

# Year 9

## Blended Learning Booklet

Name:

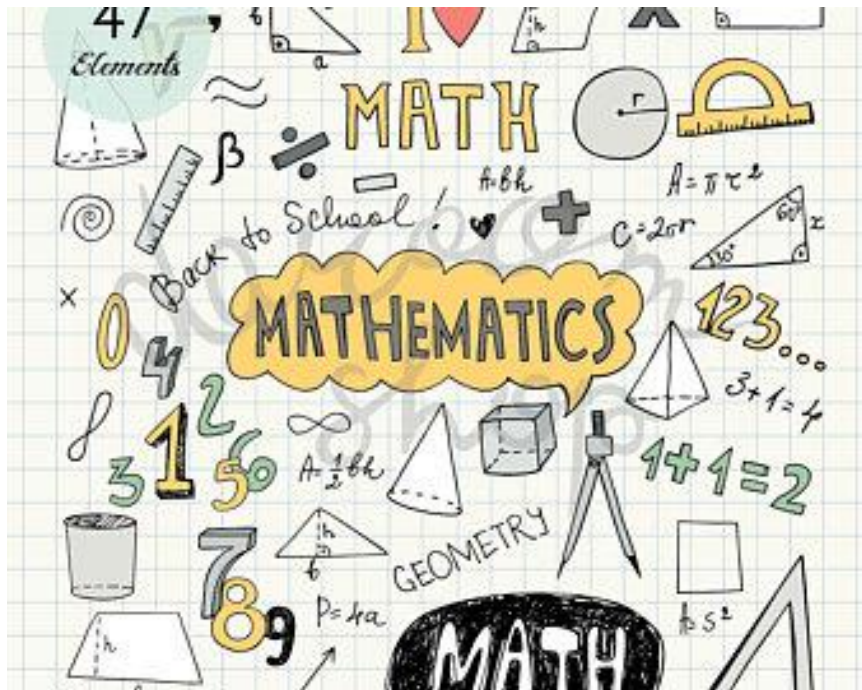
Form:

*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.*



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Big Picture

Knowledge Organiser

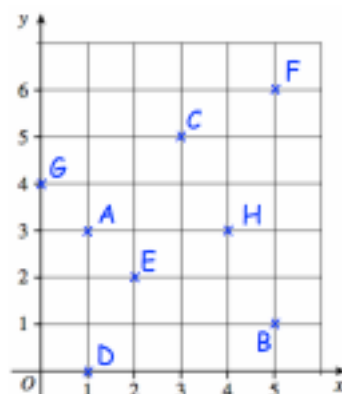
### **Week 1: Co-ordinates**

- **LI: To work with coordinates in all four quadrants**

**Demonstration Videos:**

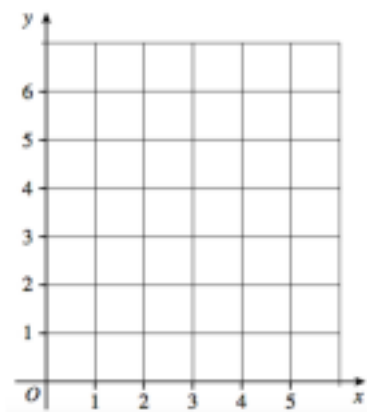
## Tasks:

**Question 1:** Write down the coordinates of the points A, B, C, D, E, F, G and H.

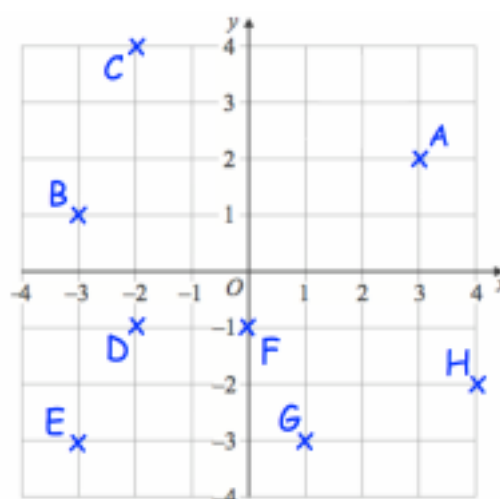


**Question 2:** Make a copy of the grid shown and then plot the points:

- (a) A (3, 1)
- (b) B (2, 5)
- (c) C (5, 4)
- (d) D (1, 1)
- (e) E (4, 0)
- (f) F (0, 1)
- (g) G (3, 3)
- (h) H (0, 0)



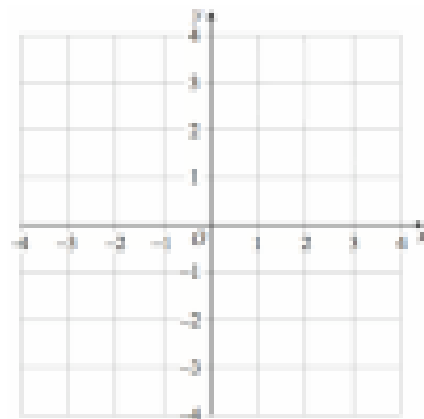
**Question 3:** Write down the coordinates of the points A, B, C, D, E, F, G and H.



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**Question 4:** Make a copy of the grid shown and then plot the points:

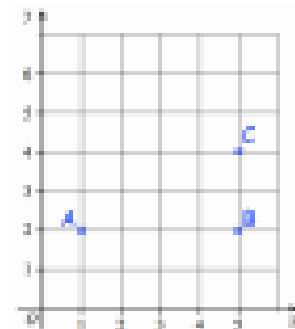
- (a) A (1, 4)
- (b) B (-1, 1)
- (c) C (-3, -4)
- (d) D (2, -1)
- (e) E (-2, 0)
- (f) F (-1, -2)
- (g) G (3, -2)
- (h) H (0, -4)
- (i) I (-2, 2)
- (j) J (-4, -1)
- (k) K (0, 1)



## Apply

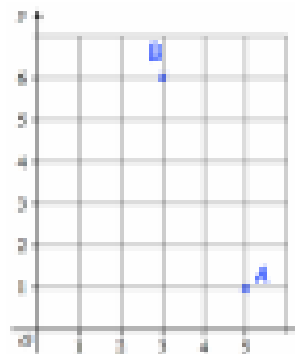
**Question 1:** Three points are shown on a grid. ABCD is a rectangle.

