Stewards Academy

Maths Spring 2

Year 9

Blended Learning Booklet

Name:

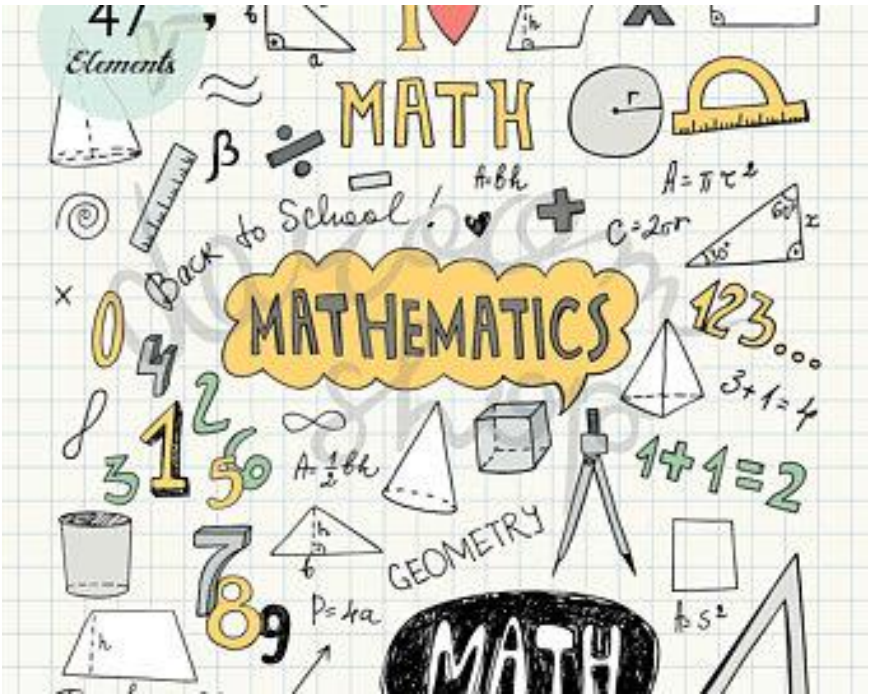
Form:

Each week covers topics you would complete in your 3 Maths lessons that week. Write out the title and LI and then complete the tasks.

All video links are online using the ClassCharts link.

The Knowledge Organiser on page 4 has further practice questions and page numbers linking to your pocket revision guides for all the key information and examples to help you with this unit.

Upload all work onto ClassCharts for feedback.



Contents

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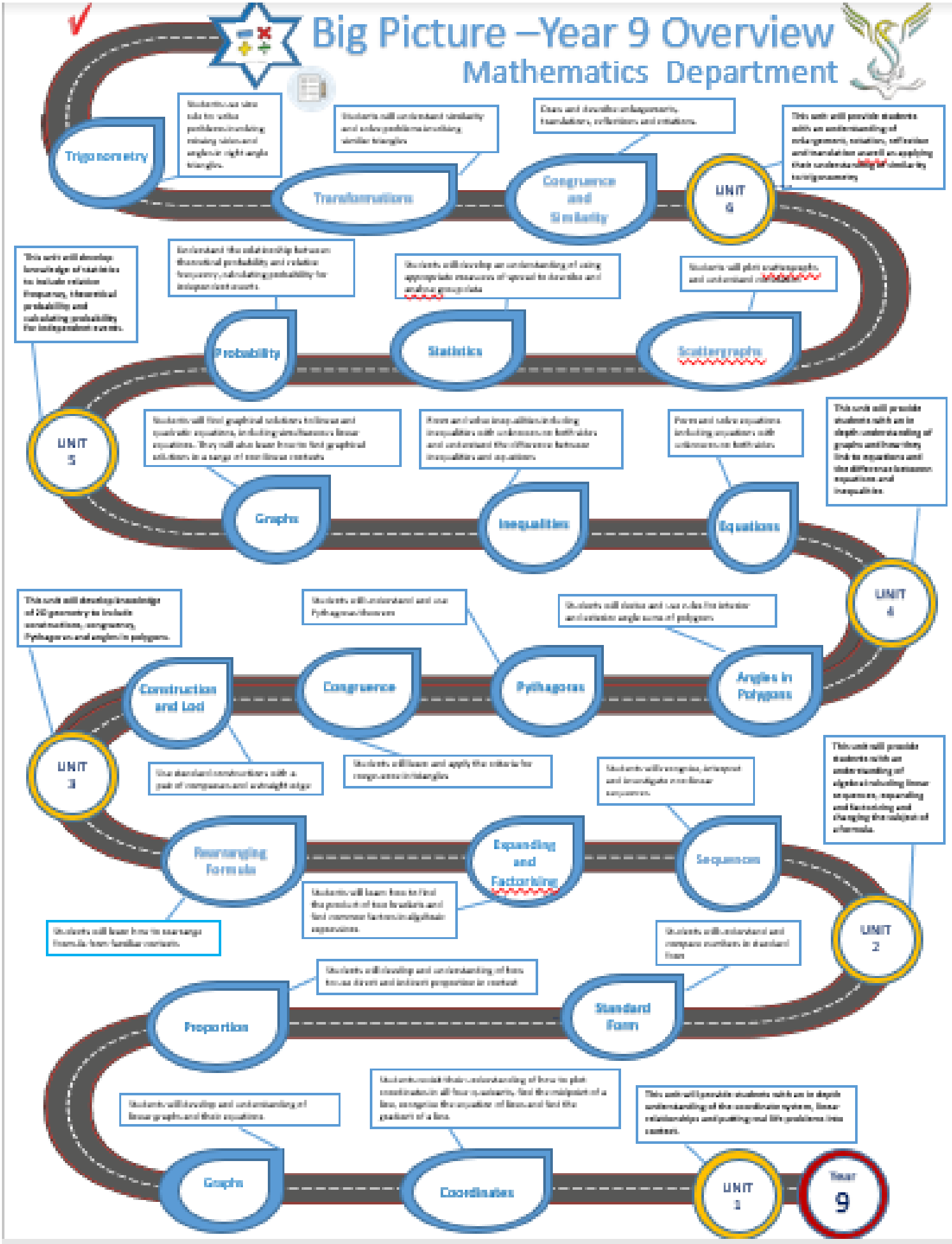

Equations and Inequalities
Revision guide reference pages
Foundation Pages 24-25, 46-47, 52, 55-57.
Higher Pages 18-19, 36-37, 48, 55-56,60, 67.
1
Solve
1) 2x + 1 > x + 6
2) 4x - 10 < 2x + 8
3) 3x + 1 ≥ 2x − 3
4) 4x − 2 < 2x + 8
5) 3x - 1 ≥ 4 − 2x
6) 5x + 6 < 2 − 3x
7) x + 3 > 9 − 2x
8) 5 − x < 4 - 2x
2
Find the gradient of the line passing through the points
(2, 3) and (0, 11)
(-2, -1) and (0, 3)
(10, 5) and (5, 3)
3
Represent the solutions to these inequalities on number lines:
Solving Inequalities
2x + 3 < 11
4x - 4 > 20
10 - 2x ≤ 2
4
Solve
1) 2x − 5 > 7
2) 4x + 3 > 15
3) 3x − 5 < 19
4) x/4 - 1 ≥ 2
5) 6 − x ≤ 1
6) 6 > 2 - 4x
7) 5 < 6 + 2x
8) 2x + 5 ≥ -1
5
Express in standard form
1) 76000
2) 8340000
Express in standard form
1) 0.052
2) 0.0014
6
Time (minutes)
7
Complete the table for y = x² + 2x − 1 and draw the graph:
x: −4, −3, −2, −1, 0, 1, 2
y: , 2, −1, −2, , , 7
8
Complete each table, then plot the points on the graph, complete the line and label it
y = x + 2
y = x + 4
y = x − 1
y = x − 3
y = 2x
9
2x + 1
3x − 2
2x + 4
a) Write and solve an equation to show that the value of x is
b) Hence calculate the value of the perimeter of the rectangle.
10
4x + 5 = x + 2
2x + 10 = 3x + 3
2x - 5 = x - 1
5x + 1 = 2x - 11
3x + 4 = x + 1
2x + 5 = x - 5
• How long did it take for the sink to be filled?
• For how long was the sink full?
• What was the rate at which water was added to the container? Give the units in litres per hour.

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Week 1:

LI: Form and solve linear equations in one unknown, including those where the unknown appears on both sides

Lesson 1

Demonstration Videos:
Solving equations - https://corbettmaths.com/2012/08/24/solving-equations/

Tasks:

We want x by itself.

If we add, subtract,

multiply or divide

on one side of an equation,

we **must balance** the equation

Solve:

$$x + 5 = 9$$

-5 -5

$$x = 4$$

How can we check?

$$4 + 5 = 9$$ ✓

Task 1

Name *Solving Equations*

18	15	21	3	8
4	13	2	7	6
4	10	5	11	9
6	8	5	10	1
23	12	12	14	22

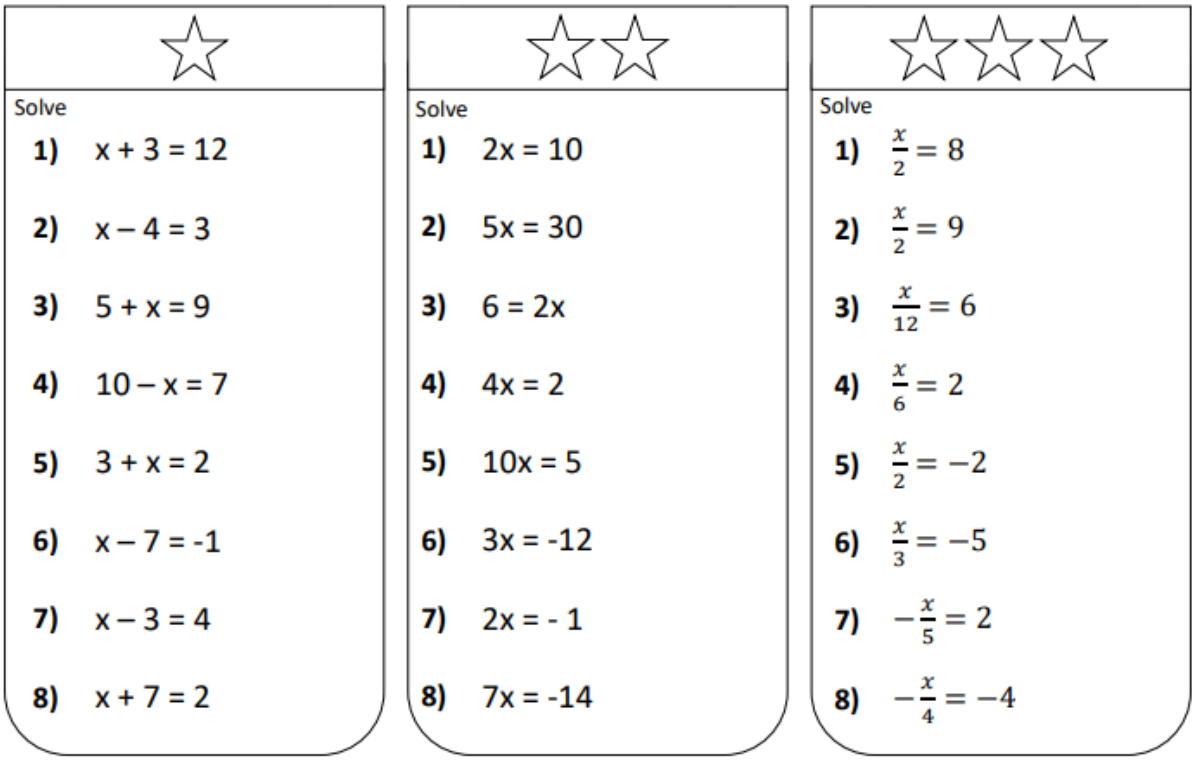
3x = 15	x + 2 = 12	2x = 16	3x = 12
x - 4 = 14	x + 3 = 26	4x = 24	x + 2 = 24
3x = 27	x - 2 = 11	2x = 14	x + 1 = 4
2x = 24	x - 6 = 9	x + 1 = 22	x - 1 = 13
5x = 25	x - 3 = 8	x + 3 = 15	x + 2 = 3

