DAILY PRACTICE 10.11.15

Q1. (3m - 1)(2m - 1)

$6m^2-3m-2m+1$

$6m^2-5m+1$

Q2. State the gradient of the line $3x - 2y + 4 = 0$

$y=mx+c$

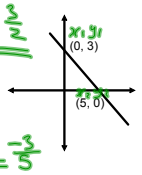
$+2y \quad +2y$

$3x+4=2y$

$\div 2 \quad \div 2$

$\frac{3}{2}x+2=y$ $m=\frac{3}{2}$

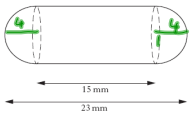
Q3. What is the equation of this line?



$m=\frac{y_2-y_1}{x_2-x_1}=\frac{0-3}{5-0}=\frac{-3}{5}$

$y=\frac{-3}{5}x+3$

Q4. What is the volume of this shape?



$V=\pi r^2h=\pi\times4^2\times15$

$=753.98mm^3$

$V=\frac{4}{3}\pi r^3=\frac{4}{3}\times\pi\times4^3$

$=268.08$

$Total=1022.06mm^3$

Daily Practice 11.11.15

1. Find the resultant vector $2\underline{u}-\underline{v}$ when $\underline{u}=\begin{pmatrix}-2\\3\\5\end{pmatrix}$ and $\underline{v}=\begin{pmatrix}0\\-4\\7\end{pmatrix}$.

Express your answer in component form.

$2\underline{u}=\begin{pmatrix}-4\\6\\10\end{pmatrix}$

2. Simplify $\frac{n^5\times10n}{2n^2}$. $=\frac{10n^6}{2n^2}=5n^4$

$2\underline{u}-\underline{v}=\begin{pmatrix}-4\\10\\3\end{pmatrix}$

3. Express $\frac{7}{x+5}-\frac{3}{x}$ $x\neq-5,\ x\neq0$ as a single fraction in its simplest form.

$\frac{7x}{x(x+5)}-\frac{3(x+5)}{x(x+5)}$

$=\frac{7x-3x-15}{x(x+5)}=\frac{4x-15}{x(x+5)}$

Today we will be learning about simultaneous equations.

HW Online due 16.11.15

1. Surds and Indices
2. Expanding Brackets and Factorisation
3. Algebraic Fractions
4. Gradient of a Straight Line & y = mx + c (Level 4)
5. Arcs and Sectors (Level 4)
6. Volume of 3D shapes (Level 4)
7. Significant Figures (Level 3)
8. Completing the Square
9. Equations and Inequalities
11. Changing the subject
21. Averages & Consistency: Quartiles, SIQR, Mean & Standard Deviation
22. Trigonometry: Area of Triangle, Sine & Cosine Rule, Bearings
23. Percentages: Increase/Decrease & Reverse Percentages (Level 3)
24. Operations with Fractions (Level 3)
25. Equation of a line of Best-Fit
26. Vectors

Topics I feel OK about

Topics I'm concerned about

Simultaneous Equations 10.11.15

Simultaneous Equations are equations that have to both be solved at the same time as they have 2 unknowns in each.

They can be solved using three methods:

- Graphically
- Elimination
- Substitution

Solving Simultaneous Equations Graphically 11.11.15

Sketch each equation. The point of intersection is the solution.

How to sketch these equations:

You can rearrange the equation so it is in the form y = mx + c and use a table of values, but this method is sometimes tricky as the gradient might be a fraction.

Or

Find the x - intercept and y - intercept and one other point on the line.

At the x-intercept, $y=0$.

At the y-intercept, $x=0$.

Daily Practice 13.11.15

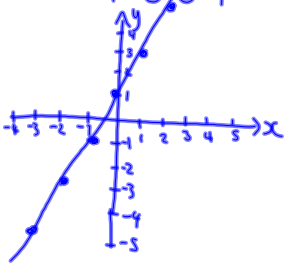
Q1. Multiply out and simplify $(3x - 2)(x^2 - 5x + 7)$

$3x^3-15x^2+21x-2x^2+10x-14$

$3x^3-17x^2+31x-14$

Q2. Using a table of values, draw the line $y = 2x + 1$

x	-3	-2	-1	0	1	2	3
y	-5	-3	-1	1	3	5	7



Today we will be continuing to practise solving simultaneous equations graphically.