- (a) Plot D
- (b) Write down the coordinates of the point D



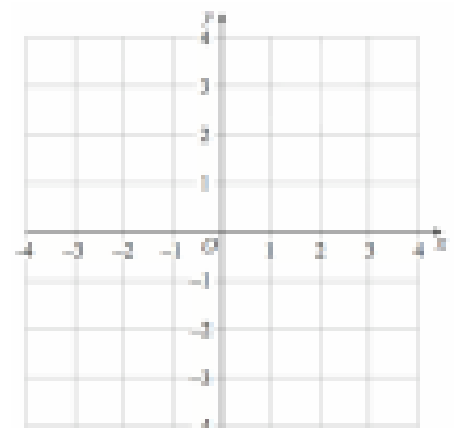
**Question 2:** Two points are shown on a grid. ABC is an isosceles triangle.

- (a) Plot C
- (b) Write down the coordinates of the point C



**Question 3:** Make a copy of the grid shown.

- (a) Plot the point A (-3, -2)
- (b) Plot the point B (1, -2)
- (c) Plot the point C (3, 1)
- (d) Plot the point D (-1, 1)
- (e) What type of quadrilateral is ABCD?





### Demonstration Videos:

<https://corbettmaths.com/2013/04/15/midpoint-of-a-line/>

<https://www.youtube.com/watch?v=4V-zBkQCgWA>

### Tasks:

Find the midpoints of the coordinates on the right and cross off the answers in the grid. Put the answers that are left over into the boxes at the bottom and find the missing coordinate.

Name

### Finding the mid-point

$(-0.5, 4)$	$(3.5, 5)$	$(5, -1)$	$(0, 2)$	$(2, 3)$
$(-1.5, 2.5)$	$(2.5, 0.5)$	$(6, 2)$	$(0, 2)$	$(2, 11)$
$(4, 6)$	$(1, 7)$	$(6, 2)$	$(5, 6)$	$(2, 7)$
$(3, 2)$	$(1, 2)$	$(0, 10)$	$(7.5, 4)$	$(-1.5, 1.5)$
$(-1, 0)$	$(0, 1)$	$(-3.5, 0)$	$(1, 0)$	$(4, 5)$

(2, 3) and (0, 11)	(-2, -1) and (-5, 1)	(4, 6) and (3, 4)	(5, 10) and (-1, 12)
(4, -4) and (6, 2)	(3, 1) and (2, 0)	(-1, 5) and (-2, -2)	(3, 5) and (9, -1)
(1, 3) and (5, 1)	(-5, 3) and (5, 1)	(-2, 2) and (2, 18)	(1, 5) and (3, 9)
(-4, 4) and (1, 1)	(1, -2) and (-3, 2)	(3, 0) and (9, 4)	(2, 5) and (6, 7)
(-1, 7) and (0, 1)	(10, 5) and (5, 3)	(2, -2) and (0, 2)	(-5, 1) and (5, 3)

Missing coordinate

Complete the table.



















What patterns can help you?

Does sketching the coordinates help you / help check your answer?

Startpoint (A)	Midpoint (M)	Endpoint (B)
(0, 0)	(6, 6)	
(4, 5)	(7, 11)	
(-2, -3)	(1, -2)	
(7, -3)	(4, 5)	
(-2, 5)		(-6, -9)
	(-5.5, -1)	(-8, 5)
	(4.5, -0.5)	(12.5, 1)

Match each line with a **START**, **MIDPOINT**, or **END**.

Watch out! One of the coordinates is **not** a start, midpoint or end.

<b>Line A</b>  <b>END</b> $(-2, -2)$ <b>MIDPOINT</b> $(-4, -7)$	<b>Line B</b>  <b>END</b> $(-8, -3)$ <b>START</b> $(-2, -8)$	<b>Line C</b>  <b>END</b> $(-1, 5)$ <b>MIDPOINT</b> $(3.5, 2)$
<b>Line D</b>  <b>END</b> $(10, 8)$ <b>START</b> $(1, -4)$	<b>Line E</b>  <b>END</b> $(8, 6)$ <b>START</b> $(2, -4)$	<b>Line F</b>  <b>MIDPOINT</b> $(10, 0)$ <b>START</b> $(5, 0)$
<b>Line G</b>  <b>MIDPOINT</b> $(2, 7)$ <b>START</b> $(-5, 6)$	<b>Line H</b>  <b>MIDPOINT</b> $(0, -5)$ <b>START</b> $(4, 1)$	<b>Line I</b>  <b>END</b> $(10, 10)$ <b>START</b> $(4, 6)$
 <b>START</b> $(8, -1)$	 <b>MIDPOINT</b> $(5, 1)$	 <b>MIDPOINT</b> $(7, 8)$
 <b>END</b> $(15, 0)$	 <b>END</b> $(-4, -11)$	 <b>?</b> $(-5, -5.5)$
 <b>?</b> $(4, 0)$	 <b>?</b> $(-6, -12)$	 <b>?</b> $(9, 8)$

Challenge:

Demonstration Vide:

<https://corbettmaths.com/2013/05/03/distance-between-two-coordinates/>

Task:

<https://corbettmaths.com/wp-content/uploads/2013/02/distance-between-2-coordinates-pdf.pdf>



## Week 2: Graphs

- LI: To recognise, sketch and produce graphs of linear functions

Demonstration Videos:

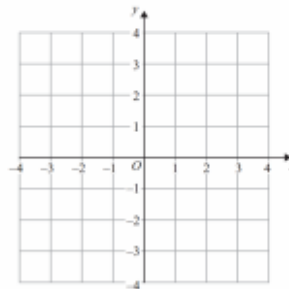
<https://corbettmaths.com/2013/05/29/x-equals-graphs/>

<https://corbettmaths.com/2013/05/29/y-equals-graphs/>

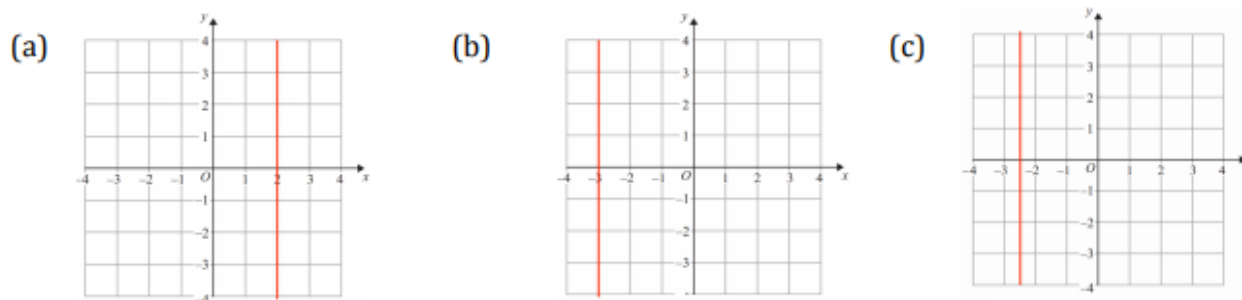
Tasks:

Question 1: Draw the following graphs

- (a)  $x = 1$
- (b)  $x = 4$
- (c)  $x = -2$
- (d)  $x = 1.5$

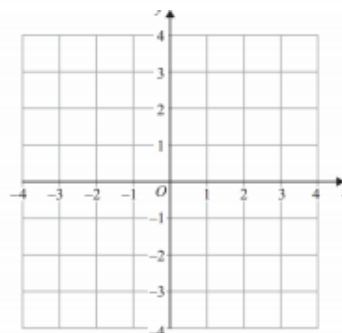


Question 2: Write down the equations of each of the lines shown below

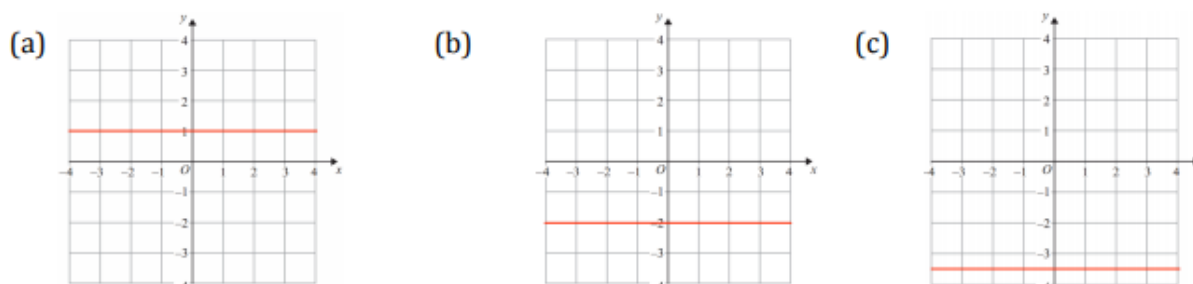


Question 3: Draw the following graphs

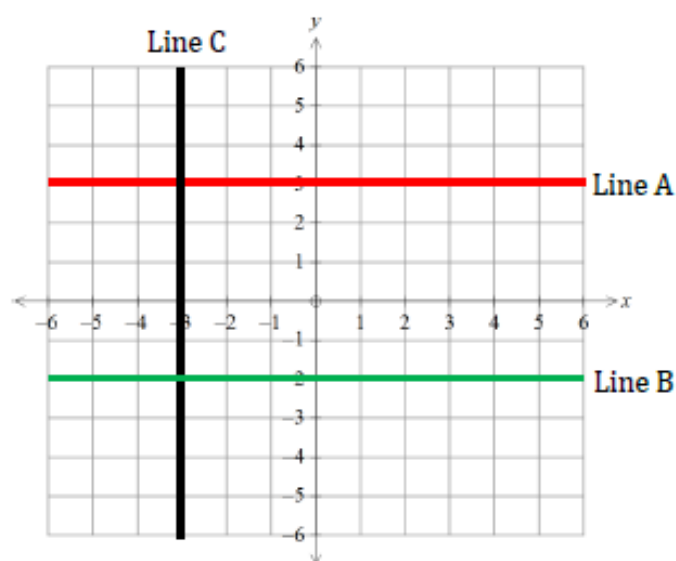
- (a)  $y = 2$
- (b)  $y = -1$
- (c)  $y = -4$
- (d)  $y = 0.5$



Question 4: Write down the equations of each of the lines shown below

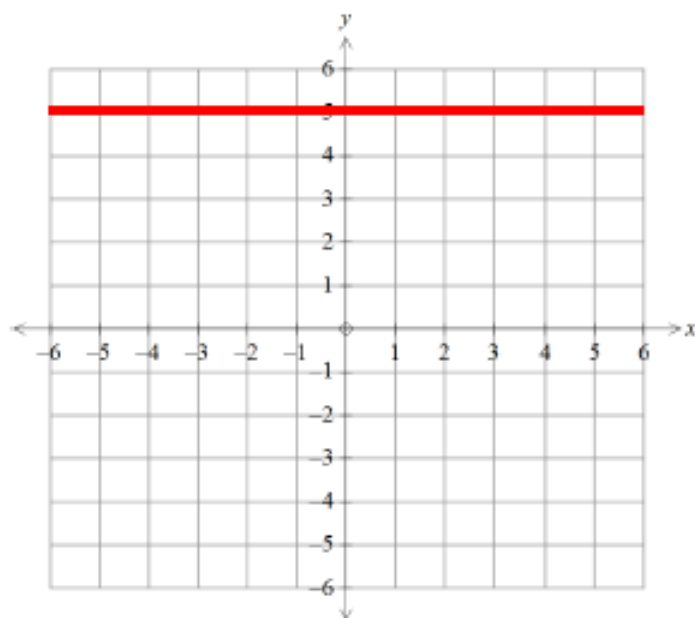


2. Write the equations of the lines A to C below.  
Draw lines D to F on the same set of axes.



Line	Equation
A	
B	
C	
D	$x = 5$
E	$y = 0$
F	$x = -5$

3. Toby has tried to draw the line  $x = 5$  on the axes below.  
Explain *why* he is incorrect and correct his mistake.



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.....

.....

## Demonstration Videos and Examples:

<https://corbettmaths.com/2012/12/23/drawing-graphs-using-xy-tables/>

<https://www.mathsgenie.co.uk/lineargraphs.html>

Draw the graph of:

$$y = 2x + 1$$

1) Express the equation as a function machine.

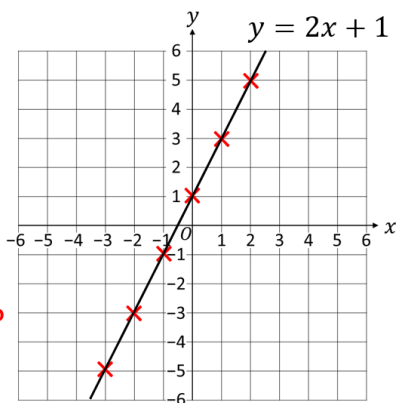


2) Complete a Table of Values.