☐ ☐ ☐ ☐ ☐ TOTAL ☐

Task 2

1) 3n + 4 = 19	2) 4n + 5 = 13	3) 4n - 3 = 25
4) 2n + 6 = 18	5) 3n - 2 = 16	6) 5n + 4 = 34
7) 3n + 7 = 19	8) 5n - 6 = 14	9) 3n - 3 = 21
10) 3n + 2 = 17	11) 4n + 6 = 14	12) 6n + 5 = 41

Task 3



☆

Solve

1) $x + 3 = 12$
2) $x - 4 = 3$
3) $5 + x = 9$
4) $10 - x = 7$
5) $3 + x = 2$
6) $x - 7 = -1$
7) $x - 3 = 4$
8) $x + 7 = 2$

☆☆

Solve

1) $2x = 10$
2) $5x = 30$
3) $6 = 2x$
4) $4x = 2$
5) $10x = 5$
6) $3x = -12$
7) $2x = -1$
8) $7x = -14$

☆☆☆

Solve

1) $\frac{x}{2} = 8$
2) $\frac{x}{2} = 9$
3) $\frac{x}{12} = 6$
4) $\frac{x}{6} = 2$
5) $\frac{x}{2} = -2$
6) $\frac{x}{3} = -5$
7) $-\frac{x}{5} = 2$
8) $-\frac{x}{4} = -4$

Task 4

Solving Equations Codebreaker 1

A	B	C	D	E	F	G	H	I	J	K	L	M
3	-2	5	8	4	-5	1	2.5	-3	10	28	18	-4

N	O	P	Q	R	S	T	U	V	W	X	Y	Z
24	15	-1	11	1.5	-1.5	0.5	9	6	12	-6	2	7

Simplify the expressions, link your answers to the table above and unjumble the letters to create a sentence:

Word 1		
$3x = 12$	$8x = 4$	$2x + 1 = 6$

Word 2					
$2x + 3 = 11$	$\frac{x}{2} = 4$	$4x - 1 = 11$	$\frac{x}{4} = 6$	$3x + 1 = 25$	$3x = -12$

Word 3					
$13 - x = 9$	$7 + 4x = 9$	$5x - 3 = 37$	$7 - x = 10$	$3x - 4 = 23$	$4x = 96$

Answer:

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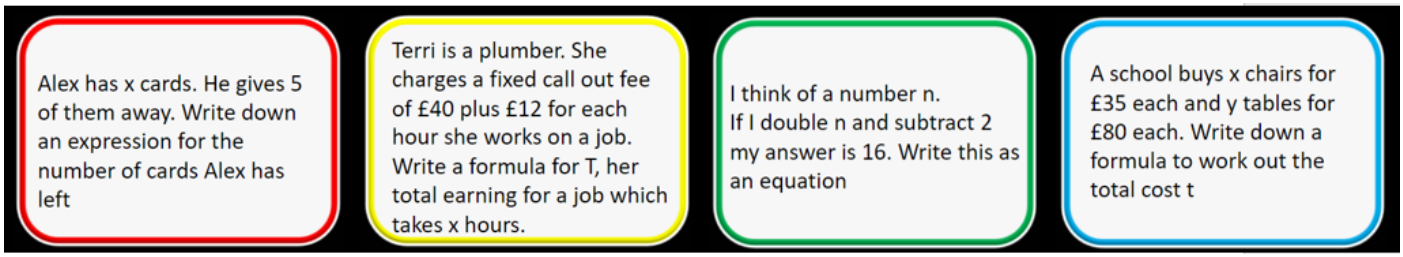
Week 1:

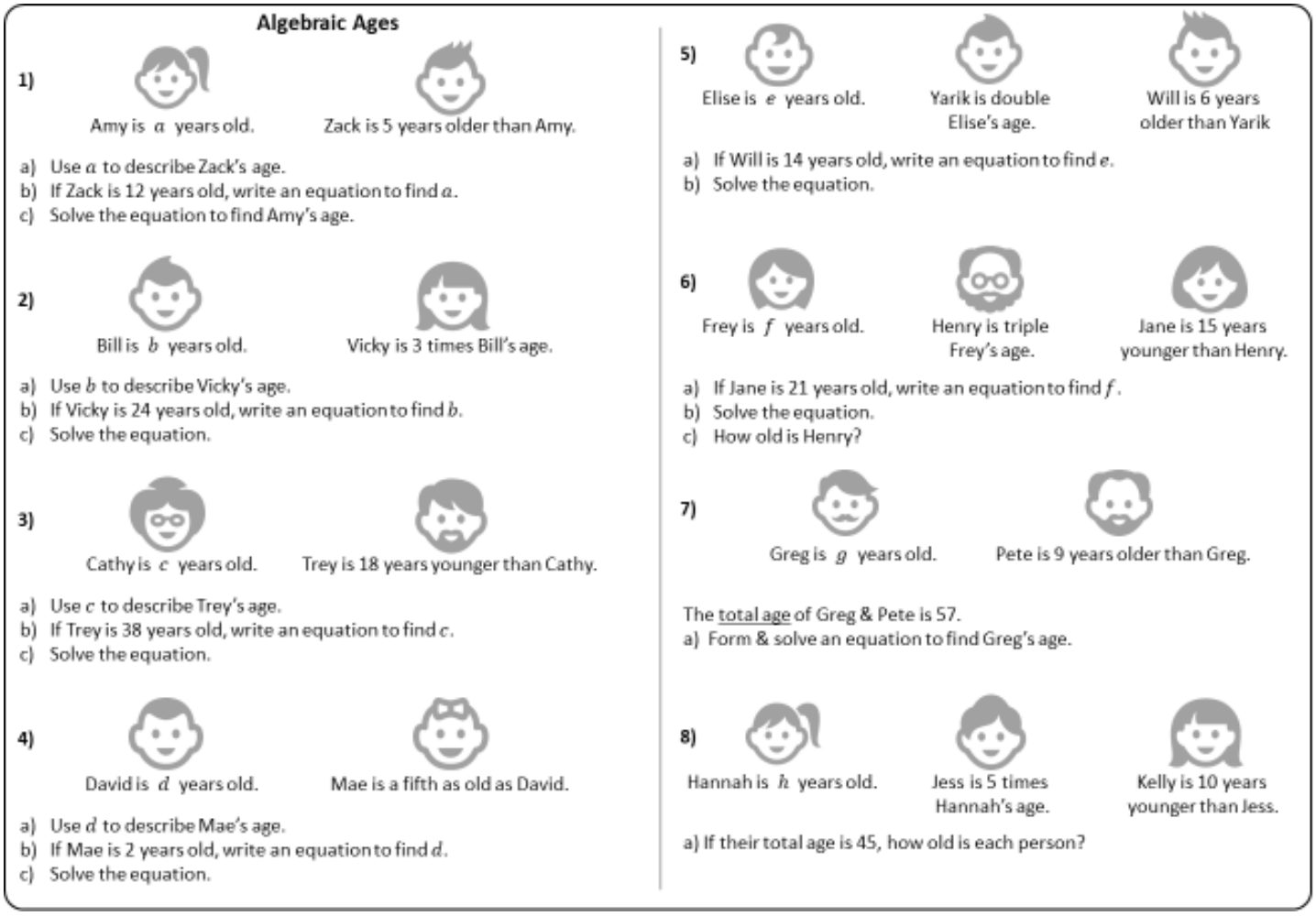
Lesson 2

Demonstration Videos:
Forming algebraic expressions - https://www.youtube.com/watch?v=NMTmHdQFKQ4
Forming algebraic equations - https://www.youtube.com/watch?v=Lz3VkLrDmhE

Task 1



Task 2



Algebraic Ages

1)

Amy is a years old. Zack is 5 years older than Amy.

a) Use a to describe Zack's age.
b) If Zack is 12 years old, write an equation to find a.
c) Solve the equation to find Amy's age.

2)

Bill is b years old. Vicky is 3 times Bill's age.

a) Use b to describe Vicky's age.
b) If Vicky is 24 years old, write an equation to find b.
c) Solve the equation.

3)

Cathy is c years old. Trey is 18 years younger than Cathy.

a) Use c to describe Trey's age.
b) If Trey is 38 years old, write an equation to find c.
c) Solve the equation.

4)

David is d years old. Mae is a fifth as old as David.

a) Use d to describe Mae's age.
b) If Mae is 2 years old, write an equation to find d.
c) Solve the equation.

5)

Elise is e years old. Yarik is double Elise's age. Will is 6 years older than Yarik

a) If Will is 14 years old, write an equation to find e.
b) Solve the equation.

6)

Frey is f years old. Henry is triple Frey's age. Jane is 15 years younger than Henry.

a) If Jane is 21 years old, write an equation to find f.
b) Solve the equation.
c) How old is Henry?

7)

Greg is g years old. Pete is 9 years older than Greg.

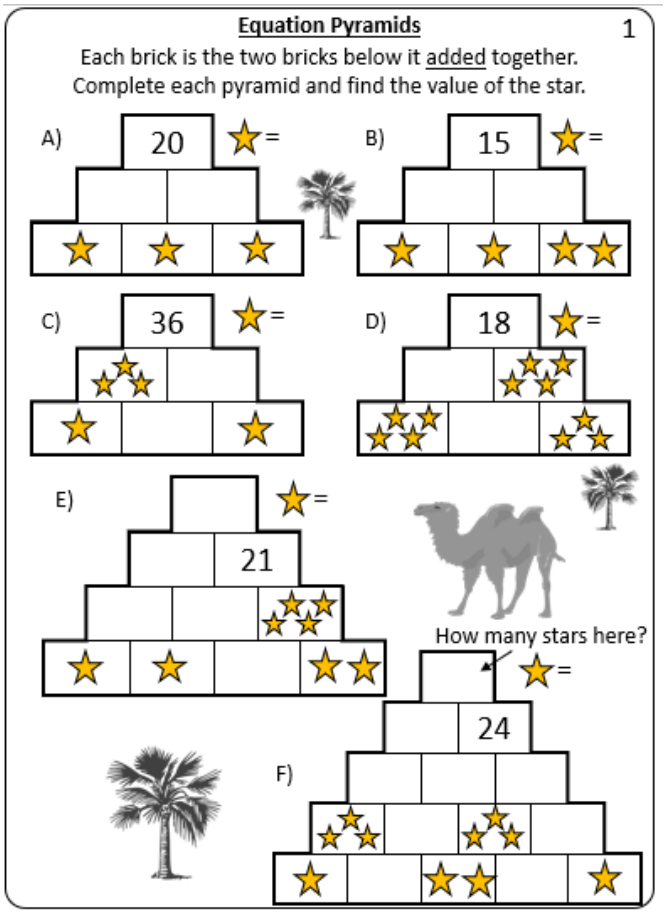
The total age of Greg & Pete is 57.
a) Form & solve an equation to find Greg's age.

