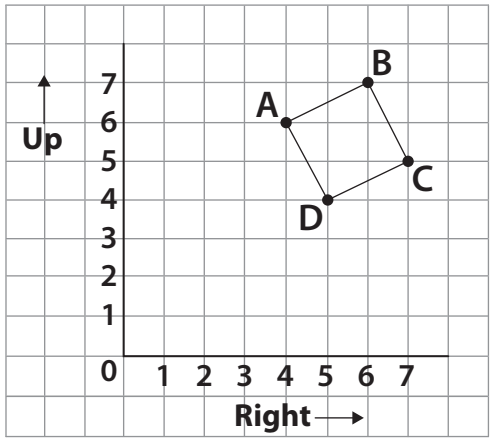
At Home At School

Quick Review

To describe the position of a shape on a grid, we use **ordered pairs**. The numbers in an ordered pair are called **coordinates**.

The first coordinate tells how far you move right. The second coordinate tells how far you move up.

The point A has coordinates (4, 6). We write: A (4, 6)



Try These

1. Match each ordered pair with a letter on the grid.

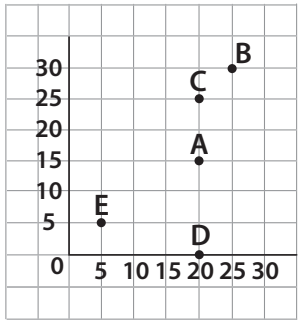
a) (20, 15) _____

b) (25, 30) _____

c) (5, 5) _____

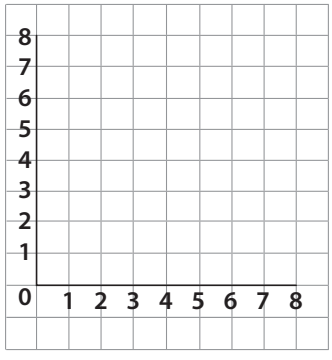
d) (20, 0) _____

e) (20, 25) _____



2. **a)** Plot each point on the grid.

A (2, 3)
B (5, 7)
C (7, 7)
D (8, 5)
E (6, 2)



b) Join the points in order. Then join E to A.

What figure have you drawn? _____

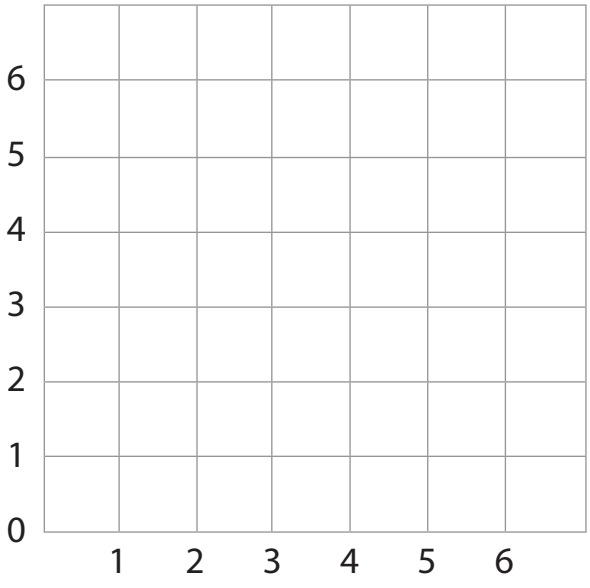
Practice

Play this game with a partner.
You will need a number cube.

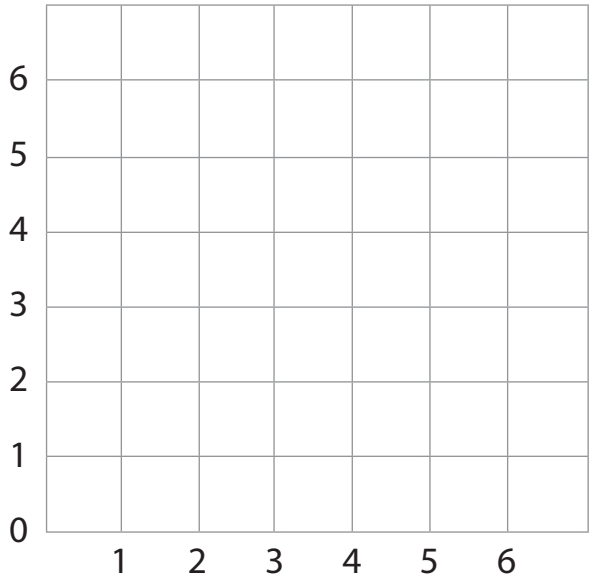
Take turns:

- Roll the number cube twice.
  Use the numbers rolled as an ordered pair.
  Plot the point on your grid.
- If you roll an ordered pair which has already been plotted, you miss your turn.
- The first player to plot 4 points that form a rectangle is the winner.

Player 1



Player 2



Stretch Your Thinking

Write the coordinates of each point on your game grid.

Write the coordinates of each point on your partner's grid.

UNIT 8

STUDENT BOOK 2 LESSON

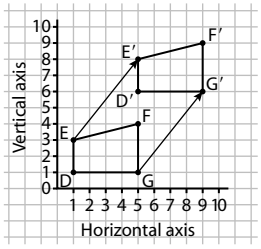
Transformations on a Coordinate Grid

Quick Review

At Home At School

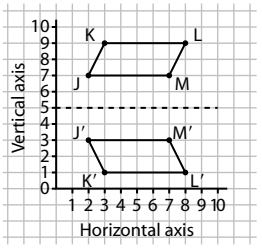
We can show transformations on a coordinate grid.

➤ **Translation**



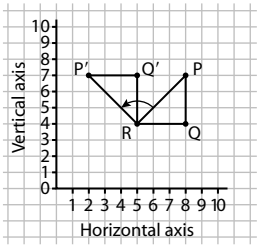
Quadrilateral DEFG was translated 4 squares right and 5 squares up.

➤ **Reflection**



Quadrilateral JKLM was reflected in a horizontal line through the vertical axis at 5.

➤ **Rotation**



Triangle PQR was rotated 90° counterclockwise about vertex R.

Try These

1. a) Identify this transformation.