Solving Simultaneous Equations Graphically

Examples:

1. State the point of intersection of the lines $x + 2y = 5$ and $x - 2y = 1$

$x+2y=5$

x-intercept $\Rightarrow y=0$ $\quad x+2(0)=5$ $\quad x=5$ $\quad (5,0)$

y-intercept $\Rightarrow x=0$ $\quad 0+2y=5$ $\quad y=2.5$ $\quad (0,2.5)$

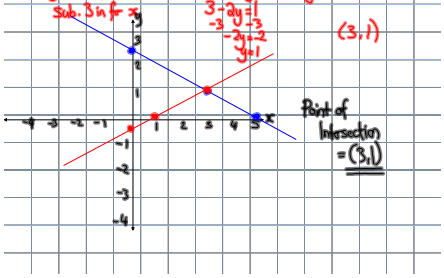
Extra coordinate $\rightarrow$ sub 3 in for x $\quad 3+2y=5$ $\quad 2y=2$ $\quad y=1$ $\quad (3,1)$

$x-2y=1$

x-intercept $\Rightarrow y=0$ $\quad x-2(0)=1$ $\quad x=1$ $\quad (1,0)$

y-intercept $\Rightarrow x=0$ $\quad 0-2y=1$ $\quad y=-0.5$ $\quad (0,-0.5)$

Sub 3 in for x $\quad 3-2y=1$ $\quad -2y=-2$ $\quad y=1$ $\quad (3,1)$



Solving Simultaneous Equations Graphically

Examples:

2. Solve the pair of simultaneous equations $5x + 2y = 20$ and $y = 2x + 1$

$5x+2y=20$

y-intercept $\quad x=0 \Rightarrow 5(0)+2y=20 \quad y=10 \quad (0,10)$

x-intercept $\quad y=0 \Rightarrow 5x+2(0)=20 \quad x=4 \quad (4,0)$

$x=2 \Rightarrow 5(2)+2y=20 \quad (2,5)$

$10+2y=20$

$2y=10$

$y=5$

$y=2x+1$

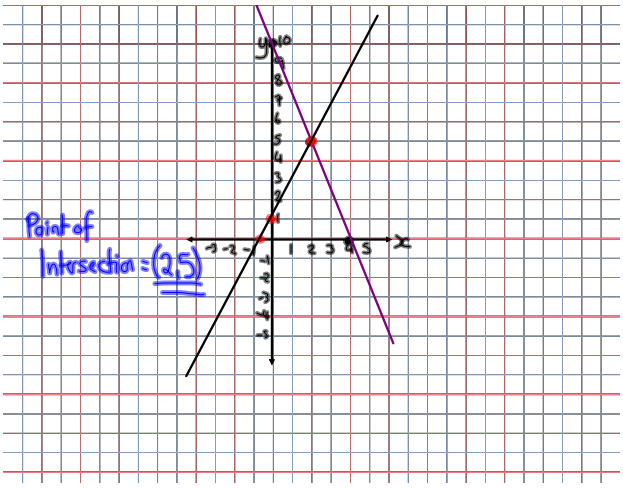
y-intercept $\Rightarrow x=0 \quad y=2(0)+1=1 \quad (0,1)$

x-intercept $\Rightarrow y=0 \quad 0=2x+1 \quad x=-\frac{1}{2} \quad (-\frac{1}{2},0)$

$-\frac{1}{2}=2x$

$-\frac{1}{2}=x$

$x=2 \Rightarrow y=2(2)+1=5 \quad (2,5)$



Daily Practice 16.11.15

Q1. Calculate the original value of a car that is now worth £4550 after depreciating by 15%

$85\% = 4550$

$1\% = 4550 \div 85$

$100\% = £5352.94$

Q2. Calculate the radius of a sphere with a volume of $1650cm^3$

$V = \frac{4}{3}\pi r^3 \quad 1650 = \frac{4}{3}\pi r^3 \quad \frac{1650}{\frac{4}{3}\pi} = r^3$

$\sqrt[3]{\frac{1650}{\frac{4}{3}\pi}} = 7.33$ cm

Q3. (i) Rearrange the line $3x - 2y + 4 = 0$ so that it is in the form $y = mx + c$.