8)

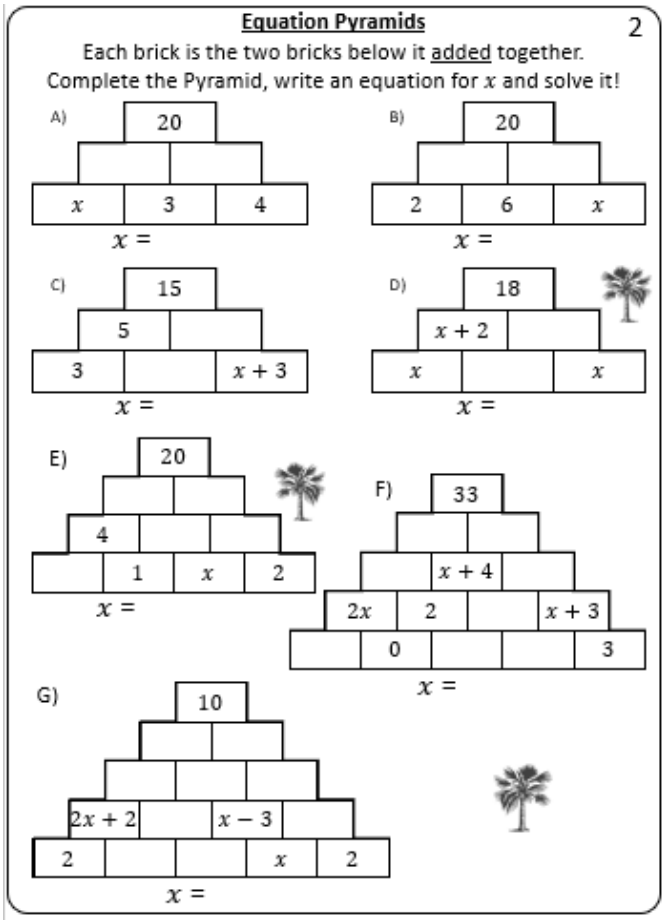
Hannah is h years old. Jess is 5 times Hannah's age. Kelly is 10 years younger than Jess.

a) If their total age is 45, how old is each person?

Task 3



Task 4



Task 5

Nellie the Elephant is n Years old

	English Expression	Algebraic Expression	Age, if Nelly is 16 years old
1	John is 3 years older	$n + 3$	19
2	Sue is 4 years younger		
3	Fran is 5 years older		
4	Philip is 6 years younger		
5	Mark is twice Nellie's age		
6	Ruth is half Nellie's age		
7	Lucy is 2 times older plus 3		
8	Sam is 4 times older plus 2		
9	Toby is 3 times older minus 2		
10	Dumbo is 3 times older plus 2		

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Week 1:

Lesson 3

Demonstration Videos:
Forming algebraic expressions - https://www.mathsgenie.co.uk/forming-and-solving-equations.html

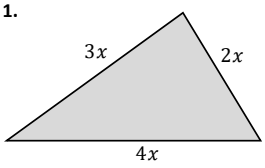
Task **1**

★	★★	★★★
1) x + 2 = 7	**1)** 2x + 3 = 13	**1)** 2x + 3 = x + 9
2) x – 3 = 9	**2)** 5x – 1 = 14	**2)** 4x – 3 = x + 9
3) 4 + x = 10	**3)** 10 + 2x = 30	**3)** 3x – 7 = 2x + 1
4) 15 –x = 10	**4)** 20 – 3x = 11	**4)** 5x -2 = 3x - 4
5) 3x = 15	**5)** $\frac{x}{2}$ + 4 = 8	**5)** x – 3 = 7 - x
6) $\frac{x}{3} = 6$	**6)** $\frac{x}{5}$ - 2 = 3	**6)** x + 5 = 11 – 2x
7) $\frac{x}{6} = 3$	**7)** 15 = 4x - 1	**7)** 10 –x = 13 – 2x
8) x – 3 = -1	**8)** 4 = 2x + 8	**8)** 2 – x = 5x - 1

Task 2

Forming & Solving Equations

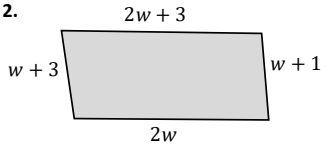
1.



Write down an expression for the perimeter of this triangle.

The perimeter is 27 cm. Create an equation and then solve it to find the value of x.

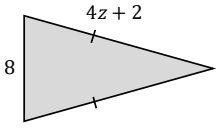
2.



The perimeter of this quadrilateral is 31 cm.

Create an equation and solve it to find the value of w.

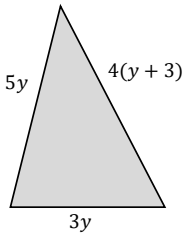
3.



The perimeter of this isosceles triangle is 28 cm.

Create an equation and solve it to find the value of z.

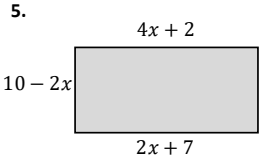
4.



The perimeter of this triangle is 30 cm.

Create an equation and solve it to find the value of y.

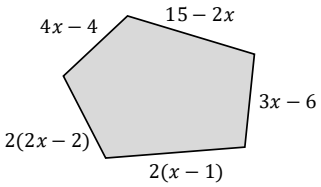
5.



Form an equation using the two corresponding lengths of this rectangle.

Solve the equation to find the value of x.
What is the perimeter of the rectangle?

6.



The perimeter of this irregular pentagon is 54 cm.

Find the value of x.

7. A quadrilateral has interior angles:
$x + 120°$, $x + 70°$, $2x + 30°$, $4x - 60°$

What is the value of x?

8. The width of a rectangle is $x + 7$
The length of the rectangle is 3 times the width.
The perimeter of the rectangle is 72 cm.

What is the area of the rectangle?

9. Rectangle **A** measures 6 cm by $(x + 1)$ cm.
Rectangle **B** measures 3 cm by $(3x + 7)$ cm.
Rectangle **B** has twice the area of Rectangle **A**.

Find the areas of **A** and **B**.

Task 3

Name

Solving linear equations

x = 1	x = 2	x= 4	x = 9	x = 10
x = 3	x = 2	x = 7	x = 8	x= 5
x = -1	x = 1	x = 6	x = -10	x = -3
x = 2	x = -2.5	x = 1	x = 6	x = 0.5
x = 0.25	x = -2	x = -5	x = -4	x = -8

3x - 12 = 2x - 4	4x + 10 = 2x + 5	9x + 3 = 5x + 11	6x - 5 = 2x - 3
4x - 5 = 2x - 15	6x + 5 = 2x + 6	5x + 1 = 2x - 11	5x - 20 = 2x + 10
2x + 5 = x - 5	6x - 4 = 3x - 1	4x + 4 = 5x - 5	2x + 10 = x + 2
2x + 10 = 3x + 3	4x - 10 = x - 4	3x - 3 = x - 9	4x - 10 = 2x + 2
6x + 10 = 3x + 4	5x + 1 = 3x + 7	7x - 3 = 2x + 2	10x + 2 = 6x - 2

Missing value

Task 4 – Exam question Higher

GCSE AQA Higher: May 2018 Paper 1, Q11

1 A large rectangle is made by joining three identical small rectangles as shown.

Not drawn accurately

The perimeter of one small rectangle is 35 cm
Work out the perimeter of the large rectangle.

[4 marks]

GCSE AQA Higher: November 2017 Paper 1, Q4

1 $x = \frac{5}{y}$ **[1 mark]**

If the value of y triples, what happens to the value of x?
Circle your answer.

÷ 3 × 3 ÷ 5 × 5

2 $x = \frac{5}{y}$ **[1 mark]**

If the value of y halves, what happens to the value of x?
Circle your answer.

÷ 10 × 10 ÷ 2 × 2

Task 5 – Exam question Foundation

GCSE AQA Foundation: November 2017 Paper 2, Q4

1 The value of x is triple the value of y. **[1 mark]**
Circle the correct formula.

$x = y^2$ $x = 3y$ $3x = y$ $x = \frac{2}{y}$

2 The value of x is half the value of y. **[1 mark]**
Circle the correct formula.

$x = \frac{2}{y}$ $2x = y$ $x = 2y$ $x = \frac{y}{2}$

3 The value of x is four less than the value of y. **[1 mark]**
Circle the correct formula.

$x - 4 = y$ $x = 4 - y$ $x + 4 = y$ $y = \frac{4}{x}$

GCSE AQA Foundation: November 2017 Paper 2, Q9

1 Sally has twin brothers.

The sum of the ages of Sally and her twin brothers is 35
In 7 years' time the twins will be 18

How old will Sally be in 6 years' time?

[3 marks]

Answer _____

Week 2:

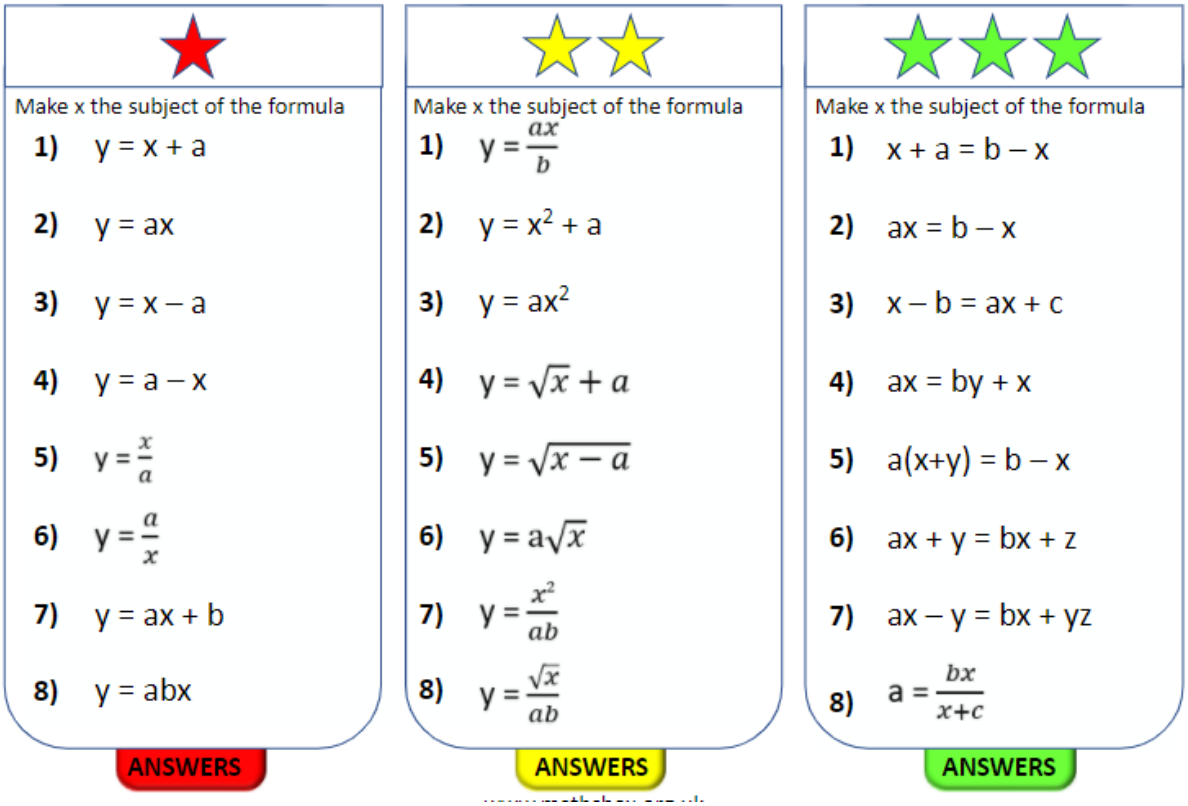
LI: Rearrange and solve linear equations given in any form, including those including those involving fractions and brackets