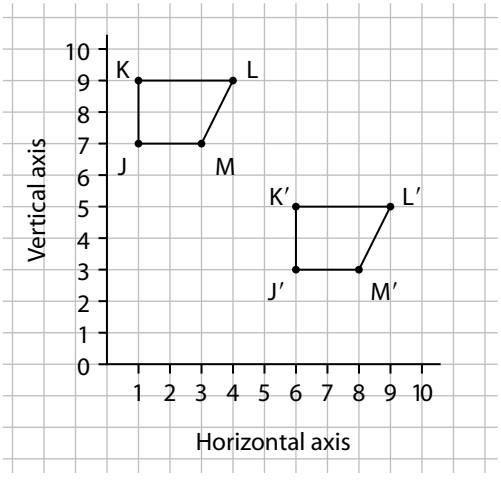
_____

_____

b) Write the coordinates of the vertices of the quadrilateral and its image.

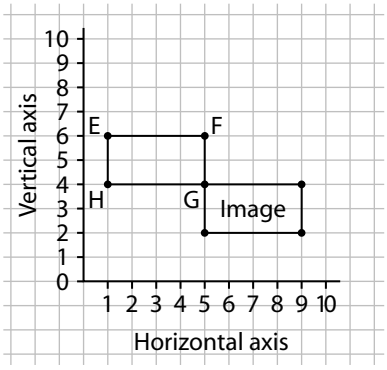
_____

_____

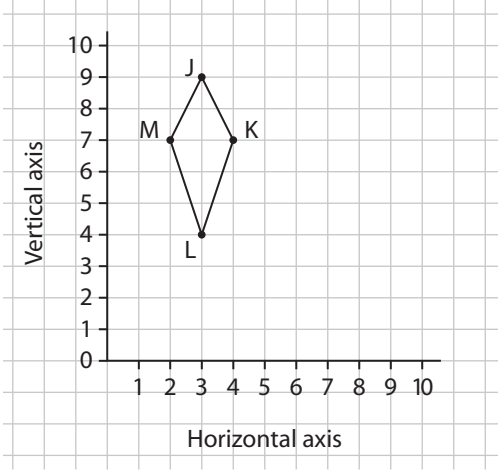


Practice

1. Describe as many different transformations as you can that would move Rectangle EFGH onto the image.



2. **a)** Draw the image of Kite JKLM after a 90° turn clockwise about vertex L. Label the vertices of the image.

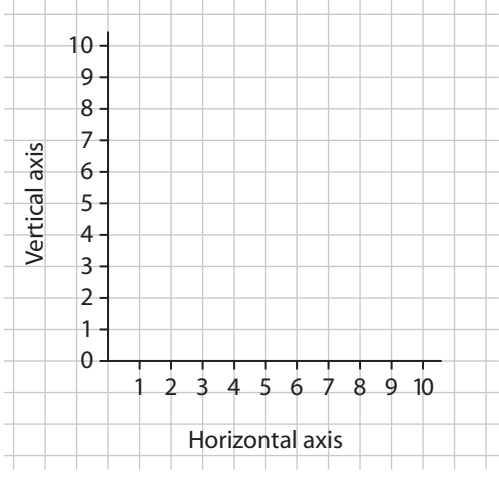


b) Write the coordinates of each vertex.

c) Write the coordinates of the vertices of the image.

Stretch Your Thinking

Draw a shape for which a translation image could also be a reflection image.
Draw the image. Write the coordinates of the shape and the image.



UNIT 8

STUDENT BOOK 3 LESSON

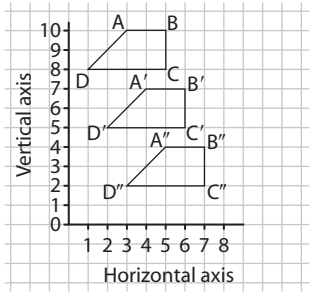
Successive Transformations

Quick Review

At Home At School

The same transformation can be applied to a shape more than once.

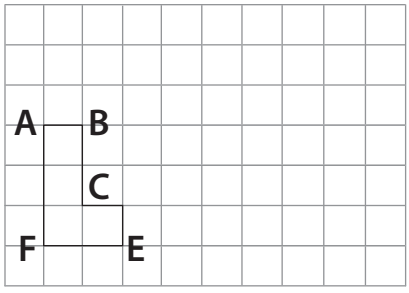
➤ When a shape is transformed 2 or more times, we say the shape undergoes **successive transformations**. Quadrilateral A″B″C″D″ is the image of Quadrilateral ABCD after 2 successive translations.



The same is true for rotations and reflections.

Try These

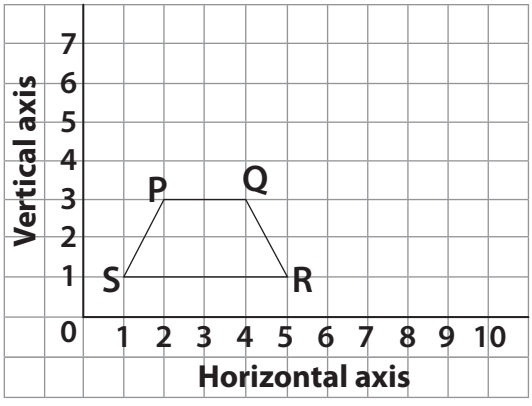
1. Make 2 successive translations of 3 squares right and 1 square up.



2. Rotate Trapezoid PQRS 180° about vertex Q.

Then rotate the image 180° about vertex S′.

Draw and label each image.

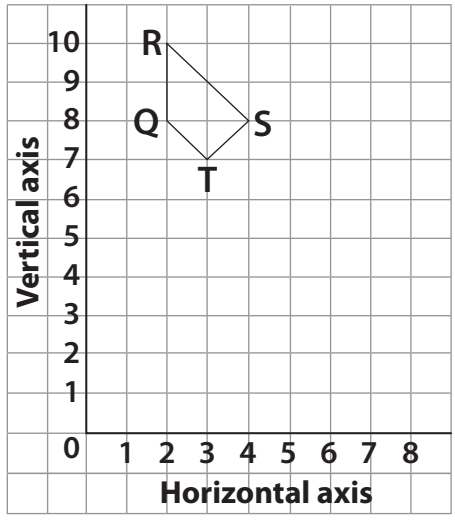


Practice

1. Translate the quadrilateral 3 squares right and 3 squares down.

Then translate the image 1 square left and 2 squares down.