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

3) Plot each pair of values as coordinates.

4) Join the points to make a line.



Draw the graph of:

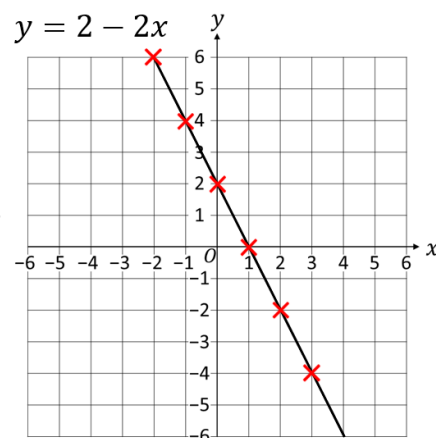
$$y = 2 - 2x$$

1) Complete a Table of Values.

x	-3	-2	-1	0	1	2	3
y	8	6	4	2	0	-2	-4

2) Plot each pair of values as coordinates.

3) Join the points to make a line.



## Tasks:

Calculate the missing values needed to plot the graph



$$y = 4x - 4$$

x	2	3	4
y		8	



$$y = 0.5x - 1$$

x	3	4	5
y		1	



$$y = 2x + 1$$

x	-1	2	3
y		5	



$$y = 10 - 3x$$

x	4	5	6
y		-5	

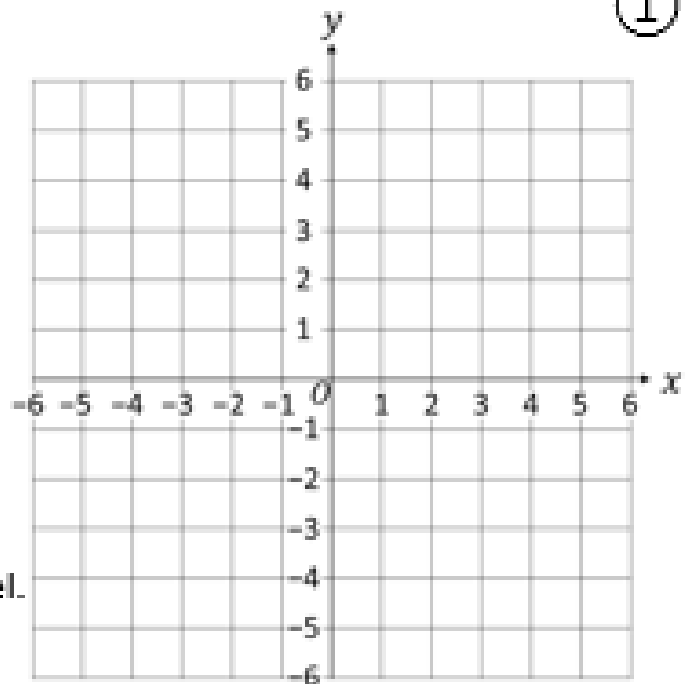
## Drawing Straight Line Graphs

1

1) Draw the graph of  $y = x + 2$

a) Complete the table of values for each value of  $x$

$x$	-3	-2	-1	0	1	2	3
$y$	-1	0				4	



b) Plot each pair of  $x$  and  $y$  values.

c) Join the points into a line and label.

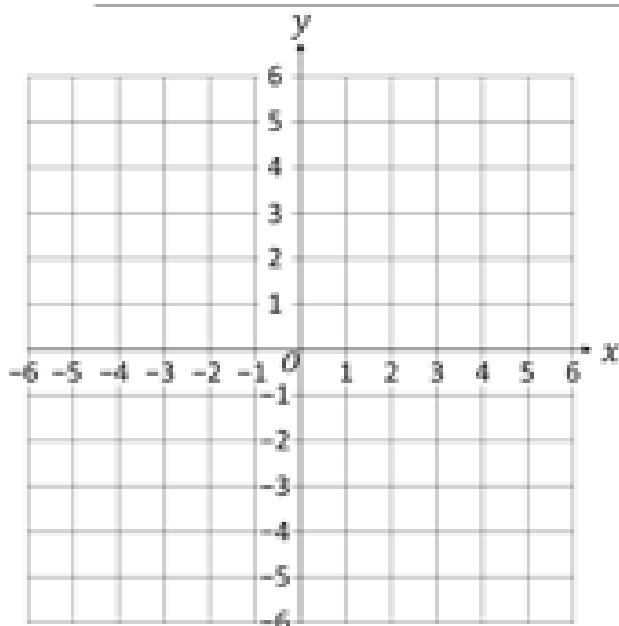
2) On the same grid,  
draw the graph of  $y = x - 2$

$x$	-3	-2	-1	0	1	2	3
$y$							

3) On the same grid,  
draw the graph of  $y = x + 4$

$x$	-3	-2	-1	0	1	2	3
$y$							

4) What can we say about these 3 lines?



5) On the grid,  
draw the graph of  $y = 2x + 1$

You will need to make your own  
table of values below.

## Further Practice:

<https://corbettmaths.com/wp-content/uploads/2013/02/drawing-linear-graphs-pdf.pdf>

### Apply

Question 1: (a) Draw  $y = x + 1$  and  $y = 2x - 1$  on the same set of axes.

(b) Where do the two graphs intersect?

Question 2: (a) Draw  $y = 3x - 4$

(b) Draw  $x + y = 2$

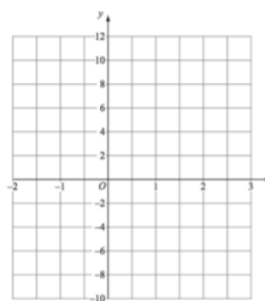
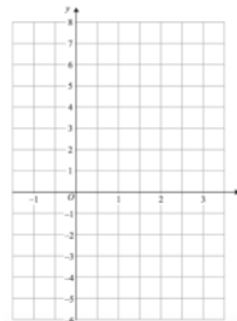
The graph  $y = 3x - 4$  crosses the y-axis at the point A  
The graph  $x + y = 2$  crosses the x-axis at the point B  
O is the origin.