(ii) State the gradient and y - intercept of this line.

(i) $3x-2y+4=0$

$+2y \quad +2y$

$3x+4=2y$

$\div 2 \quad \div 2$

$1.5x+2=y$

$y=1.5x+2$

(ii) $m = 1.5$ or $\frac{3}{2}$

y-intercept $= (0,2)$

Daily Practice 17.11.15

Q1. Calculate the original cost of a coat that is now £131.75 with 15% off.

85% = 131.75
1% = 131.75 ÷ 85 = 1.55
100% = 1.55 × 100 = £155

Q2. $\left(\frac{3}{5} \div \frac{2}{3}\right) + 1\frac{1}{6}$

$\frac{3}{5} \times \frac{3}{2} = \frac{9}{10}$ $\frac{9}{10} + 1\frac{1}{6} = \frac{9}{10} + \frac{7}{6}$ $\frac{54}{60} + \frac{70}{60} = \frac{124}{60}$ $= 2\frac{4}{60}$ $= 2\frac{1}{15}$

Q3. Draw the resultant vector of $\underline{a} + \underline{b}$ where $\underline{a} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$ and $\underline{b} = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$

$\underline{a} + \underline{b} = \begin{pmatrix} 6 \\ 2 \end{pmatrix}$

Today we will be continuing to learn how to solve simultaneous equations.

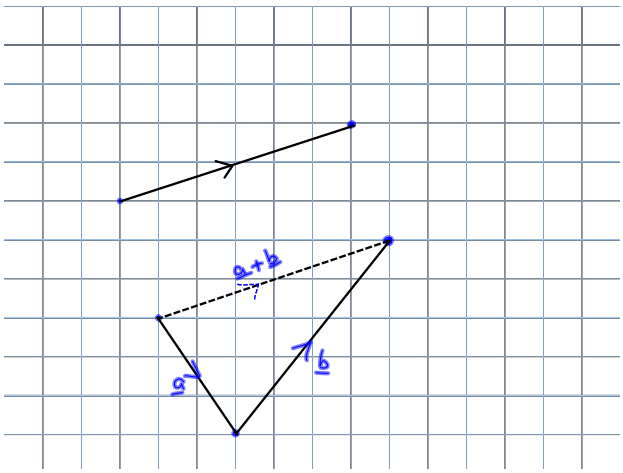
Homework Due!

Solving Simultaneous Equations Graphically

Solve the following by sketching and stating the point of intersection:

(a)	$3y - x = 9$ $x + y = 11$	**(b)**	$2x - 3y = 6$ $x + 2y = 10$	**(c)**	$x + 2y = 10$ $2x + y = 8$
(d)	$x - 2y = -2$ $2x - y = 2$	**(e)**	$x - y = 7$ $3x - 2y = 24$	**(f)**	$3x + 2y = 6$ $x - 2y = 10$
(g)	$2y - x = 8$ $3y + x = 17$	**(h)**	$x + y = 2$ $2x - y = 4$	**(i)**	$x - 2y = 3$ $x + y = 0$

From Pegasys



Daily Practice 18.11.15

Q1. Noel bought a painting for £3500 and sold it for £4800. Calculate the profit as a percentage

£4800 − £3500 = £1300 $\frac{1300}{3500} = 0.3714 \times 100^{\circ} = 37.1\%$

Q2. Rearrange the line 2y - 3x = 4 so that it is in the form y = mx + c and state the gradient and y - intercept

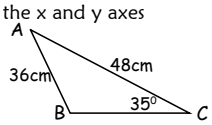
+3x +3x

2y = 3x + 4 m = 1.5
y = 1.5x + 2 c = 2 (0, 2)

Q3. State where the line 7y - x = 14 cuts the x and y axes

(−14, 0) (0, 2)

Q4. Calculate the size of the angle ABC



$\frac{\sin A}{48} = \frac{\sin 35}{36}$

$\sin A = 0.0159 \times 48$

$A = \sin^{-1}(0.159.. \times 48)$

$A = 49.88^{\circ}$

Today we will be learning to solve simultaneous equations by elimination.