Lesson 1

Demonstration Videos:
Rearrange linear equations - https://corbettmaths.com/2013/12/23/changing-the-subject-video-7/

Rearrange linear equations advanced - https://corbettmaths.com/2013/12/28/changing-the-subject-advanced-video-8/

Task 1



Make x the subject of the formula

1) $y = x + a$
2) $y = ax$
3) $y = x - a$
4) $y = a - x$
5) $y = \frac{x}{a}$
6) $y = \frac{a}{x}$
7) $y = ax + b$
8) $y = abx$

ANSWERS

Make x the subject of the formula

1) $y = \frac{ax}{b}$
2) $y = x^2 + a$
3) $y = ax^2$
4) $y = \sqrt{x} + a$
5) $y = \sqrt{x - a}$
6) $y = a\sqrt{x}$
7) $y = \frac{x^2}{ab}$
8) $y = \frac{\sqrt{x}}{ab}$

ANSWERS

Make x the subject of the formula

1) $x + a = b - x$
2) $ax = b - x$
3) $x - b = ax + c$
4) $ax = by + x$
5) $a(x+y) = b - x$
6) $ax + y = bx + z$
7) $ax - y = bx + yz$
8) $a = \frac{bx}{x+c}$

ANSWERS

Task 2

Make x the subject	Make x the subject	Make x the subject
1. $y = x + c$	1. $y = ax + b$	1. $y = ax^2$
2. $y = x - c$	2. $y = b - ax$	2. $y = ax^2 - b$
3. $y = c - x$	3. $y = \frac{x}{a} + b$	3. $y = \frac{ax^2}{b} - c$
4. $y = ax$	4. $y = \frac{x - b}{a}$	4. $y = \frac{ax^2 - b^2}{c}$

Task 3

Question 1: Make y the subject of each of the following

(a) $y + w = c$ (b) $y - p = m$ (c) $m + y = s$

(d) $y - 2g = n$ (e) $3y = c$ (f) $ay = w$

(g) $\frac{y}{c} = w$ (h) $\frac{y}{a} = 2c$ (i) $a = y + p$

(j) $c = y - k$ (k) $y^2 = s$ (l) $y^3 = x$

(m) $\sqrt{y} = g$ (n) $\pi y = c$ (o) $n - y = t$

(p) $ry = c$ (q) $4\pi y = b$ (r) $y + 7t = c + r$

(s) $\frac{r}{y} = w$ (t) $y^2 = k + x$ (u) $A = xy$

Question 2: Make x the subject of the following formulae

(a) $4x + c = w$ (b) $dx - t = 8$ (c) $x^2 + 3 = h$

(d) $2x + 2y = P$ (e) $s = x^2 - 3$ (f) $y = xz + s$

(g) $\frac{x}{n} + 2 = w$ (h) $\frac{x}{6} - 5 = w$ (i) $\frac{x + 3}{c} = h$

(j) $3y = 4x + 1$ (k) $x^2 + a = v$ (l) $x^3 - 4 = 5y$

(m) $\frac{x + t}{m} = 2c$ (n) $\frac{w + x}{u} = 3z$ (o) $A = \pi x^2$

(p) $A = \frac{1}{2}bx$ (q) $V = abx$ (r) $v^2 = u^2 + 2ax$

(s) $\frac{a + b}{x} = r$ (t) $\frac{5cx}{b} = a$ (u) $\sqrt[3]{\frac{x}{k}} = w$

Task 4

1) $5a + b = 4c - 3$

i) Rearrange the equation to make c the subject. _____

ii) Find the value of c, if $a = 5$ and $b = -4$. _____

2) $\sqrt{\frac{x + 3}{2y - 4}} = 6$

i) Rearrange the equation to make y the subject. _____

ii) Find the value of y, if $x = -3$. _____

3) $-3g - 2h = \frac{d - 56}{4}$

i) Rearrange the equation to make d the subject. _____

ii) Find the value of d, if $g = \frac{1}{4}$ and $h = 7$. _____

4) $-r + 8s = 9p^2q$

i) Rearrange the equation to make p the subject. _____

ii) Find the value of p, if $q = 2$, $r = 30$ and $s = 24$. _____

5) $\sqrt[3]{\frac{-6m + 10k}{10k - 1}} = 2$

i) Rearrange the equation to make k the subject. _____

ii) Find the value of k, if $m = 18$. _____

Challenge

Question 1: The cosine rule is $a^2 = b^2 + c^2 - 2bc \cos A$.
Make cos A the subject.

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Week 2:

Lesson 2

Demonstration Videos:
Solving linear equations with brackets - https://www.youtube.com/watch?app=desktop&v=XwRcCDSkWuw

DEMO

Solve to find the value of x.

$3(2x + 5) = 27$ — Expand Brackets

$6x + 15 = 27$ — Expand Brackets

$6x = 12$ — -15

$x = 2$ — $\div 6$

Task 1

$2(3x + 1) = 26$

$3(3x - 10) = 33$

$148 = 4(7 + 5x)$

$5(40 - 3x) = 80$

Task 2

☆ Solve

1) $2(x + 3) = 10$
2) $5(x - 1) = 20$
3) $3(x + 4) = 21$
4) $2(3x + 1) = 14$
5) $4(3 + 2x) = 36$
6) $7(2x - 3) = 35$
7) $8(4 - x) = 16$
8) $6(5x - 3) = 42$

☆☆ Solve

1) $2x + 4 = x + 14$
2) $3x - 1 = x + 7$
3) $2x - 9 = x + 2$
4) $5x - 10 = 3x - 2$
5) $3x + 5 = 20 - 2x$
6) $7x - 4 = 20 - x$
7) $6 - x = x - 10$
8) $5 - x = 4 - 2x$

☆☆☆ Solve

1) $3(2x - 1) = x + 12$
2) $2(3x + 1) = 2x + 10$
3) $5(2x - 1) = 5x + 15$
4) $6(x + 4) = 4(2x + 5)$
5) $8(3x - 2) = 8x$
6) $3(4x - 2) = 5(x + 3)$
7) $4(5x + 2) = 6(3x + 2)$
8) $3(6x - 2) = 5(4x - 2)$

Task 3

x = -0.5	x = -4	x = -5	x = 8	x = 10
x = 1	x = 1	x = 2	x = -1	x = 3
x = 0.5	x = 6	x = 5	x = -2	x = 3
x = 1	x = 7	x = 4	x = 6	x = 3
x = 5	x = 9	x = 2	x = 4	x = 0

3(6x + 2) = -30	4(2x + 4) = 40	4(3x + 2) = 14	5(2x - 1) = 85
2(4x - 5) = -2	2(2x - 3) = 22	4(2x - 2) = 56	4(3x - 2) = 64
2(2x + 3) = 10	2(10x + 3) = -14	3(3x - 2) = -51	3(2x + 5) = 12
3(2x - 1) = 27	5(2x - 1) = -45	4(3x + 4) = 16	4(4x + 4) = 48
3(3x + 2) = 24	2(4x + 2) = 36	4(2x - 3) = 12	5(2x + 4) = 120

Missing Value

Task 4

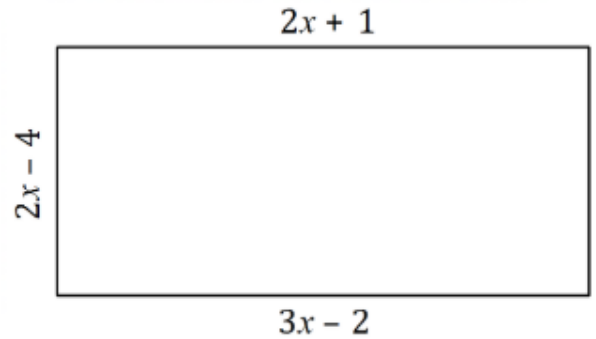
Answer Maze!

To get to the finish, look for answers vertically, horizontally, or diagonally!

START	$x = 4$	$x = 8$	$x = 5$
$2(2x + 2) = 20$	$26 = 2(2x + 3)$	$5(2x - 8) = 10$	$4(4x + 3) = 76$
$x = 5$	$x = 1$	$x = 9$	$x = 4$
$54 = 3(2x + 4)$	$3(2x - 2) = 42$	$6 = 3(7x - 3)$	$3(4x - 4) = 24$
$x = 2$	$x = 7$	$x = 3$	$x = 5$
$4(x + 5) = 24$	$46 = 2(3x + 5)$	$5(2x - 8) = 40$	$11 = 7(4x + 8)$
$x = 6$	$x = 11$	$x = 8$	$x = 7$
$15 = 3(2x + 1)$	$9(3x - 6) = 21$	$3 = 3(2x + 5)$	$2(2x + 2) = 8$
$x = 5$	$x = -2$	$x = 4$	$x = 0$
$3(4x + 6) = 12$	$3(4x - 30) = 42$	$6(5x + 7) = 22$	$49 = 7(5x - 18)$
$x = 13$	$x = 11$	$x = -3$	$x = 5$
$6 = 7(4x - 2)$	$6(5x + 20) = 30$	$-10 = 2(5x - 5)$	*FINISH*

Task 5

The diagram below shows a rectangle. Some of the lengths are shown on the diagram.



NOT DRAWN TO SCALE

a) Write and solve an equation to show that the value of x is 3.

b) Hence calculate the value of the perimeter of the rectangle.

Week 2:

Lesson 3

Demonstration Videos:
Solving linear equations with fractions - https://www.youtube.com/watch?v=kaIqgpKV4Cc&feature=emb_title

Task 1

Solving Fractional Equations

(a) $\frac{x}{4}+1=9$ (b) $\frac{x}{2}-5=9$ (c) $\frac{w}{5}+2=3$ (d) $\frac{x}{8}-7=2$

(e) $\frac{m}{3}-4=0$ (f) $\frac{x}{6}+7=2$ (g) $\frac{k}{4}+5=-6$ (h) $\frac{x}{6}-2=-8$

(i) $\frac{2x}{4}+4=8$ (j) $\frac{3x}{12}-7=-5$ (k) $\frac{6x}{4}-7=5$ (l) $\frac{5x}{10}+3.5=6$

Answer Grid:

12	-30	8	27
72	32	17	14
-36	8	5	20
8	-44	-18	28

Sovle $\frac{3x}{2}+4=13$

$\frac{3x}{2}+4=13$
$-4 \quad -4$
$\frac{3x}{2}=9$
$\times 2 \quad \times 2$
$3x=18$
$\div 3 \quad \div 3$
$x=6$

Describe what has happened to the x.

Do 'opposites backwards'.

Substitute your answer into the original equation to check.