(c) Write down the coordinates of the point A

(d) Write down the coordinates of the point B

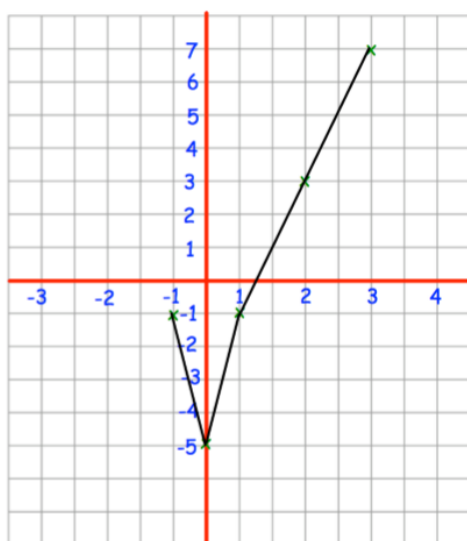
(e) Find the area of triangle OAB.

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Question 3: Emma has tried to draw the graph of  $y = 4x - 5$   
Can you spot any mistakes?

Question: On the grid, draw  $y = 4x - 5$  for values of  $x$  from  $-2$  to  $2$ .



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

## Week 3: Equation of a Line

- LI: To identify key features of a linear graph and make links between the graphical and the algebraic representation

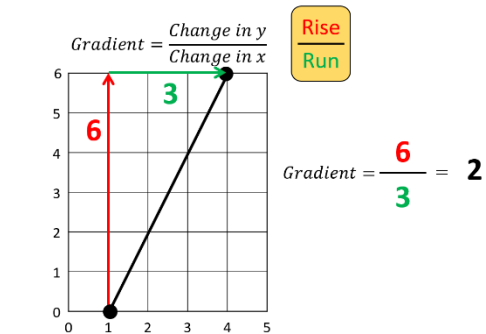
### Demonstration Videos:

<https://corbettmaths.com/2013/05/15/gradient-of-a-line/>

<https://corbettmaths.com/2013/05/28/gradient-between-two-points/>

<https://corbettmaths.com/2013/05/29/ymxc/>

### Tasks:



Question 1: Find the gradient of each of these lines

(a)



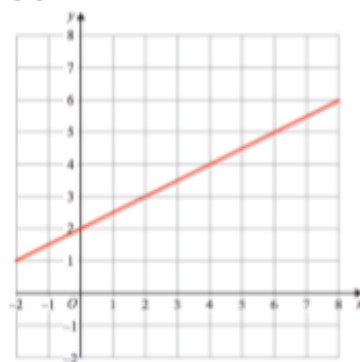
(b)



(c)



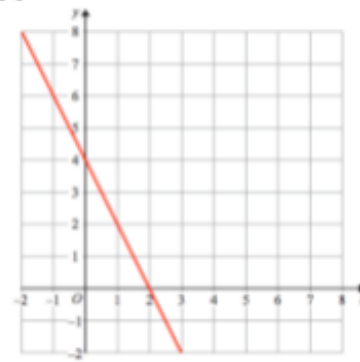
(d)



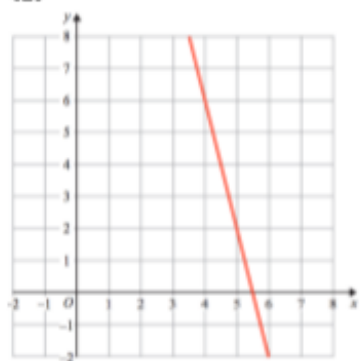
(e)



(f)



(g)



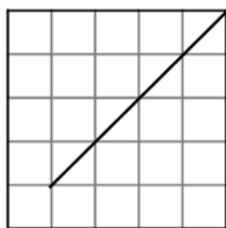
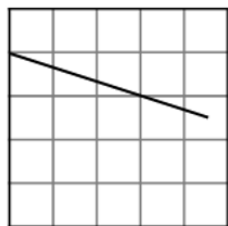
(h)



(i)



**Gradients:** Match the gradient with the line.

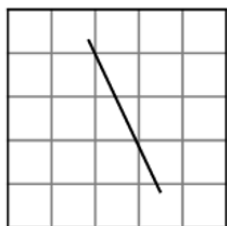


$$\frac{1}{2}$$



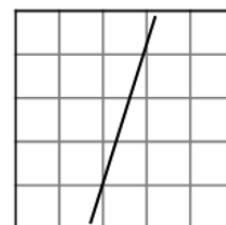
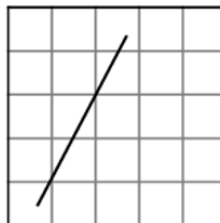
$$\frac{2}{3}$$

$$-2$$



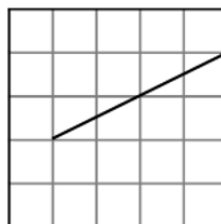
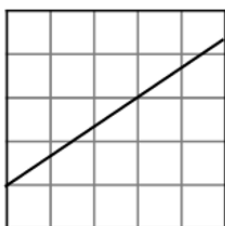
$$-\frac{1}{2}$$

$$3$$



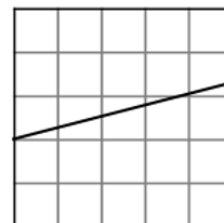
$$\frac{1}{4}$$

$$-\frac{1}{3}$$



$$1$$

$$2$$



Name

Finding the gradient

$\frac{2}{5}$	-2	6	3	-0.5
2	10	-5	-2	8
4	-6	$\frac{1}{5}$	-3	7
1	5	3	-1	-4
$-\frac{1}{5}$	0.5	1	2	-3

(3, -2) and (5, 10)

(1, -2) and (-3, 2)

(4, 5) and (3, -5)

(-2, 1) and (-1, 6)

(-5, 3) and (5, 1)

(-1, 7) and (0, 1)

(2, 5) and (6, 7)

(4, -4) and (6, 2)

(2, -2) and (0, 2)

(1, 7) and (2, 4)

(-1, 5) and (-2, -2)

(3, 1) and (2, 0)

(1, -5) and (2, 3)

(-5, 1) and (5, 3)

(-2, -1) and (0, 3)

(10, 5) and (5, 3)

(-6, 4) and (-5, -1)

(-2, 2) and (2, 18)

(1, 3) and (5, 1)

(2, 3) and (0, 11)