Solving Simultaneous Equations by Elimination 18.11.15

We can solve a pair of simultaneous equations by adding or subtracting the equations and eliminating one of the variables.

E.g. $x + 2y = 7$ $\quad x - 8y = -13$ or $3x - 4y = -2$ $\quad 5x + 4y = 23$

Then solve for the other variable and substitute it back into either equation to find the variable you have eliminated.

Solving Simultaneous Equations by Elimination

Examples: Solve the following

(a) $x + y = 7$
$x - 8y = -29$
$9y = 36$
$\div 9 \quad \div 9$
$y = 4$
sub 4 in for y
$x + y = 7$
$x + 4 = 7$
$x = 3$
(3,4)

(b) $3x - 4y = 1$
$5x + 4y = 23$
$8x = 24$
$x = 3$
$3x - 4y = 1$
$3(3) - 4y = 1$ (3,2)
$9 - 4y = 1$
$-4y = -8$
$y = 2$

Solving Simultaneous Equations by Elimination

Solve the following pairs of simultaneous equations: Pegasys

(a)	$2x + y = 15$ $x - y = 6$	**(b)**	$3x + 2y = 32$ $x - 2y = 8$	**(c)**	$5x + 3y = 26$ $2x - 3y = 2$
(d)	$3x + y = 9$ $x + y = 5$	**(e)**	$4x + y = 11$ $2x + y = 5$	**(f)**	$7x + 2y = 36$ $2x + 2y = 16$

Today we will be continuing to learn how to solve simultaneous equations.

Scholar Passwords

Big HW online due 30.11.15

Daily Practice 20.11.15

Q1. Calculate the original size of a box of cereal that now weighs 725grams with 25% extra free
$125\% = 725$
$1\% = 725 \div 125 = 5.8$
$100\% = 5.8 \times 100 = 580g$

Q2. Write with a rational denominator $\frac{3}{\sqrt{6}} \times \frac{\sqrt{6}}{\sqrt{6}} = \frac{3\sqrt{6}}{6} = \frac{\sqrt{6}}{2}$ (÷3, ÷3)

Q3. Evaluate 500 x 7000.184 and write your answer in scientific notation 3.500092×10^6

Q4. Simplify $3x^2(x^{0.5} - x^{-3})$
$3x^{2.5} - 3x^{-1}$
$3x^{\frac{5}{2}} - \frac{3}{x}$
$3\sqrt{x^5} - \frac{3}{x}$

Q5. 20% of £40 - £3.86
£8 - £3.86 = £4.14

Solving Simultaneous Equations by Elimination

Sometimes you need to multiply one or both of the equations by a number first, to ensure that one of the variables can cancel.

Examples: Solve

(a) ① $2x + 3y = 9$
② $x + 4y = 7$ (x2)
$2x + 3y = 9$
$2x + 8y = 14$
$-5y = -5$
$\div -5 \quad \div 5$
$y = 1$
sub y into ①
$2x + 3(1) = 9$
$2x + 3 = 9$
$2x = 6$
$x = 3$
(3,1)

(b) ① $3x + 4y = 5$ (x2)
② $2x + 5y = 12$ (x3)
$6x + 8y = 10$
$-6x + 15y = 36$
$23y = 46$
$\div 23 \quad \div 23$
$y = 2$
sub y = 2 into ①
$3x + 4y = 5$
$3x + 4(2) = 5$
$3x + 8 = 5$
$3x = -3$
$x = -1$
(-1,2)

Q
$3x + 4y = 6$
$x + 3y = 7$

$2x+3y=7$ $(\times 5)$ $10x+15y=35$
$5x-6y=8$ $(\times 2)$ $10x-12y=16$

Today we will be continuing to practise simultaneous equations.