Task 2

★

1) $\frac{x}{3}=7$
2) $\frac{x}{5}=2$
3) $\frac{2x}{7}=4$
4) $\frac{3x}{5}=6$
5) $\frac{2x}{3}=8$
6) $\frac{4x}{5}=4$
7) $\frac{2x}{3}=12$
8) $\frac{10x}{4}=5$

★★

1) $\frac{x+3}{2}=7$
2) $\frac{x-3}{5}=2$
3) $\frac{x-1}{3}=3$
4) $\frac{x+9}{5}=2$
5) $\frac{x-9}{3}=4$
6) $\frac{4+x}{3}=4$
7) $\frac{5+x}{4}=5$
8) $\frac{6-x}{3}=4$

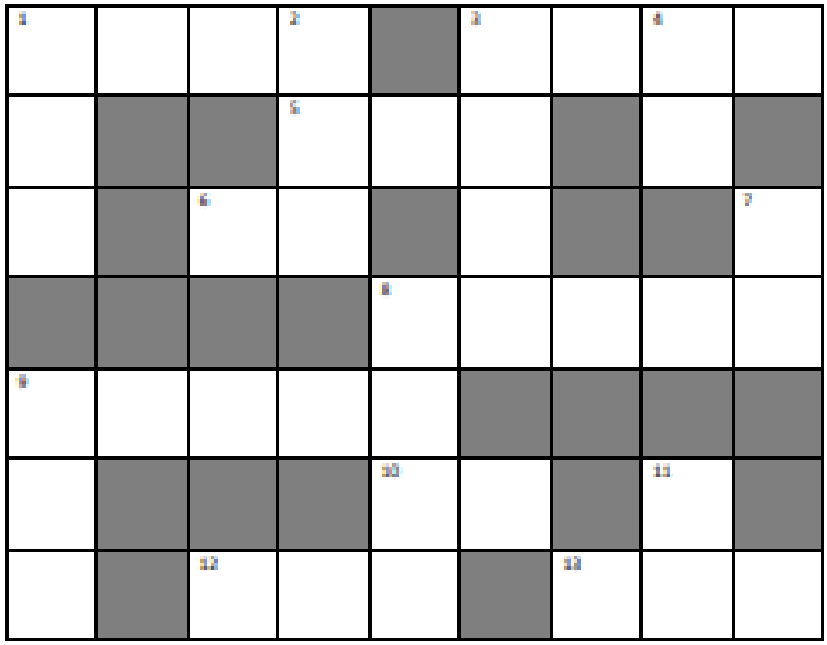
★★★

1) $\frac{5x-6}{3}=8$
2) $\frac{3x+8}{4}=5$
3) $\frac{3x+5}{5}=4$
4) $\frac{8x-3}{5}=9$
5) $\frac{3x+11}{2}=7$
6) $\frac{4x-3}{7}=3$
7) $\frac{7x-11}{2}=-2$
8) $\frac{4x-9}{7}=-1$

Task 3

Algebra Cross Number

Put all decimal points on the line and round answers to the accuracy specified, where necessary



Across Clues:

1) $\frac{3-7x}{2} = 1$ (3dp)

3) $\frac{3x}{4} - 2 = 6$ (2dp)

5) $\frac{2(3x-1)}{5} = 9$ (2dp)

6) $3(2x-1) - 4(x-5) = 24$

8) $3x + 4(2x-1) = 0$ (4dp)

9) $\frac{7x+1}{4} = 4$ (4dp)

10) $4 - \frac{5x}{3} = 1$

12) $\frac{x+1}{4} = \frac{2x-3}{5}$ (2dp)

13) $6 - 3x = 19 - 7x$

Down Clues:

1) $4(x-1) + 2(2x-3) = -4$

2) $4x - 5 = 10$

3) $3x = 4$ (3dp)

4) $\frac{2x-3}{5} = 2$

7) $2x + 3 = 7x - 5$

8) $6(2x+1) = 17$ (3dp)

9) $5x = 121$

11) $2(7-x) = 3(x+1)$

Week 3:

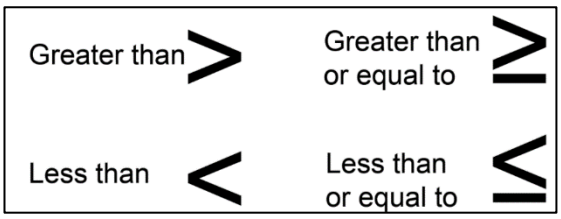
LI: Express relationships using inequality notation
LI: Form and solve linear inequalities in one unknown, including those where the unknown appears on both sides

Lesson 1

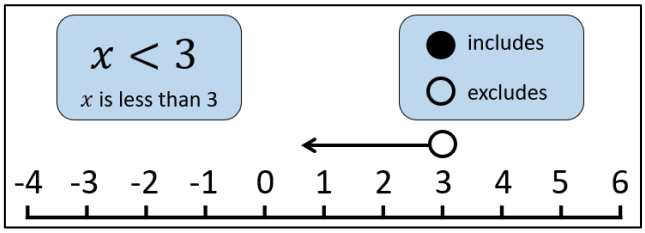
Demonstration Videos:
Inequalities - https://www.youtube.com/watch?v=OjgdLu0JaZo

Inequalities on a number line - https://corbettmaths.com/2013/05/18/inequalities-on-a-number-line/

Reminder



New learning



Task 1

Inequalities on number lines

The symbols $<$, $\leq$, $>$ and $\geq$ are used to express inequalities (things that are **not** equal).

$x < 3$ means .....

$2 < x$ means .....

$x \leq 5$ means .....

$-1 \leq x$ means .....

$x > 4$ means .....

$10 > x$ means .....

$x \geq -3$ means .....

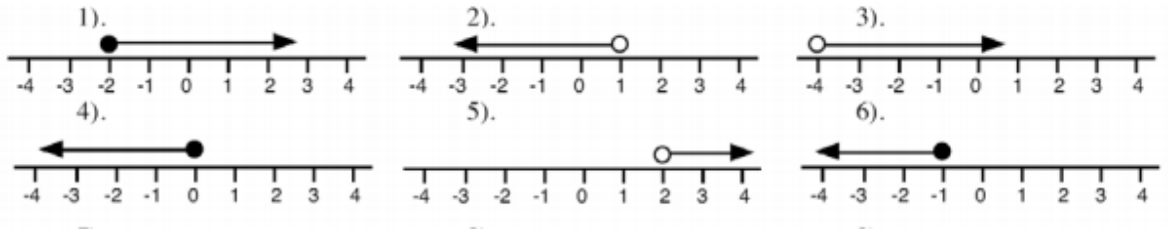
$6 \geq x$ means .....

$2 < x < 7$ means .....

$1 \leq x \leq 9$ means .....

Task 2

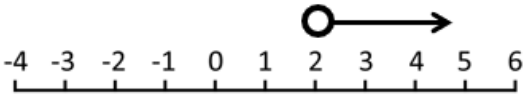
Describe these inequalities in words

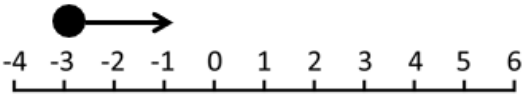


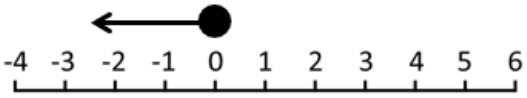
Task 3

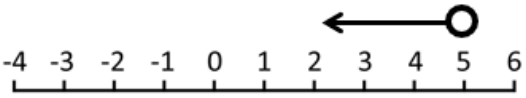
Describe these inequalities using algebra

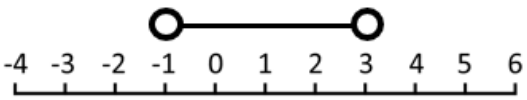
What inequalities do these diagrams represent?

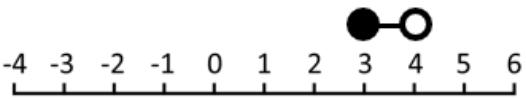
a) 

b) 

c) 

d) 

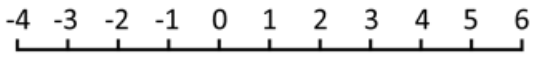
e) 

f) 

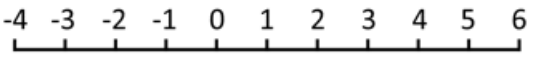
Task 4

Represent these inequalities on a number line.

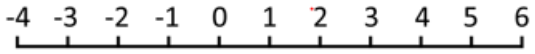
g) $x \leqslant 2$



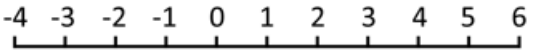
h) $x > -3$



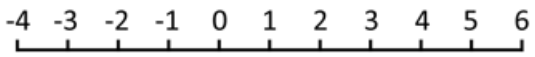
i) $x < -1$



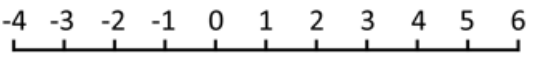
j) $-2 \leqslant x \leqslant 2$



k) $0 \geqslant x > 6$



l) $-1 < x \leqslant 4$



Task 5

Name

List the integer solutions

4, 5, 6, 7	-1, 0	5, 6, 7	-4, -3, -2	1, 2, 3
-3, -2, -1	-1, 0	7, 8	4, 5	-3, -2
0, 1, 2	2, 3	0, 1	1, 2	4, 5, 6
3, 4	-2, -1	-2, -1	-2, -1, 0, 1	3, 4, 5
5, 6, 7, 8	0, 1, 2, 3	0, 1	6, 7, 8	-1, 0, 1

$0 < x < 3$	$3 \leq x < 6$	$0 \leq x \leq 2$	$0 \leq x \leq 3$
$2 < x < 5$	$-2 \leq x < 0$	$-4 \leq x < -1$	$-2 \leq x \leq 1$
$-4 < x \leq -1$	$3 < x < 6$	$4 < x < 8$	$4 \leq x \leq 7$
$4 < x \leq 8$	$-1 \leq x < 1$	$-1 \leq x \leq 1$	$0 \leq x < 2$
$6 < x \leq 8$	$5 < x \leq 8$	$3 < x \leq 6$	$0 < x \leq 3$

Missing values

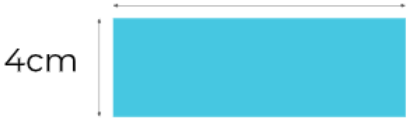
Week 3:

Lesson 2

Demonstration Videos:
Forming and solving inequalities - https://classroom.thenational.academy/lessons/forming-and-solving-inequalities-part-1-61jk6t?step=2&activity=video

Task 1

Find possible values of x in these two examples



The length is x cm longer.

The area is greater than 40cm^2.

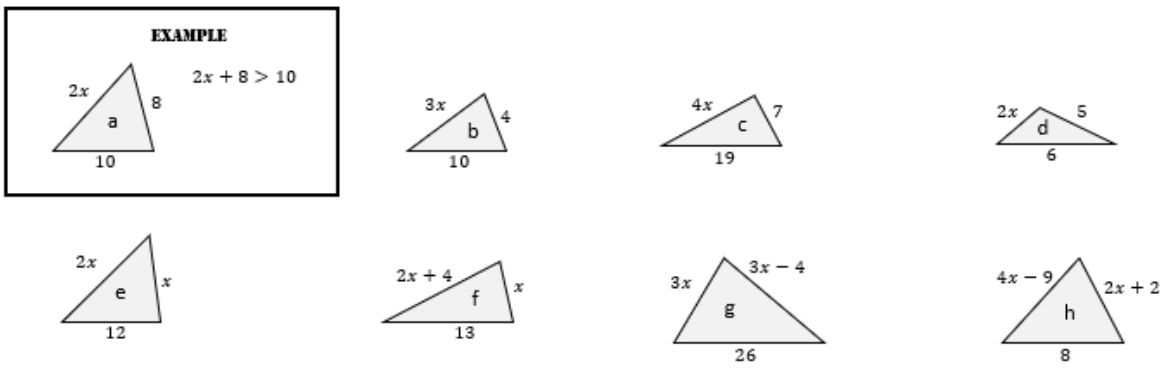
The area of the square is less than 64cm^2

Task 2

Forming Single Inequalities

All these 'Acute Angle Triangles' (all angles less than 90°) are not drawn accurately

Form an inequality to express their side lengths. The first has been done as an example.