TOTAL

Question 3: Write down the equation of the lines below

(a) gradient of 3 and y-intercept of 6

(b) gradient of 2 and y-intercept of -1

(c) gradient of -4 and y-intercept of 3

(d) gradient of 8 and y-intercept of 4

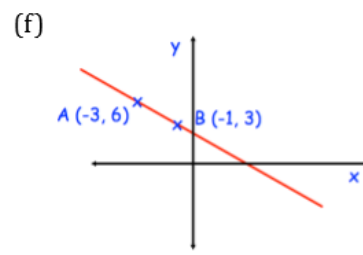
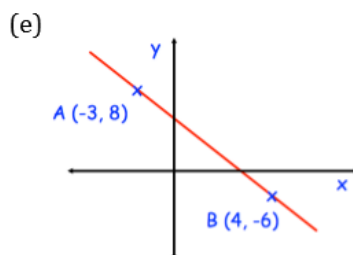
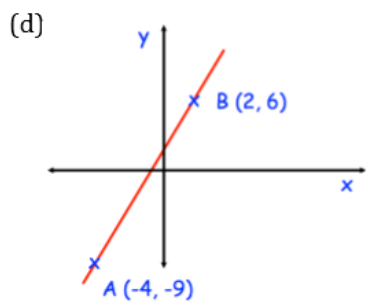
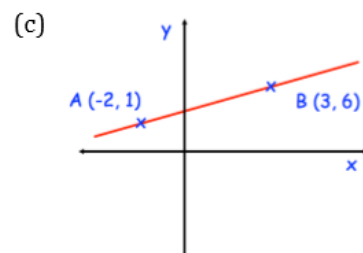
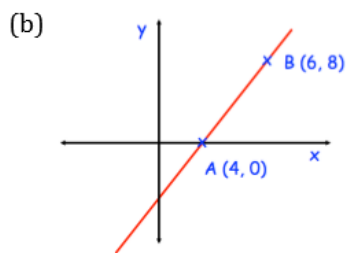
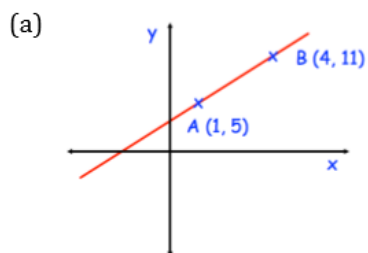
(e) gradient of 1 and passing through (0, 4)

(f) passing through (0, -2) with gradient 4

(g) gradient of -5 and passing through the origin.

## Challenges:

Question 6: Find the gradient of each line shown below



Name

8	-3	0.2	-6	0.5
3	-6	1	-5	3
7	6	4	-1	2
-1	-4	2	-0.5	0.5
2	-3	5	-2	1

$$2y = x + 2$$

$$2y = 4x + 2$$

$$y = 10 - 3x$$

$$y - 8x = 20$$

$$2y + x = 10$$

$$6x + y = 12$$

$$2y - x = 4$$

$$2y - 6x = 3$$

$$x = y + 4$$

$$2y = 10 - 10x$$

$$3y = 18x - 12$$

$$4y + 16x = 12$$

$$5y - x = 10$$

$$2y + 4x = 8$$

$$y - 2x = 8$$

$$3y = 20 - 18x$$

$$3y = 15x + 12$$

$$x + y = 4$$

$$3y - 12x = 15$$

$$2y - 14x = 14$$

Find the gradient of the lines

TOTAL



## Demonstration Videos:

<https://corbettmaths.com/2013/05/29/finding-the-equation-of-a-straight-line/>

<https://www.mathsgenie.co.uk/equation-of-a-line.html>

## Tasks:

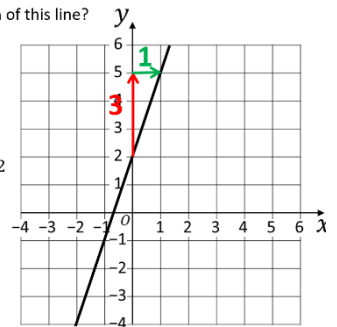
What is the equation of this line?