Homework due 30.11.15

Today we will be learning how to solve worded simultaneous equations.

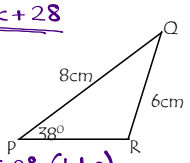
Daily Practice 23.11.15

Q1. Multiply out and simplify $(2x-4)(3x^2+6x-7)$

$6x^3+12x^2-14x-12x^2-24x+28$

$6x^3-38x+28$

Q2. Calculate the size of the angle PRQ



$\frac{\sin A}{a}=\frac{\sin B}{b}$

$\frac{\sin A}{8}=\frac{\sin 38^\circ}{6}$

$A=\sin^{-1}(8\times 0.1026\ldots)=55.2^\circ$ (1d.p)

Q3. State the equation of the line joining (2, 3) and (4, -5). Express your answer in the form y = mx + c

$m=\frac{-5-3}{4-2}=\frac{-8}{2}=-4$

$y=-4x+c$

$3=-4(2)+c$

$3=-8+c$

$c=11$

$y=-4x+11$

$y-b=m(x-a)$

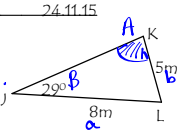
$y+5=-4(x-4)$

$y+5=-4x+16$

$y=-4x+11$

Daily Practice 24.11.15

Q1. Calculate the size of the angle JKL



$\frac{\sin A}{a}=\frac{\sin B}{b}$ $\frac{\sin JKL}{8}=\frac{\sin 29^\circ}{5}$

$\frac{\sin JKL}{8}=0.09696\ldots$

$\sin JKL=0.77569\ldots$

$JKL=\sin^{-1}0.7\ldots=50.9^\circ$

Q2. Solve $\frac{2x+3}{2}-\frac{x}{2}=\frac{2x}{3}$

$\frac{6x+9}{6}-\frac{3x}{6}=\frac{4x}{6}$

$6x+9-3x=4x$

$3x+9=4x$

$-x=-9$

$x=9$

Q3. Calculate the median and Inter-quartile range of the data set

2, 14, 3, 5, 13, 21, 22, 15, 7

2, 3, 5, 7, (13), 14, 15, 21, 22

Median $(Q_2)=13$ $Q_1=\frac{3+5}{2}=4$ $Q_3=\frac{15+21}{2}=18$

Inter-quartile range $=Q_3-Q_1=18-4=14$

Daily Practice 25.11.15

Q1. $\frac{2x+1}{3}\times\frac{x}{4}=\frac{x(2x+1)}{12}=\frac{2x^2+x}{12}$

Q2. Find the equation of the line joining (-2, 1) and (3, 4). State your equation in the form ax + by + c = 0

$x_1\ y_1$ $x_2\ y_2$

$m=\frac{y_2-y_1}{x_2-x_1}=\frac{4-1}{3-(-2)}=\frac{3}{5}$

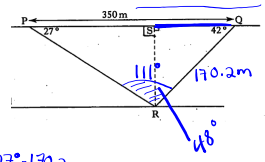
$y-b=m(x-a)$

$y-1=\frac{3}{5}(x+2)$

$5y-5=3x+6$

$-3x+5y-11=0$

Q3. Calculate the length of QS



$\frac{QR}{\sin 27^\circ}=\frac{350}{\sin 111^\circ}$

$\frac{QR}{\sin 27^\circ}=374.9$

$QR=374.9\times\sin 27^\circ=170.2$ m

$\frac{QS}{\sin 48^\circ}=\frac{170.2}{\sin 90^\circ}$

$\frac{QS}{\sin 48^\circ}=170.2$

$QS=170.2\times\sin 48^\circ$

$=126.48$m (2d.p)

Today we will be continuing to practise worded simultaneous equations.