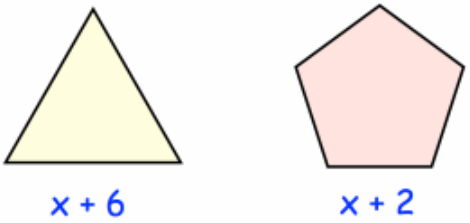


Task 3

Question 3: The perimeter of the regular pentagon is larger than the perimeter of the equilateral triangle.

(a) Form an inequality in terms of x

(b) Solve the inequality to find the possible range of values for x.



Task 4

Form an inequality for each problem

Anna starts saving £5 a week. How many weeks until she has saved over £52?	Ben splits some money between 5 friends. How much must he have if everyone gets more than £6?	Chay has £240 & spends £15 a day. How many days until she has less than £50?
David has £180 & spends £10 a day. How many weeks until he has £70 or less?	El has £65 & saves £25 a week. How many weeks until she has £250?	Fae has £320 & spends £20 a week. For how many weeks does she have more than £190?
Greg spends £3.50 a day on coffee. How many days until he has spent £30 on coffee?	Hannah has £60 & saves £8 a week. How many weeks until she has £132 or more?	Ingrid splits some money with herself & 9 other people. How much must she have if everyone gets at least £4.50?

Task 5

Perimeter

A 40 cm length of wire is used to form a rectangle. The width of the rectangle is 2 cm longer than the height. Not all the wire is used.

Find the range of values for the shortest side

Task 6

A school is buying chairs and tables. The number of tables is represented by v and the number of chairs is represented by w.

The school must buy at least four times as many chairs as tables.
Write this information as an inequality.

Week 3:

Lesson 3

Demonstration Videos:
Solving inequalities unknown on both sides - https://www.mathsgenie.co.uk/inequalities.html

Task 1

☆

Solve

1) $2x < 4$
2) $x + 3 > 5$
3) $x - 5 \leq 10$
4) $4x \geq 2$
5) $\frac{x}{4} < 6$
6) $5 > 2 - x$
7) $4 < 6 + x$
8) $x + 2 \geq -1$

☆☆

Solve

1) $2x - 5 > 7$
2) $4x + 3 > 15$
3) $3x - 5 < 19$
4) $\frac{x}{4} - 1 \geq 2$
5) $6 - x \leq 1$
6) $6 > 2 - 4x$
7) $5 < 6 + 2x$
8) $2x + 5 \geq -1$

☆☆☆

Solve

1) $2x + 1 > x + 6$
2) $4x - 10 < 2x + 8$
3) $3x + 1 \geq 2x - 3$
4) $4x - 2 < 2x + 8$
5) $3x - 1 \geq 4 - 2x$
6) $5x + 6 < 2 - 3x$
7) $x + 3 > 9 - 2x$
8) $5 - x < 4 - 2x$

Task 2

x < 11	x < -1.5	x < 9	x > -5	x < 1
x < 7	x < -3	x ≤ -4	x ≤ 1.5	x > 2
x < 5	x < 4	x ≤ 3	x > -2	x > -2.5
x < 7	x > -1	x < -1	x > 10	x < 8
x > 9	x < -10	x > 6	x < -8	x < 3

4x - 5 > x - 11	4x + 5 > x + 2	5x + 2 ≤ 3x + 5	5x + 1 ≤ 3x + 7
3x - 3 < x - 9	2x + 10 > 3x + 3	4x - 10 > 2x + 2	4x - 10 > x - 4
3x - 2 < 2x + 3	4x - 5 > 2x - 15	3x - 12 < 2x - 4	10x + 2 < 6x - 2
4x + 10 > 2x + 5	3x + 4 < x + 1	5x + 1 ≤ 2x - 11	5x - 20 > 2x + 10
2x - 5 < x - 1	2x + 10 < x + 2	4x + 4 < 5x - 5	2x + 5 < x - 5

☐ ☐ ☐ ☐ ☐

The target is the inequality needed to complete the pattern

TARGET ☐

Task 3

CHECK IT

Solving Inequalities

Solve

1)	$6x - 4 \leq 3x - 1$	2)	$5x + 1 \leq 2x - 11$
3)	$3x + 4 < x + 1$	4)	$7x - 3 \geq 2x + 2$
5)	$5x + 3 \leq 2x + 2$	6)	$5x - 20 > 2x + 10$
7)	$3x - 3 < x - 9$	8)	$5x + 2 \leq 3x + 5$
9)	$2x + 10 > 3x + 3$	10)	$4x - 5 > x - 11$
11)	$10x + 2 < 6x - 2$	12)	$7x - 4 \geq 3x - 5$
13)	$4x - 10 > 2x + 2$	14)	$2x + 10 < x + 2$
15)	$6x - 5 \leq 2x - 3$	16)	$5x + 1 \leq 3x + 7$
17)	$4x + 4 < 5x - 5$	18)	$2x + 5 < x - 5$
19)	$4x - 10 > x - 4$	20)	$9x + 3 \geq 5x + 11$
21)	$2x - 5 < x - 1$	22)	$6x + 10 \leq 3x + 4$
23)	$3x - 2 < 2x + 3$	24)	$5x + 3 \leq x + 1$
25)	$6x + 2 \geq 3x + 3$	26)	$3x - 12 < 2x - 4$
27)	$5x + 1 \leq 2x - 11$	28)	$4x + 5 > x + 2$
29)	$7x - 3 \geq 2x + 2$	30)	$6x + 5 \geq 2x + 6$

Stewards Academy

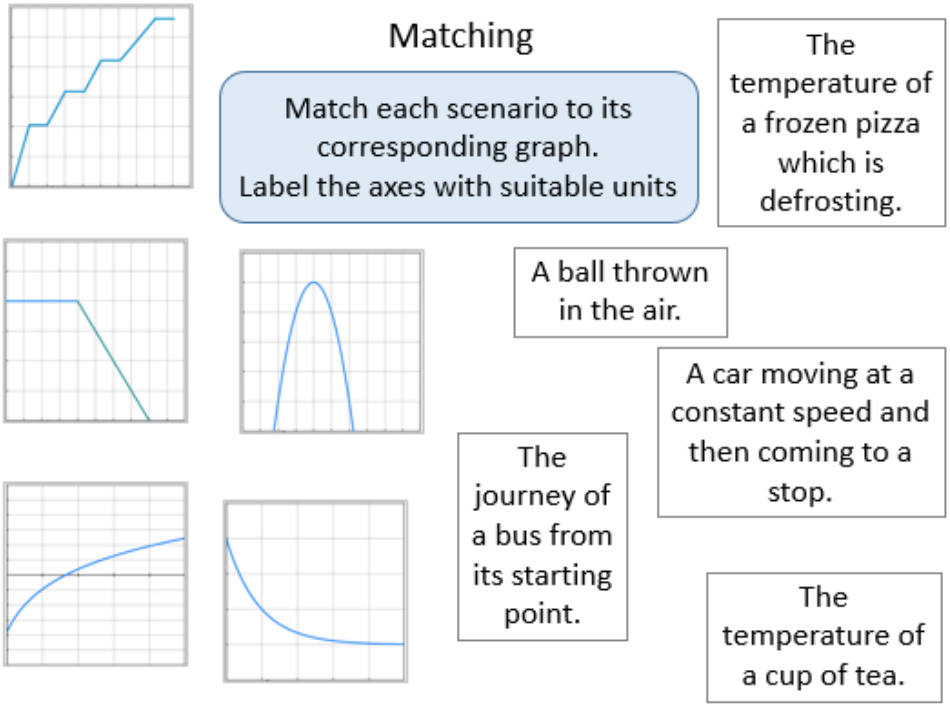
Week 4:

LI: To use linear graphs to find approximate solutions of simultaneous linear equations
LI: To use linear and quadratic graphs to estimate values of y for given values of x

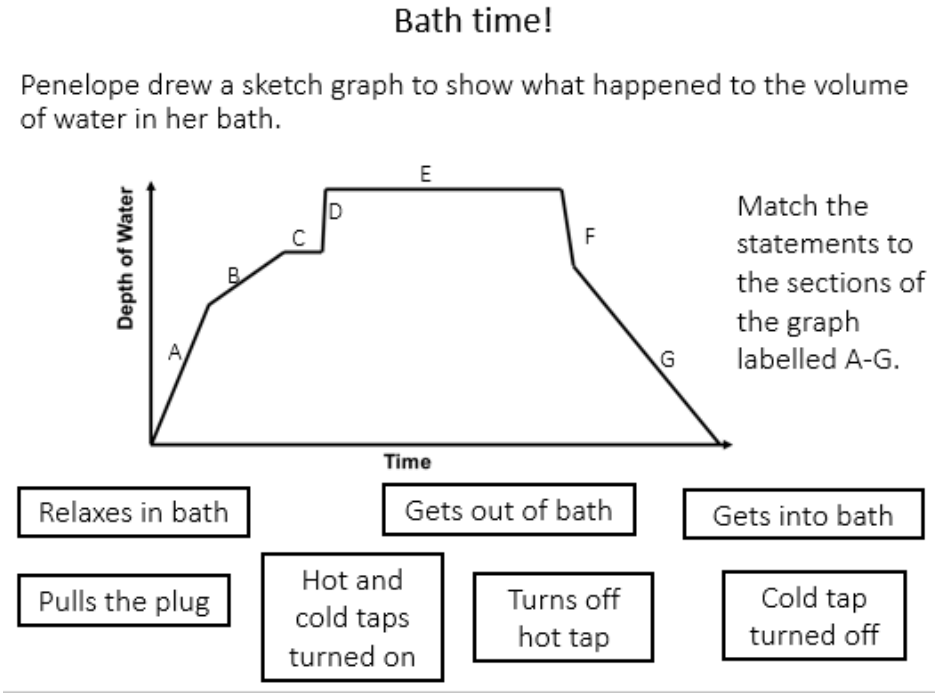
Lesson 1

Demonstration Videos:
Real life graphs - https://www.youtube.com/watch?v=wCnfckm4S-o