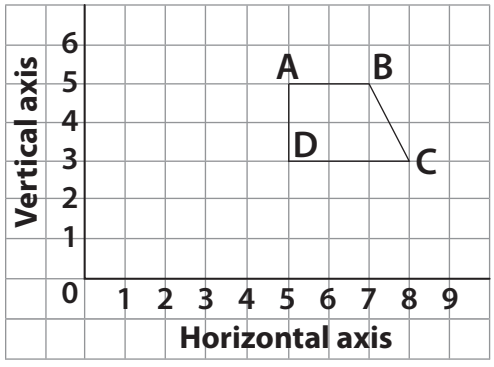
Draw and label each image.



2. Reflect the quadrilateral in a line through AD.

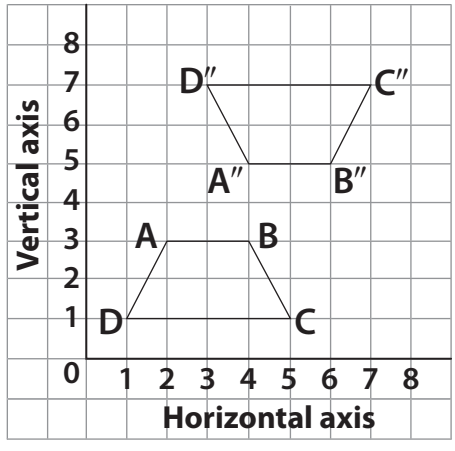
Then reflect the image in a line though C'D.

Then reflect the second image in a line through A″D.



Stretch Your Thinking

Describe 2 successive transformations that move Trapezoid ABCD to its image, A″B″C″D″.



UNIT 8

STUDENT BOOK 4 LESSON

Combining Transformations

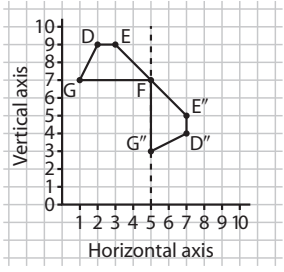
Quick Review

At Home At School

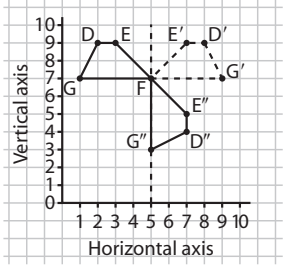
A combination of 2 or 3 different types of transformations can be applied to a shape.

To identify the transformations, we can work backward.

➤ Can you find a pair of transformations that move Trapezoid DEFG to its final image?

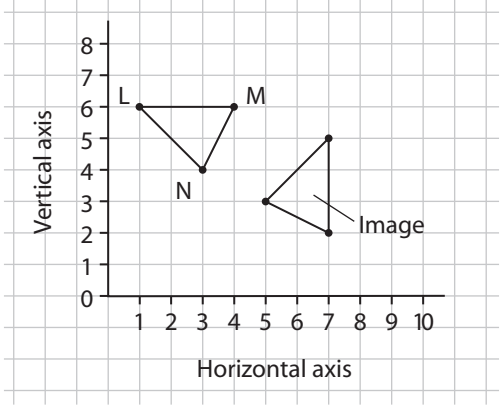


1. D′E′FG′ is a reflection in a vertical line through 5 on the horizontal axis.
2. D″E″FG″ is a rotation of 90° clockwise about vertex F.



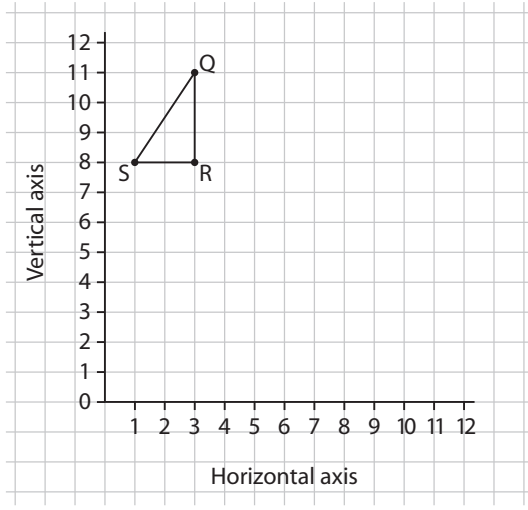
Try These

1. Describe a pair of transformations that move △LMN to its image.



Practice

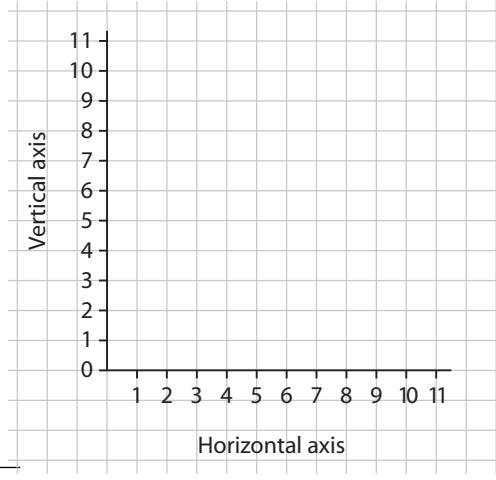
1. a) Translate △QRS 3 squares right and 2 squares down.
Then reflect the translation image in a vertical line through 7 on the horizontal axis.



b) List the coordinates of the final image.

_____

2. a) Draw a pentagon whose vertices have these coordinates:
A(4, 10) B(7, 10) C(8, 8)
D(6, 6) E(3, 8)



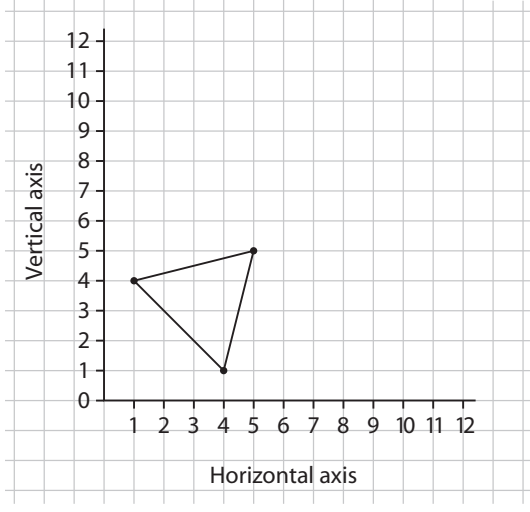
b) Rotate the pentagon 180° about D.
Then translate the rotation image 2 squares left.

c) List the coordinates of the final image.