Homework due Monday

Solving Simultaneous Equations by Elimination

Pegasys

(g)	$2x - 5y = -21$ $3x + 10y = 56$	**(h)**	$3x + 8y = 23$ $x - 4y = 1$	**(i)**	$3x + 4y = 10$ $6x + 5y = 17$
(j)	$5x - 2y = 16$ $3x + 4y = 20$	**(k)**	$7x + 3y = -13$ $3x + y = -5$	**(l)**	$3x - 5y = 8$ $x - 7y = 8$

Solve the following pairs of simultaneous equations:

(a)	$5x + 2y = 9$ $2x - 3y = -4$	**(b)**	$4x + 5y = 7$ $7x - 3y = 24$	**(c)**	$5x + 2y = 14$ $4x - 5y = -2$
(d)	$3x + y = 16$ $2x + 3y = 13$	**(e)**	$8x - 3y = 19$ $3x - 2y = 1$	**(f)**	$5x + 3y = 19$ $7x - 4y = 43$
(g)	$2x - 5y = 21$ $3x + 2y = 3$	**(h)**	$2x - 3y = 17$ $7x - 4y = 40$	**(i)**	$8x + 2y = 23$ $5x + 6y = 31$
(j)	$2x + 3y = 7$ $4x + 5y = 12$	**(k)**	$7x + 2y = 11$ $6x - 5y = -4$	**(l)**	$7x - 5y = 35$ $9x - 4y = 45$

Q1.

(g)	$x = 2$ and $y = 5$	**(h)**	$x = 5$ and $y = 1$	**(i)**	$x = 2$ and $y = 1$
(j)	$x = 4$ and $y = 2$	**(k)**	$x = -1$ and $y = -2$	**(l)**	$x = 1$ and $y = -1$

Q2.

(a)	$x = 1$ and $y = 2$	**(b)**	$x = 3$ and $y = -1$	**(c)**	$x = 2$ and $y = 2$
(d)	$x = 5$ and $y = 1$	**(e)**	$x = 5$ and $y = 7$	**(f)**	$x = 5$ and $y = -2$
(g)	$x = 3$ and $y = -3$	**(h)**	$x = 4$ and $y = -3$	**(i)**	$x = 2$ and $y = 3{\cdot}5$
(j)	$x = 0{\cdot}5$ and $y = 2$	**(k)**	$x = 1$and $y = 2$	**(l)**	$x = 5$ and $y = 0$

Worded Simultaneous Equations

25.11.15

Examples:

1. Robyn sold ~~30 tickets~~ for a concert.
She sold ~~x tickets for £3~~ each, and ~~y tickets for £4.50~~ each.
She collected ~~£123 in total~~.

a. Write down two equations connecting x and y.

$x + y = 30$
$3x + 4{\cdot}5y = 123$

b. Solve these simultaneous equations to find the numbers of the two different types of tickets sold.

$x + y = 30$ (x3)
$3x + 4{\cdot}5y = 123$

$3x + 3y = 90$
$3x + 4{\cdot}5y = 123$
$-1{\cdot}5y = -33$
$\div -1{\cdot}5 \quad \div -1{\cdot}5$
$y = 22$ tickets

Sub 22 in for y
$x + 22 = 30$
$x = 8$ tickets

Daily Practice **27.11.15**

Q1. Calculate the height of a cone that has a volume of 2Litres and a radius of 24cm. Give your answer to 2s.f.

Q2. Factorise $6x^2 + 11x - 2$

Q3. Multiply out and simplify $(7x - 1)(2x^2 + 9x - 8) + 4x^2$

Q4. State the gradient and y - intercept of the line $x - 3y = 4$

Q5. Write $x^2 - 16x + 5$ in completed square form

Today we will continue to practise simultaneous equations in worded form.

Homework due Monday.

Worded Simultaneous Equations

Examples:

2. A rectangular park is x metres long and y metres broad. The difference between the length and the breadth is 50m and the perimeter of the park is 200m. Calculate its length and breadth.

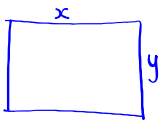
① $2x+2y=200$

① $x+y=100$

② $x-y=50$ (+ + +)

$2x = 150$

$x = 75$ metres (length)



$75+y=100$

$y = 25$ metres (breadth)