Task 1



Task 2

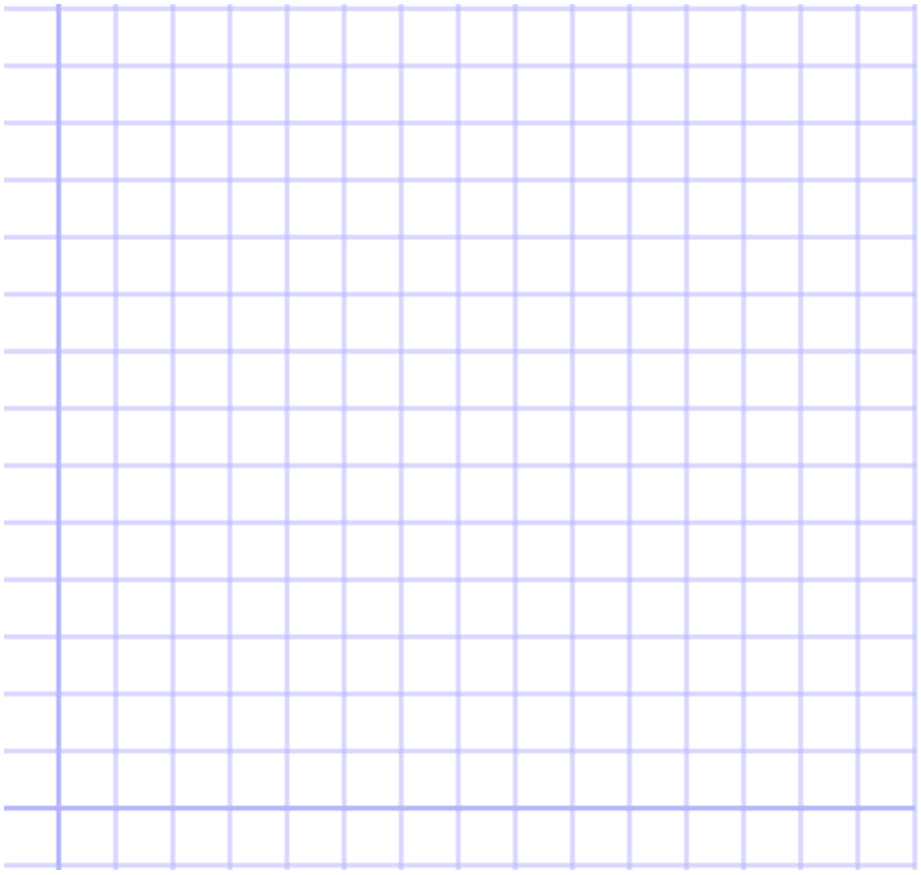


Solving equations –
- LO: I can rearrange and solve linear equations given in any form
- LO: I can rearrange and solve linear equations involving fractions and brackets
- LO: I can express
-

Task 3

Plot a graph to show the following:

The graph is showing the depth of snow between 18:00 and 23:00	At 20:00, it stopped snowing and the depth remained constant for the next 30 minutes.
At 18:00 the depth of snow was 20cm.	After 30 minutes of no snowfall, the temperature increased and 2cm of snow had melted.
Between 18:00 and 19:00 another 3cm of snow fell.	Between 9pm and 10pm it snowed at exactly the same rate that it had been snowing at 6pm
Between 19:00 and 20:00 the rate of snowfall doubled.	By 11pm, there was exactly the same depth of snow as there had been at 9pm.



Don’t forget to add a title and label your axis

Week 4:

Lesson 2

Demonstration Videos:
Inequalities - https://www.youtube.com/watch?v=wCnfckm4S-o

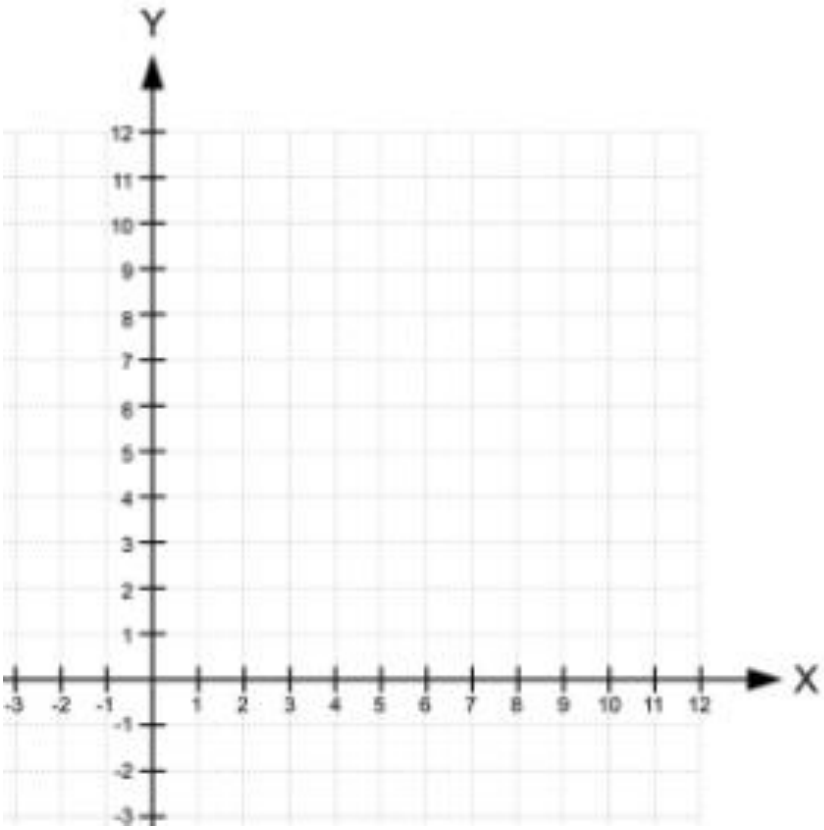
Task 1

Draw the graphs

$x + y = 6$

$y = x + 4$

$y = x + 1$



Use your graphs to find the solutions to the following simultaneous equations:

a) $x + y = 6$ and $y = x + 4$
b) $x + y = 6$ and $y = x + 1$
c) $y = x + 1$ and $y = x + 4$

Task 2 (Use the squared paper in your pack)

Lucy is doing a sponsored bike ride

Lillie-Mae has sponsored her £20, plus £3 per additional mile.	Jenny has sponsored her £30, plus £2 per additional mile.

By drawing a graph, identify the number of miles that Lucy will need to cycle so that they both donate exactly the same amount.

What if?

Lillie-Mae has sponsored her £40, plus £3 per additional mile.	Jenny has sponsored her £30, plus £4 per additional mile.
Lillie-Mae has sponsored her £40, plus £2 per additional mile.	Jenny has sponsored her £20, plus £4 per additional mile.

Task 3

Solving Simultaneous Equations
Graphically
Plot each equation on the same grid.
You may want to rearrange the equations first.
The intersection shows the values (x, y) that satisfy both equations.
Check the solution by substituting values back into the equations.
y = 2x + 2
y + x = 8
(2, 6)
Solution: x = 2 y = 6
Substitute to check:
y = 2x + 2 6 = 2(2) + 2
y + x = 8 6 + 2 = 8
① y = x + 1 y + x = 9 x = 4 y = 5
② y = x + 3 y + x = 7 x = 2 y = 5
③ y = 2x y + 2x = 8 x = 2 y = 4
④ y = 3x − 3 2y + 3x = 12 x = 2 y = 3
⑤ y = 5 − 2x y = 0.5x − 5 x = 4 y = −3
⑥ y − x = −3 2y − 3x = −9 x = 3 y = 0
⑦ 2y + 5x = 30 y = 6x − 2 x = 2 y = 10
⑧ 4y + 5x = −20 y = −1/2 x + 5.5 x = −6 y = 2.5
⑨ 2x = −24 − 6y y − 10 = 2x x = −6 y = −2

Week 4:

Lesson 3

Demonstration Videos:
Solving simultaneous equations - https://www.youtube.com/watch?v=phlus4x0UqM

Task 1

C	B	B	14
C	B	B	14
D	B	B	12
4	18	18	

G	E	G	28
G	G	F	27
G	E	F	28
27	29	27	

J	M	M	22
K	K	J	8
J	K	K	8
13	10	15	

Task 2

Simultaneous Equations
Find the value of each shape in each pair of equations.

a) ○ + □ = 7
○ + □ + □ = 12

b) ⬠ + △ = 7
⬠ + △ + △ + △ = 15

c) ○ + ○ + □ + □ = 16
○ + ○ + □ + □ + □ = 18

d) ⬠ + △ = 10
⬠ + ⬠ + △ + △ + △ = 23

e) ⬠ + △ + △ = 13
⬠ + ⬠ + △ + △ + △ + △ + △ = 30

f) ⬠ + ⬡ + ⬡ = 12
⬠ + ⬠ + ⬡ = 18

Task 3

Find the value of each item.

A

 = £2.70

 = £1.50

B

 = £1.30

 = 85p

1) **Subtract** to **find the difference.**

2) **Solve** to find the value of 1 variable.

3) **Substitute & solve** to find the remaining value.

4) Substitute & **check**!

C 3 hotdogs and 5 sodas cost £9.70

It costs £11.90 for 7 sodas and 3 hotdogs.

D Anna is sent to the shop for the office lunch. She has a £20 note and buys 4 sandwiches and 4 apples. She gets £7.60 in change. The next day Jay is sent. He has to buy 2 extra sandwiches and also a chocolate bar (90p) for his boss. He pays £18.10

Task 4

☆

Solve simultaneously

1) $x + 2y = 8$, $3x + 2y = 12$

2) $3x + y = 7$, $3x + 2y = 11$

3) $x + 3y = 5$, $2x + 3y = 4$

4) $4x - y = 10$, $3x - y = 8$

5) $2x - y = 7$, $2x + 3y = 3$

6) $x + 5y = 2$, $2x + 5y = -1$

☆☆

Solve simultaneously

1) $x + 2y = 6$, $3x - 2y = 10$

2) $3x - y = 10$, $2x + y = 5$

3) $-3x + y = 9$, $3x + 4y = 6$

4) $4x - y = 11$, $x + y = -1$

5) $-x - 2y = 6$, $x - 5y = 1$

6) $2x + 3y = 6$, $x - 3y = -17$

☆☆☆

Solve simultaneously

1) $2x + y = 4$, $3x - y = 1$

2) $x + 3y = 7$, $x - 2y = -8$

3) $x + 4y = 15$, $3x - 4y = -19$

4) $3x + 5y = 9$, $3x + y = -3$

5) $2x - 3y = 4$, $x + 3y = 11$

6) $-2x + y = -7$, $x - y = 4$

Challenge

Calculate the price of each fast food item	Nuggets, fries and a milkshake costs £4.54	One ice cream and three soft drinks costs £4.37	The drinks cost less than £1.50 each
One burger and one fries costs £3.35	All the items cost under £3.00 each	The burger is the most expensive item on the menu	Two ice creams and a soft drink costs £3.79
Two burgers and one fries costs £5.75	There are 7 items on the menu	One hot dog and one fries costs £3.15	Two nuggets and three milkshakes costs £8.67

Week 5:

LI: To use linear and quadratic graphs to estimate values of y for given values of x

Lesson 1

Demonstration Videos:
Plotting quadratic graph - https://corbettmaths.com/2013/06/23/drawing-quadratics/

Task 1

$a = 3$ $b = 2$
$c = 5$ $d = 4$

Questions

$3b^2$	$b + c$	$-d^2$
bc	b^3	ab
$(c + b)^2$	a^2	$a - c$
$2ad$	$c - b^2$	$2a^2$
c^2	$b - c$	$a + 2d$
$d^2 - 5c$	$3a + c^2$	$4b^2$
ac^2	$(a + c)^2$	$2b$
$3a^2b$	$-3b^2$	$-a^3$
$2a - c^2$		

4 in a Row

Choose a question from the left.
Find, then highlight the answer below.
See if you can get 5 in a row.