_____

Stretch Your Thinking

Apply transformations to the triangle to make a design. Explain how you did it.



_____

_____

_____

_____

_____

UNIT 8

STUDENT BOOK 5 LESSON

Creating Designs

Quick Review

At Home At School

We can use transformations of one or more shapes to create a design.

➤ Start with Hexagon A.

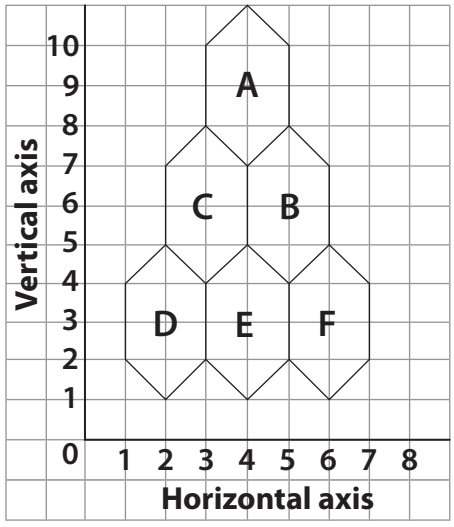
Translate the hexagon 1 square right and 3 squares down to get Image B.

Translate Image B 2 squares left to get Image C.

Translate Image C 1 square left and 3 squares down to get Image D.

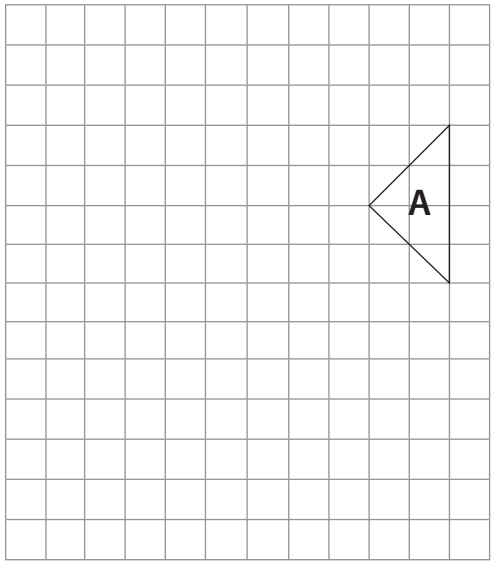
Translate Image D 2 squares right to get Image E.

Translate Image E 2 squares right to get Image F.



Try These

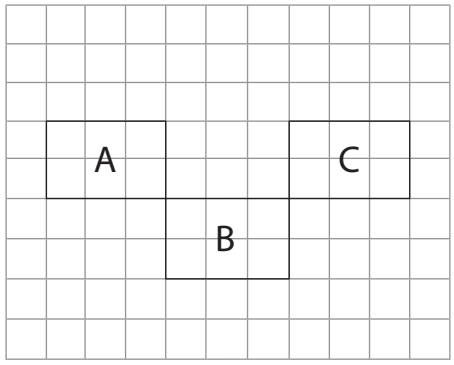
1. Transform this triangle to create a design. Describe the transformations you used.



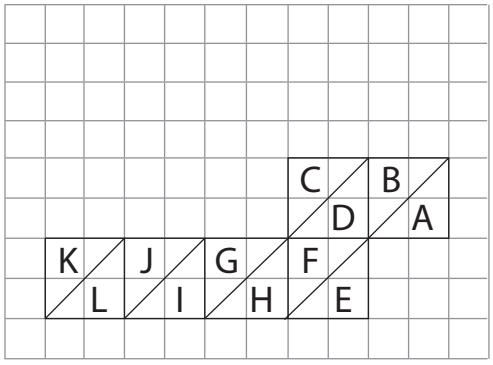
Practice

1. Describe a set of transformations that could be used to create each design.

a)

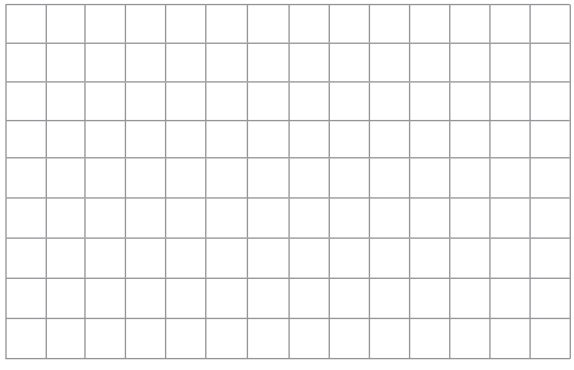


b)



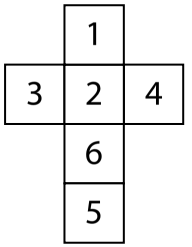
Stretch Your Thinking

Draw 2 shapes on the grid. Use a different colour for each shape.
Transform copies of the shapes to create a design.
Describe the transformations you used.



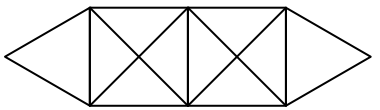
It's Amazing!

Tell a friend that you can look through number cubes to "see" the numbers on the other side.
Roll 5 number cubes that have been labelled as shown in the net.
After "pondering" for a few minutes, announce the sum of the numbers on the bottom of the cubes.



Here's how it works:
While you pretend to look through the cubes, mentally add up all the numbers on the top of the cubes.
Then, subtract the sum of the top numbers from 35.
The answer is the sum of the numbers on the bottom of the cubes.
Flip the cubes over, one by one, and add the numbers together as your friend stands in amazement.

Pencil Trail



Can you draw this figure without lifting your pencil?
You can cross lines, but you cannot retrace any.

Think About It!

If there are 3 CDs
and you take away 2,
how many will you have?

2; you took 2 CDs.

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Fold

Math at Home

Have you ever really wondered
How one million truly looks?
Could I eat one million candies
Or read one million books?
Would one million hockey cards
Fill the gap beneath my bed?
Could there be one million stringy hairs
Hanging from my head?
Do you think a large pile of sand
Could house one million ants?
Could there really be one million holes
Covering my pants?
Well, the other day, by surprise,
My teacher heard me say,
"I can't believe she really thinks
We learned one MILLION facts today!"