$$y = mx + c$$

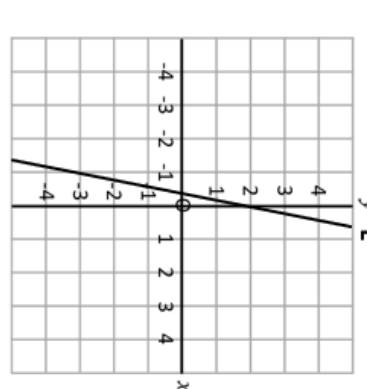
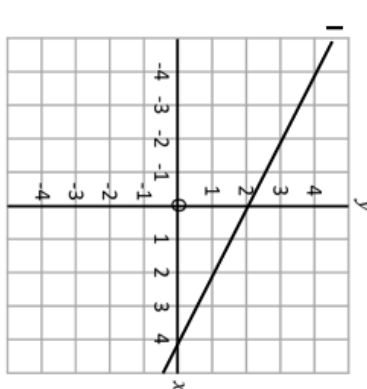
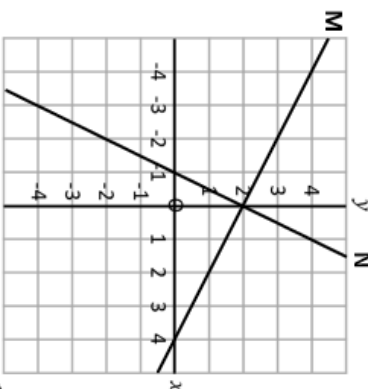
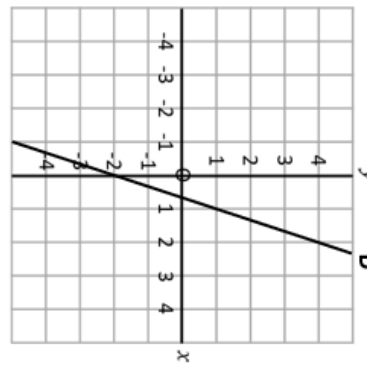
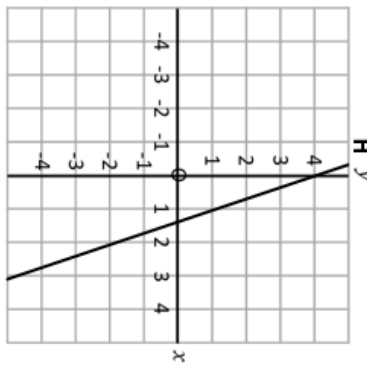
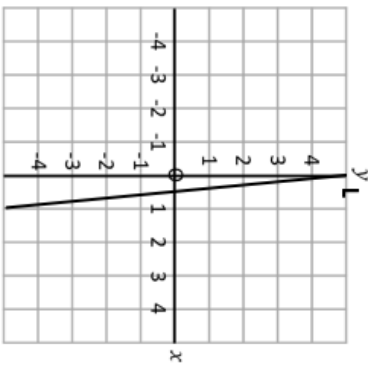
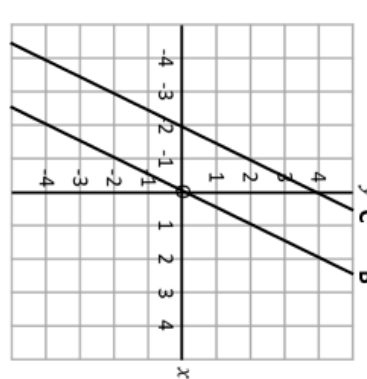
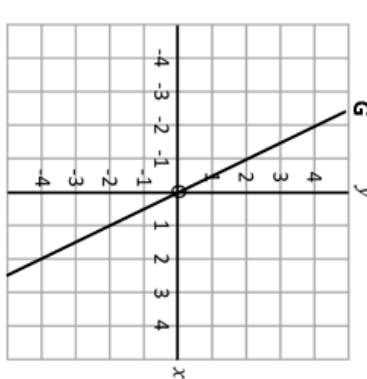
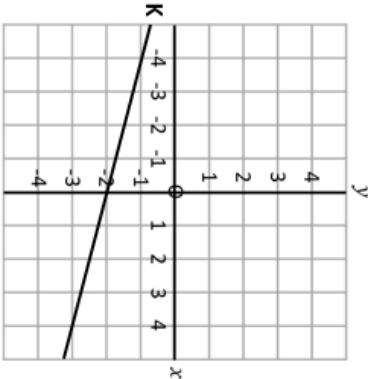
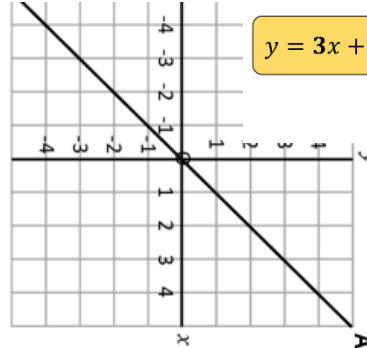
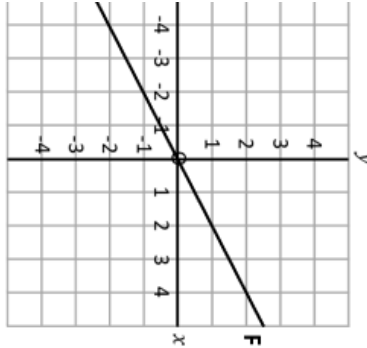
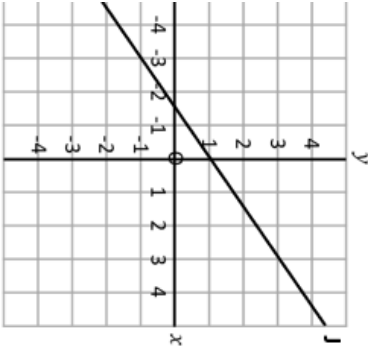
$m = \text{gradient} = 3$

$c = \text{y-intercept} = +2$

$$y = 3x + 2$$



**finding the Equation of a Line:** For each line, read the gradient & the y-intercept. Use this information to find the equation of each line.



Challenge:

Demonstration Videos:

<https://corbettmaths.com/2013/06/06/graphs-parallel-lines/>

<https://corbettmaths.com/2013/06/06/perpendicular-lines-2/>

Tasks:

1. Match up the pairs of lines with the same gradient.

$$y = 4x + 7$$

$$y = 1 - 0.25x$$

$$y = -4x + 3$$

$$y = 2x$$

$$y = -\frac{1}{4}x - 9$$

$$y = 4x - 3.5$$

$$y = 2x + 7$$

$$y = -4x$$

2. Write an equation of a line which is parallel to the line  $y = 2x - 4.5$ .

3. Sofia draws two line segments. She draws  $AB$  between points  $A(1, 1)$  and  $B(4, 2)$ , and  $CD$  between points  $C(1, -2)$  and  $D(-2, -3)$ .

Show that the line segment  $AB$  is parallel to the line segment  $CD$ .

## LINK Left & Right

Link the lines that are perpendicular.

<b>A</b>	$y = 2x + 3$	$y = 0.25x + 3$	
<b>B</b>	$3y + x = 9$	$y = 2x - 5$	
<b>C</b>	$y = -4x + 2$	$y = 3 - x$	
<b>D</b>	$2y = x - 3$	$2y + x = 10$	
<b>E</b>	$y = -\frac{1}{2}x + 2$	$3y = 12x - 2$	
<b>F</b>	$y = \frac{2}{3}x + 3$	$6y = 2x + 3$	
<b>G</b>	$y + 3x = -5$	$y = 3x - 4$	
<b>H</b>	$4y = -x + 7$	$2y + 3x = -2$	
<b>I</b>	$y = x - 2$	$y + 2x = 4$	

## Week 4: Standard Form

- LI: To interpret and compare numbers in standard form

### Demonstration Video:

<https://corbettmaths.com/2013/04/28/standard-form/>

#### Standard Form

This is always in the form  $x \times 10^n$ , where  $1 \leq x < 10$ . For very big numbers,  $n$  will be positive and for very small numbers  $n$  will be negative.

Convert 360,000 to standard form.

360000

$$\underbrace{3.6} \times \underbrace{10^5}$$

A number:  $1 \leq x < 10$       Integer power of 10

Convert 70,400 to standard form.

70400

$$7.04 \times 10^4$$

Convert 0.00073 to standard form.

0.00073

$$\underbrace{7.3} \times \underbrace{10^{-4}}$$

A number:  $1 \leq x < 10$       Integer power of 10

Convert 0.0081 to standard form.