Answer Grid

64	49	-27	25	-2
-12	16	1	-16	24
9	4	-3	54	27
10	7	-9	6	-19
18	75	11	8	34

Task 2

Complete these tables of values

$y = 2x^2$

x	-2	-1	0	1	2
y					

$y = x^2 + x$

x	-2	-1	0	1	2
y					

$y = 0.5x^2$

x	-2	-1	0	1	2
y					

$y = 3x^2 + 2x$

x	-2	-1	0	1	2
y					

$y = 3x^2 - 4x + 3$

x	-2	-1	0	1	2
y					

$y = x^2 - 5x$

x	-2	-1	0	1	2
y					

$y = x^2 + 3x + 4$

x	-2	-1	0	1	2
y					

$y = 2x - x^2$

x	-2	-1	0	1	2
y					

$y = 3x^2 - 5$

x	-2	-1	0	1	2
y					

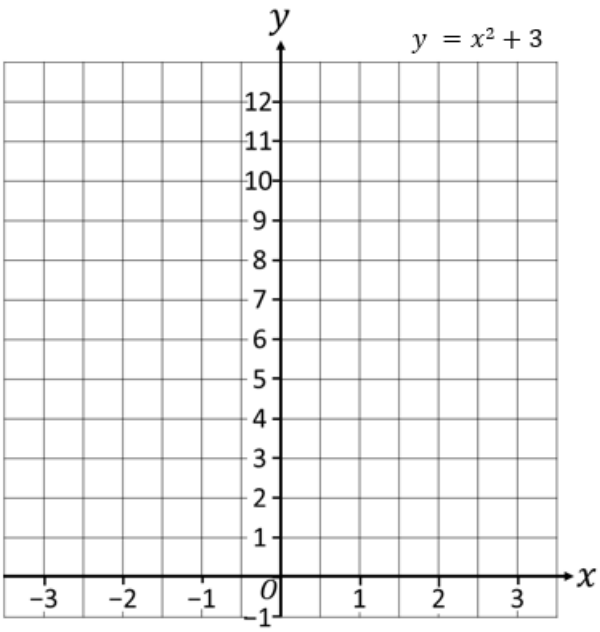
Task 2

Plotting Quadratic Graphs

Plot the graph of: $y = x^2 + 3$

x	−3	−2	−1	0	1	2	3
x^2	9	4	1	0	1	4	9
+3	3	3	3	3	3	3	3
y	12	7	4	3	4	7	12

(−3, 12)

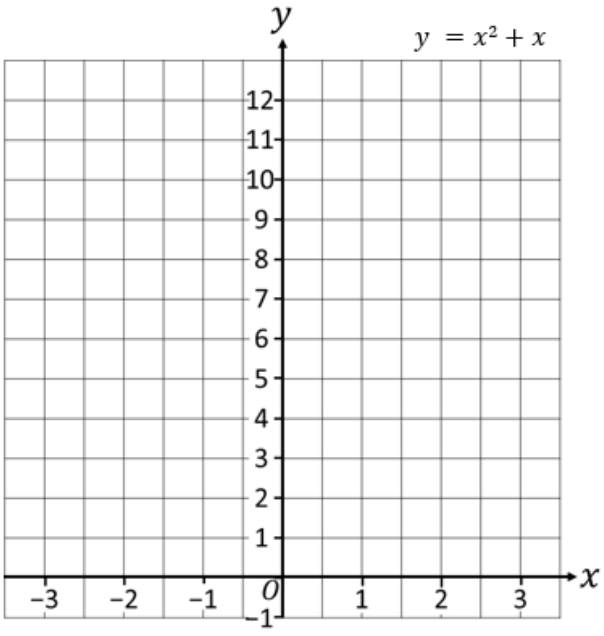


Task 3

Plotting Quadratic Graphs

Complete the table of values and plot the graph of: $y = x^2 + x$

x	−3	−2	−1	0	1	2	3
x^2	9	4					
x	−3	−2					
y	6	2					



Task 4

Set up a table of values and plot the graphs of the following;

1	$y = 3x^2 - 2x$	**2**	$y = 0.5x^2$	**3**	$y = 2x^2$
4	$y = x^2 + x - 3$	**5**	$y = 2x^2 - 4x + 5$	**6**	$y = 4x^2 - 10$

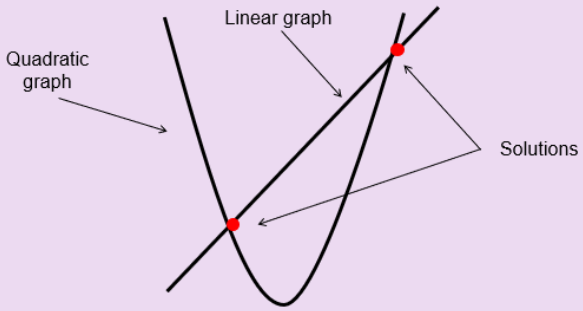
Week 5:

Lesson 2

Demonstration Videos:

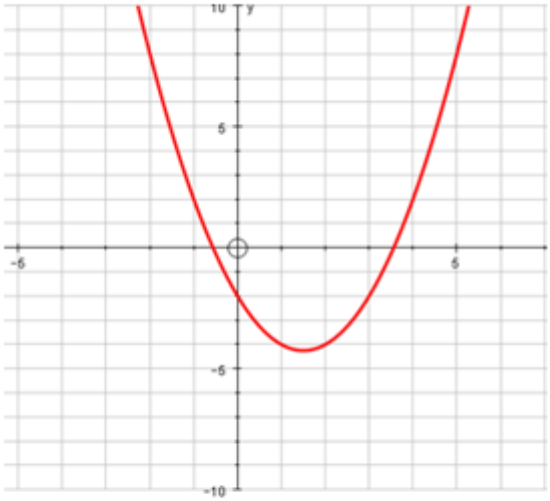
Plotting quadratic graph - https://www.youtube.com/watch?v=7C3f-sYMNCU

Example: where one is linear and one is a quadratic



Task 1

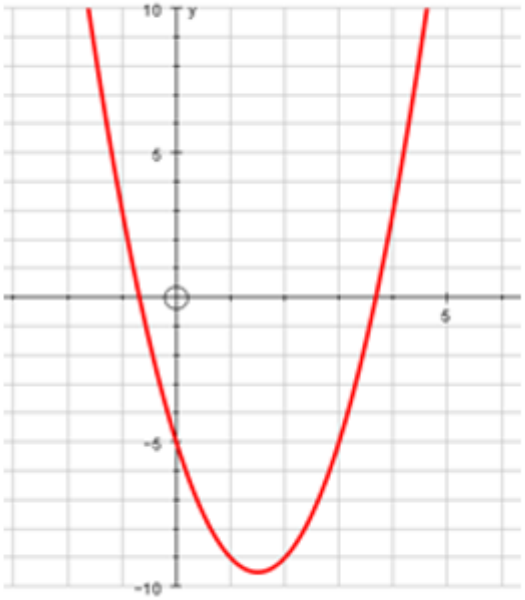
1. This is the graph of $y = x2 - 3x - 2$.
   On the same grid, plot the line $y = 5$.



Find the coordinates of the points where these two graphs intersect:

(,) and (,)

2. This is the graph of $y = 2x2 - 6x - 5$.
   On the same grid, plot the line $y = 2x$.



Task 2

Solving Quadratic & Linear Simultaneous Equations by Plotting

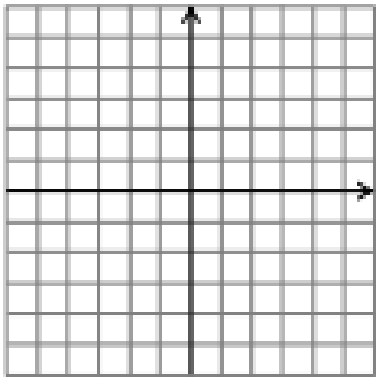
$y = x^2 + 5x + 9$ $y = x + 5$	$xy = 8$ $y = x - 2$	$y = x^2 + 6x + 4$ $y = 2x + 1$

Task 3

Solving Simultaneous Equations Graphically

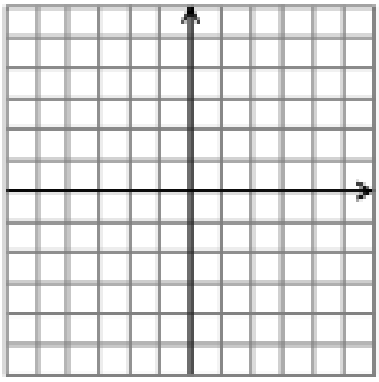
For each pair of equations draw the lines for each, the point of intersection represents the solution.

1. $y = 3x - 1$
   $y = 2x$



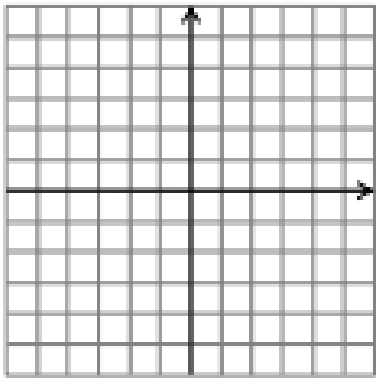
Point of intersection (____, ____) so x=____ & y=____

2. $y = 2x - 1$
   $y = x$



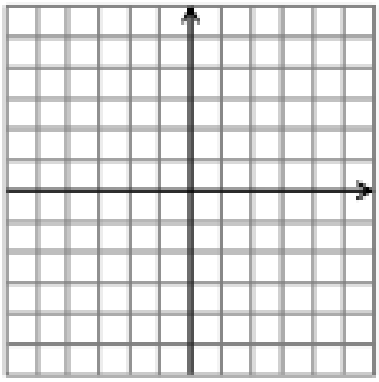
Point of intersection (____, ____) so x=____ & y=____

3. $y = 3x - 2$
   $y = x - 2$



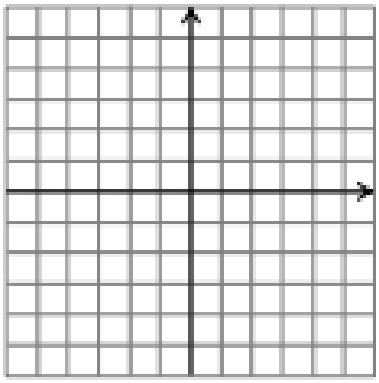
Point of intersection (____, ____) so x=____ & y=____

4. $y = 3 - 2x$
   $y = x$



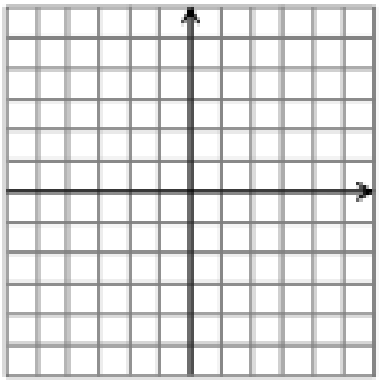
Point of intersection (____, ____) so x=____ & y=____

5. $x + y = 5$
   $y = 2x - 1$



Point of intersection (____, ____) so x=____ & y=____

6. $2x + y = 6$
   $x + y = -6$



Point of intersection (____, ____) so x=____ & y=____

Attainment Band :	Unit 4 - Equations and inequalities	
	Knowledge and Understanding	**Skills**
Yellow Plus		Uses a volume time graph to calculate rate 6c Completes a table of values for a quadratic graph 7a/b Uses quadratic graphs to estimate values 7c
Yellow	Knows how to substitute values into a quadratic equation to find coordinates 7	Use graphs to find solutions to linear simultaneous equations 5b Forms an inequality from a worded problem 10
Blue	Know the difference between inequalities and equations 10	Solve linear inequalities 4a Form equations and solves an equation 9 Interprets information from volume time graph 6a/b Solve equations with unknowns on both sides 1b Solve inequalities with unknowns on both sides 8
Green	Plots co-ordinates correctly 5a* Understands inequality signs 3	List a set of integers that satisfy an inequality 2* Represent inequalities on a number line 4b Recognise an inequality from a worded statement 3 Completes a table of values for a linear equation 5a*
White	Understands inverse operations 1	Solve basic two step equations 1a