Math at Home 1

Risky Rules

You'll need:

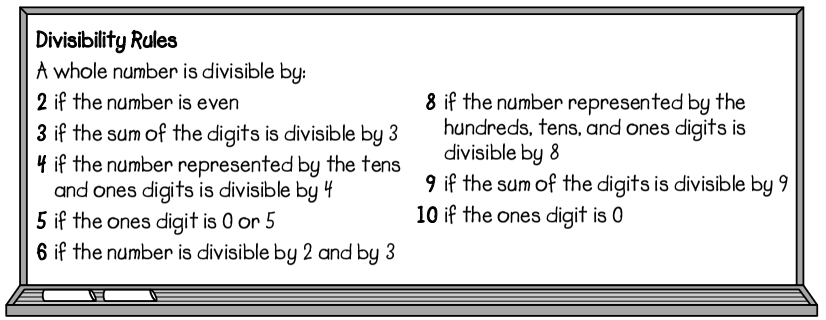
- 3 sets of number cards, each labelled 0 to 9
- 20 counters
- a list of divisibility rules (below)

The object of the game is to be the first player to get 10 counters.
Before beginning, shuffle the cards, place them face down, and have each player take 2 counters.

On your turn:

- Draw 6 cards from the deck. Place them face down in a row to make a 6-digit number. No peeking!
- Draw another card. The number on the card represents your divisor.
- Turn over the 6 cards. If the 6-digit number can be divided by your divisor, with no remainder, take 2 counters. If not, give 1 counter to your opponent.

Take turns until one player has 10 counters. If one player loses all his or her counters, start the game again.



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100-Chart Game Board

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiple Mambo

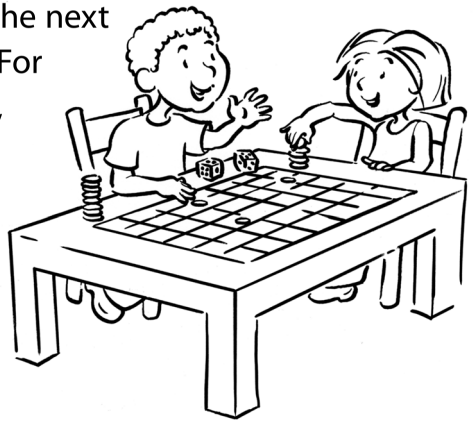
You'll need:

- 2 number cubes, each labelled 1 to 6
- 2 different colours of counters
- 100-chart game board (on page 7)

The object of the game is to be the first player to earn 12 points.

On your turn:

Use one colour of counter.
Roll both cubes and add the numbers together.
Place a counter on the sum on the 100 chart.
Now, put a counter on the next 6 multiples of the sum. For example, if the sum is 4, you would cover 4, 8, 12, 16, 20, 24, and 28.



Special Rules

1. Every time a player puts a counter on a number that's already covered, he or she gets a point.
2. After each round, clear the 100 chart and switch who goes first.
   Be the first to earn 12 points and you're the "Multiple Mambo" champ!

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Plot a Triangle

You'll need:

- 2 different coloured markers
- 2 number cubes, each labelled 1 to 6
- copies of the grid below

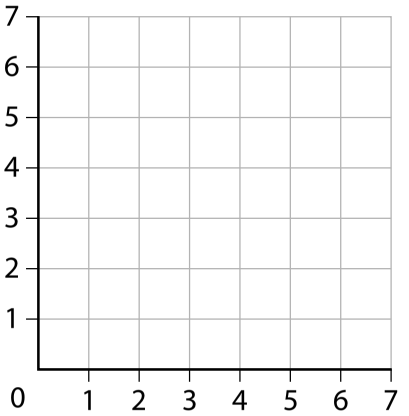
The object of the game is to be the first player to win three rounds.
To win a round, the area of your triangle must be smaller than the area of your opponent's triangle.

On your turn:

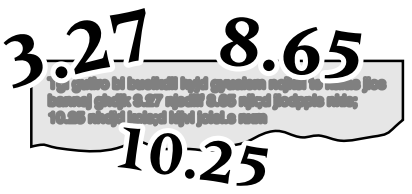
- Roll both number cubes. Use the numbers to create an "ordered pair." For example, if you roll 3 and 2, the ordered pair would be (3, 2) or (2, 3).
- Plot the point on the grid using one of the markers.

Take turns until each player has 3 different points plotted on the same grid.
Then, each player connects his or her coloured dots.

Compare the two triangles.
Estimate, then check, each area.
The player whose triangle has the smaller area wins the round.

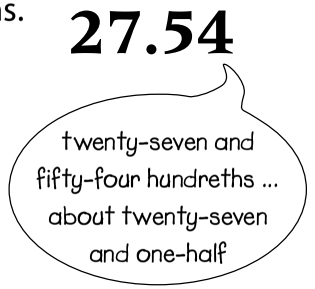


Boredom Buster

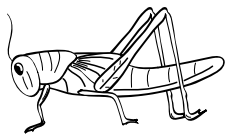


Instead of leaving that Saturday paper lying around, open it up and see how many decimal numbers you can find. Say each number out loud. Then, write it down. Ignore dollar signs and percent signs.

When you've got a big list, order the numbers from least to greatest. Do you notice anything interesting?



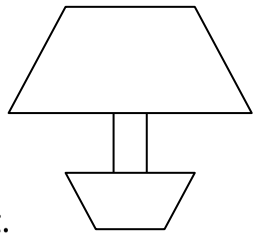
Did You Know?



The desert locust is sometimes considered to be the world's most destructive insect. In fact, large swarms of locusts can gobble up to 20 000 tonnes of grain and plants in just one day!

How many days would it take a large swarm to eat 1 million tonnes? 2 million tonnes?
F.Y.I.: 1 tonne = 1000 kg

Look Closely



Which is wider, the top of the shade for the "lamp" or the top of the base?

If you are not sure, measure to find out.

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How Many Millions?

You'll need:

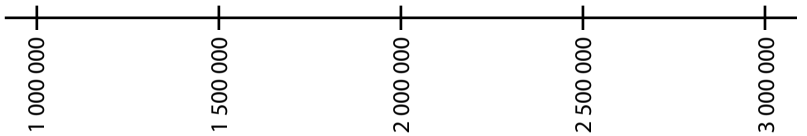
- a coin
- a number line (below)
- 20 small strips of paper
- a paper bag
- pencils

The object of the game is to have the least number of points at the end of the game.
Before you begin, print 20 different numbers, between 1 million and 3 million, on the paper strips.
Put the strips into the bag.
Place the number line in front of you.

On your turn:
Draw a number from the bag and read it out loud.
Estimate to mark its position on the number line.

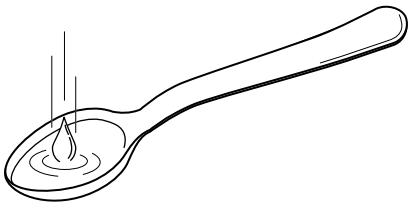
Take turns until each player has a number on the line.
Toss the coin. If it lands on heads, then the player with the greatest number gets a point. If it lands on tails, then the player with the least number gets a point.

Play until all numbers have been used.
Tally up your points.
The player with the *least* number of points wins!



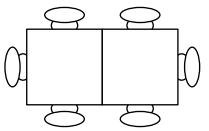
Did You Know?

Suppose it takes 120 drops of water to fill a teaspoon. Since 1 teaspoon equals 5 mL, how many drops of water does it take to fill 50 mL? 1 L?

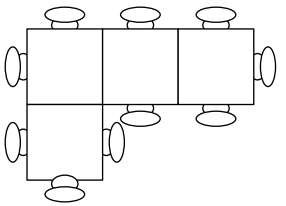


A Night Out

Suppose two friends go out for dinner. They are seated at a square table. Unexpectedly, 4 friends join them. They quickly pull 2 square tables together.



But wait! Suppose 4 more friends join the group and they add 2 more tables.



Friends keep arriving in groups of 4. What might the arrangement of tables look like if there were 12 extra friends? 16 extra friends? 24 extra friends?

Hint: *The pattern keeps "growing."*

Can you arrange the same number of tables in a different way so that the same number of friends can sit down?

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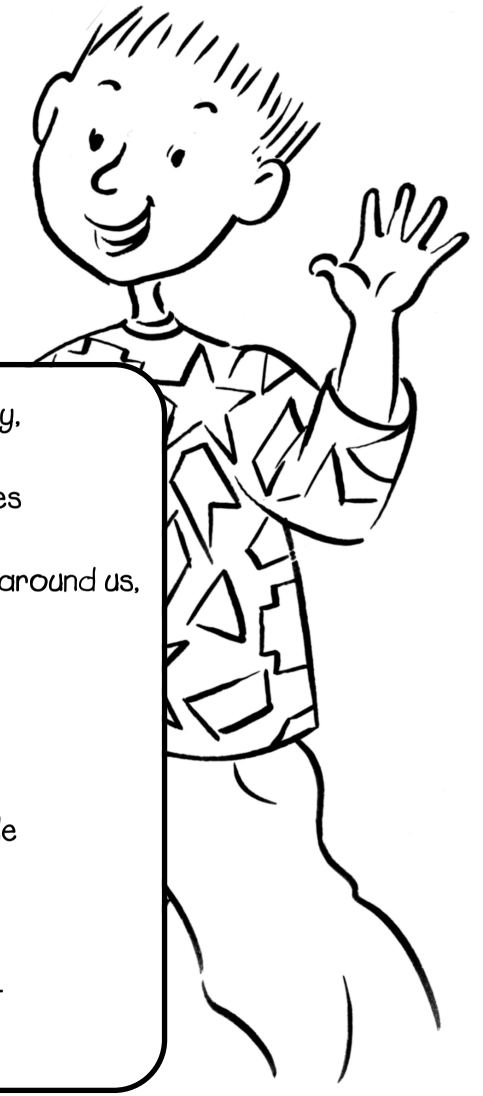
Fold

Math at Home

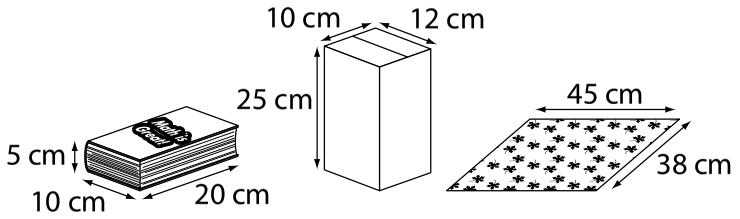


I heard so many things today,
There's hardly time to tell.
I found that measuring angles
In a polygon is swell.
I learned that shapes are all around us,
Like on this shirt I wore,
And this I know for certain:
This pattern's not a bore!
Do I see right angles?
Acute? Well, fancy that!
I can imagine a straight angle
As a line, clear and flat.
Wow! Do I feel dizzy . . .
I need to take a seat!
My investigations show that
Geometry is neat.

Math at Home 2

Wrap It Up

Seth has 2 gifts picked out for Elena, but has only one piece of wrapping paper.
Can he wrap either gift, assuming he covers it completely?

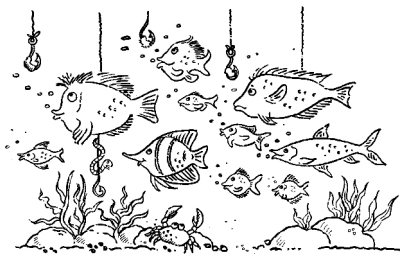


Hint: *Think about each gift as a rectangular prism. Then, think about its net.*

Let's Go Fishing!

Twelve boys and girls went fishing. Altogether they caught 55 fish. Each girl caught 5 fish and each boy caught 4 fish. How many boys and how many girls went fishing?

Hint: *Drawing a chart will help you out here!*



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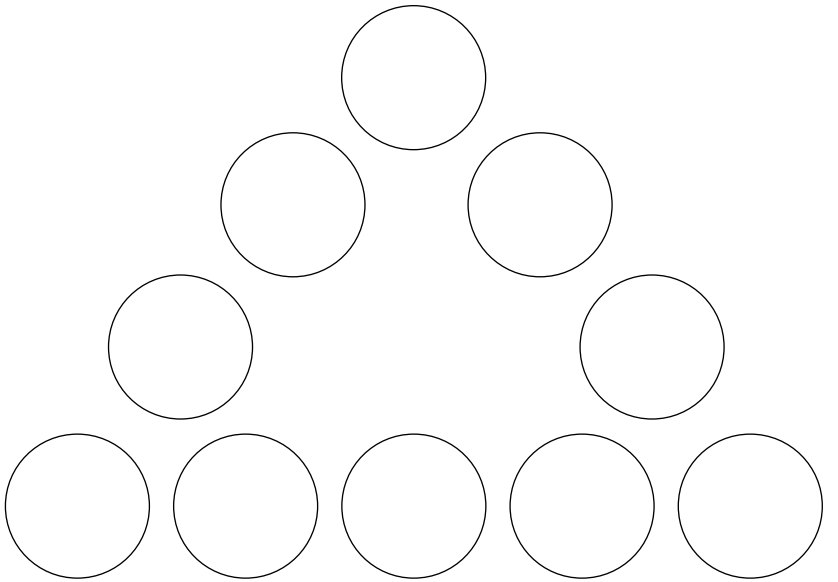
Triangle Sums

Put the numbers 0 to 9 in the circles so that the sum on each side of the triangle is the same.
How many different solutions can you find?



Roman Numeral Challenge

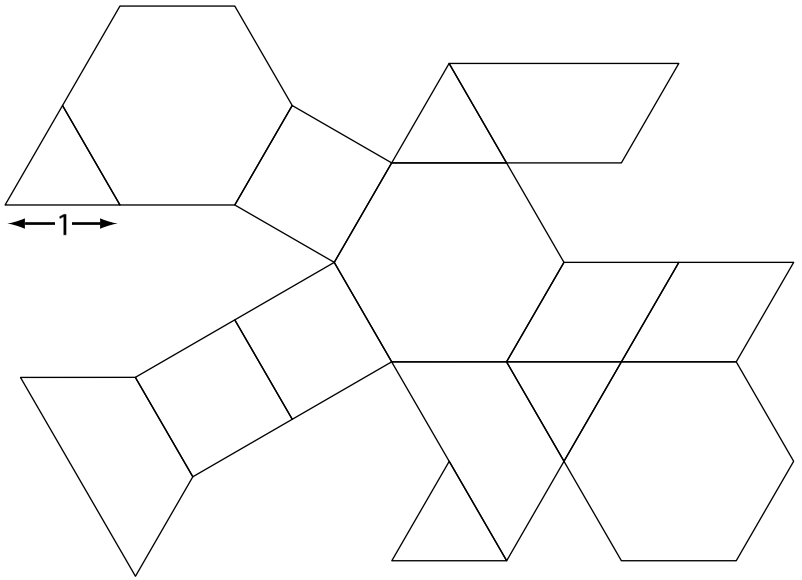
Without lifting your pencil, draw one continuous line to turn the Roman numeral IX into 6.

IX

Add the letter S.

Shape Puzzler

The shape below is made with Pattern Blocks.
If the length of each side of the triangle equals 1 unit, what is the perimeter of the whole shape?



Extra challenge:
Trace the shapes of all of the Pattern Blocks and cut them apart.
Rearrange them to make a new shape with a smaller perimeter.
Now, try to make one with a greater perimeter.

Does the area ever change? Why or why not?

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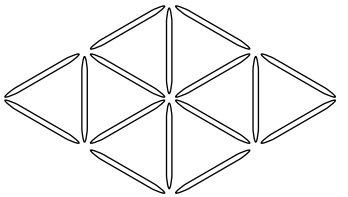
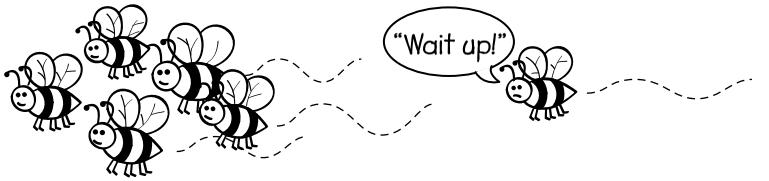
Triangle Tangle

Arrange 16 toothpicks as shown below.
Remove 4 toothpicks so that only 4 triangles remain.



Hint: *The triangles don't have to be congruent.*

Did You Know?



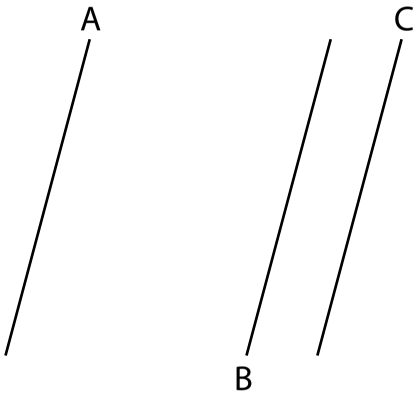
Suppose a honeybee can flap its wings about 250 times in just 1 s.
Complete the table below to show how many times it can flap its wings in 2 s, 3 s, and so on.
About how many times can a honeybee flap its wings in 1 min?

Time (s)	1	2	3	4	5
Number of Flaps					

Time (s)	6	7	8	9	10
Number of Flaps					

Look Closely

Which is greater, the distance from A to B or the distance from B to C?



Believe it or not, they are both the same!

Fun with Words

Look carefully at each group of letters.
Can you figure out what common Math term is "disguised" in each puzzle?

p l o t
graph

scatter plot graph

allel allel

"pair" allel lines

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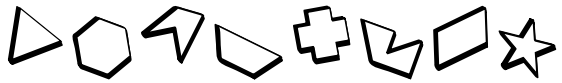


Shape Up!

You'll need:

- a variety of cutouts of shapes
- a number cube, labelled 1 to 6

The object of the game is to have the greater number of shapes at the end of the game.
Before you begin, draw and cut out a number of shapes and place them in front of you.

On your turn:

Choose any shape.
Roll the cube. Each number represents an attribute.

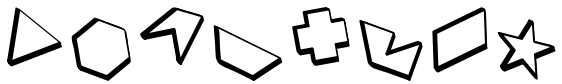
1—has 1 or more right angles	4—is concave
2—has more than 1 acute angle	5—has no parallel lines
3—has parallel lines	6—has 6 sides

If your shape has the attribute represented by the number on the cube, keep it. If not, put the shape back.

Take turns until all the shapes are gone.
The player with the greater number of shapes wins.

Extra challenge:

At the end of the game, sort your shapes into 2 or 3 different groups.
Challenge other players to guess your sorting rule.



I Wonder …

Do you ever wonder why, on some days, it seems to take "forever" to get to the mall and at other times, the trip seems to go really quickly?

Conduct your own experiment to see what you can find out.

Here's how:

- ➤ On your way to the mall, set a timer or check a watch, and record the car's speed at one-minute intervals.
- ➤ Use a table like the one below to record the speed.

Time (min)	1	2	3	4	5	6	7	8	9	10
Speed (km/h)										

- ➤ On the way home, do the same thing.
- ➤ When you get home, look at your data and find the total number of minutes it took to travel each way. Ask an older family member to help you calculate the mean speed the car was travelling for each part of the trip.

What did you find out?

Try the experiment on a few more trips to the mall to see how the data change each time!

So … is it all in your head, or does it actually take longer sometimes?

 The next 4 pages fold in half to make an 8-page booklet.

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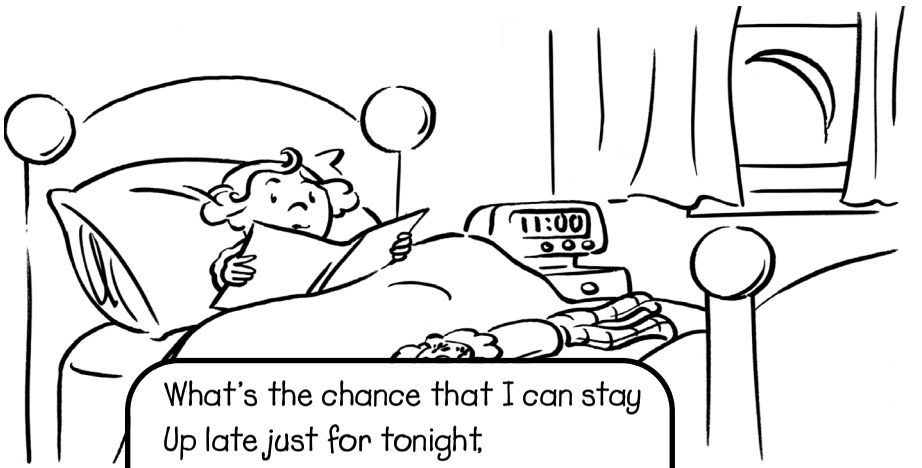
Fold

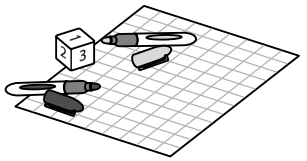
Math at Home



What's the chance that I can stay
Up late just for tonight,
Or skip my Math assignment
Without an argument or fight?
Is it really very likely
I won't have to eat my peas,
Or always use polite words
Like pardon me and please?
Are the chances very good
That my brother won't be mad
If I mess up all his stuff,
Then tell Mom that he was bad?
Although I'd like to risk it,
The odds aren't looking great.
Luck or probability …
I'd PROBABLY seal my fate!

Math at Home 3

Time to Redecorate



You'll need:

- a number cube, labelled 1 to 6
- 2 different coloured pencils or markers
- centimetre grid (on page 3)

Design your ideal bedroom on the grid.
Be sure to include everything: dressers, bed, desk, night tables, shelves, hamper … and maybe even you!
When you're done, it's time to reflect, translate, and rotate!

To begin:

Choose a piece of furniture to "move" first and roll the number cube.
Each number represents a different transformation.
Move the item as indicated by the roll.
Draw the item in its new position using a different colour.
If the transformed image does not fit on the grid, roll again until the image does fit.

1—rotate 90°
2—translate left or right 4 and up or down 5
3—reflect (You choose the mirror line.)
4—rotate 180° and translate to any new spot
5—translate left or right 2 and up or down 3
6—You decide how to move it.

Keep choosing new pieces and rolling the cube until everything has a new spot.
What do you think of the new arrangement?
Challenge a friend to figure out how to translate, rotate, or reflect each item back to its original position.

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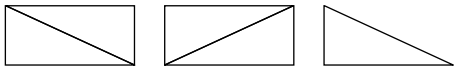
Centimetre Grid

Rectangle Rumble

You'll need:

- a pencil and paper
- 3 copies of a centimetre grid (on page 7)
- scissors
- a paper bag

The object of the game is to build the greater number of rectangles.



Before you begin, draw several rectangles of various sizes on the grids. Draw as many rectangles as you can on each grid. Draw one diagonal for each rectangle.

Cut out the rectangles. Then, cut along the diagonals so that each rectangle makes 2 triangles. Put the triangles into the bag.

On your turn:

- Take 2 triangles from the bag.
- Put them together to see if they make a rectangle. If so, keep both triangles.
- If not, choose one of the triangles and keep it. Put the other one back in the bag.

Special Rule:

If another player has a triangle that you need, you can take it instead of drawing from the bag.

Take turns until all the triangles are gone.
The player with the greater number of rectangles is the winner!

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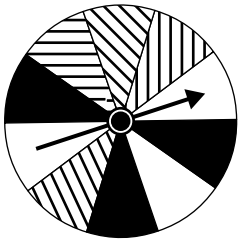
Centimetre Grid

Is It Fair?

Chantal made a deal with her little brother, Daryl:

"If I spin the pointer on this spinner and land on a striped section, you have to clean my room. But, if you spin and land on a black section, I'll clean yours!"



Who's getting the better deal?

If you were Daryl, how would you change this spinner?

Did You Know?

A pip is the name for one of the spots on dice, playing cards, or dominoes.

How many pips are on a regular die?
How many are on 2? On 4? On 8? On 16?
Draw a table and see if you can *spot* a pattern.

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Bedtime Blues

Do you ever feel that you have to go to bed before most other kids?
Conduct your own survey to find out if it's true.

You'll need to:

- ➤ Think of a good survey question.
- ➤ Ask a large number of students the question.
- ➤ Record your data in a table or in a graph.

You may be surprised at what you find out!

Think about this:

How might your data change if you:

- ➤ surveyed only Kindergarten and Grade 1 students?
- ➤ conducted the survey the morning after a school concert that ended late and that a lot of students attended?

What else could affect your results?

How Old?

The age of a father and son add up to 66.
The digits in the father's age are the digits in the son's age reversed.
How old could they be?

Hint: *There are 3 possible answers.*