0.0081

$$8.1 \times 10^{-3}$$

**Task: Convert the numbers on the right to standard form and cross off the answers in the grid. Put the answers that are left over into the boxes at the bottom and find the missing number.**

Name

$4.11 \times 10^{-6}$	$2.32 \times 10^{-4}$	$6.39 \times 10^5$	$5.99 \times 10^7$	$3.57 \times 10^{-7}$
$5.99 \times 10^6$	$5.99 \times 10^2$	$5.72 \times 10^{-4}$	$3.57 \times 10^{-6}$	$5.52 \times 10^5$
$3.80 \times 10^{-3}$	$3.80 \times 10^5$	$5.99 \times 10^0$	$5.99 \times 10$	$3.83 \times 10^{-3}$
$5.99 \times 10^{-1}$	$5.72 \times 10^3$	$5.99 \times 10^2$	$3.83 \times 10^5$	$5.99 \times 10^4$
$3.80 \times 10^{-6}$	$5.70 \times 10^7$	$2.46 \times 10^7$	$4.11 \times 10^{-5}$	$3.80 \times 10^6$

--	--	--	--	--

Expressing in standard form

0.000572	3800000	57000000	0.00383
59900000	0.0000038	0.000000357	0.000232
0.00000411	5720	599	552000
639000	383000	0.00000357	380000
5990000	24600000	0.0000411	0.0038

MISSING NUMBER

--

Convert  $2.37 \times 10^5$  to an ordinary number.

2.370000000

= 237000

Convert  $9.05 \times 10^5$  to an ordinary number.

9.050000000

= 905000

Convert  $6.4 \times 10^{-4}$  to an ordinary number.

0.00064

= 0.00064

Convert  $1.06 \times 10^{-3}$  to an ordinary number.

0.00106

= 0.00106

## Tasks:

This table shows the distance in kilometres of the planets from the Sun.

Planet	Distance from the Sun (km)
Earth	$1.5 \times 10^8$
Jupiter	$7.78 \times 10^8$
Mars	$2.28 \times 10^8$
Mercury	$5.8 \times 10^7$
Pluto	$5.92 \times 10^9$
Saturn	$1.43 \times 10^9$
Uranus	$2.87 \times 10^9$
Venus	$1.08 \times 10^8$
Neptune	$4.5 \times 10^9$

- Write down each distance as an ordinary number.
- Which planet is closest to the Sun? Explain how you can tell this from the standard form.
- Which planet is furthest from the Sun?



Express in ordinary form

1)  $4.6 \times 10^3$

2)  $1.4 \times 10^{-2}$

3)  $2.5 \times 10^{-4}$

4)  $1.01 \times 10^4$

5)  $2.7 \times 10^{-4}$

6)  $1.99 \times 10^3$

7)  $6 \times 10^{-3}$

8)  $5.5 \times 10^2$

. Three of these numbers are not written in standard form, which are they.

a)  $3.05 \times 10^4$     b)  $42.6 \times 10^7$

c)  $0.5 \times 10^5$

d)  $4.26 \times 10^3$

e)  $7.45 \times 10^{12}$     f)  $22.6 \times 10^9$

g)  $3.764 \times 10^{23}$

h)  $4.7 \times 10^9$



**Easy** - Put these in order, from smallest to biggest.

- |                         |                        |                      |                       |
|-------------------------|------------------------|----------------------|-----------------------|
| 1) $4.2 \times 10^3$    | $3.3 \times 10^2$      | $4.5 \times 10^7$    |                       |
| 2) $3.9 \times 10^7$    | $4.7 \times 10^{11}$   | $6.1 \times 10^3$    |                       |
| 3) $4.8 \times 10^4$    | $6.7 \times 10^1$      | $3.82 \times 10^5$   | $2.7 \times 10^3$     |
| 4) $5.9 \times 10^{-3}$ | $4.7 \times 10^2$      | $5.8 \times 10^{-7}$ |                       |
| 5) $3.4 \times 10^2$    | $4.57 \times 10^{-8}$  | $5.78 \times 10^7$   | $6.54 \times 10^{-3}$ |
| 6) $5.6 \times 10^{-9}$ | $3.45 \times 10^{-11}$ | $1.2 \times 10^6$    | $3.45 \times 10^{-4}$ |

**Medium** - Put these in order, from smallest to biggest.

- |                         |                      |                      |                   |
|-------------------------|----------------------|----------------------|-------------------|
| 1) $3.2 \times 10^2$    | $4.5 \times 10^{-4}$ | $2.9 \times 10^2$    |                   |
| 2) $4.5 \times 10^7$    | $2.3 \times 10^6$    | $4.51 \times 10^6$   |                   |
| 3) $3.4 \times 10^{-3}$ | $3.7 \times 10^4$    | $2.3 \times 10^5$    | $2.9 \times 10^4$ |
| 4) $1.6 \times 10^3$    | $1.9 \times 10^3$    | $2.7 \times 10^3$    | $4.1 \times 10^6$ |
| 5) $1.21 \times 10^2$   | $3.21 \times 10^2$   | $3.4 \times 10^{-1}$ | $3.8 \times 10^5$ |
| 6) $1.21 \times 10^4$   | $2.43 \times 10^3$   | $2.12 \times 10^4$   | $2.5 \times 10^3$ |

**Hard** - Put these in order, from smallest to biggest.

- |                         |                      |                       |                        |
|-------------------------|----------------------|-----------------------|------------------------|
| 1) $2.3 \times 10^8$    | $3.2 \times 10^8$    | $1.92 \times 10^8$    |                        |
| 2) $1.29 \times 10^2$   | $1.2 \times 10^2$    | $1.67 \times 10^2$    | $2.34 \times 10^2$     |
| 3) $2.34 \times 10^3$   | $3.21 \times 10^3$   | $1.7 \times 10^3$     | $2 \times 10^3$        |
| 4) $1.21 \times 10^5$   | $3.23 \times 10^7$   | $1.25 \times 10^5$    | $4.23 \times 10^7$     |
| 5) $7.6 \times 10^4$    | $6.7 \times 10^4$    | $2.32 \times 10^4$    | $4.567 \times 10^4$    |
| 6) $3.3 \times 10^{-3}$ | $2.3 \times 10^{-3}$ | $3.67 \times 10^{-3}$ | $2.456 \times 10^{-3}$ |

**Challenge** - Put these in order, from smallest to biggest.

- |                      |                   |                       |                      |
|----------------------|-------------------|-----------------------|----------------------|
| 1) $2.3 \times 10^2$ | 2400              | 35000                 | $6.1 \times 10^1$    |
| 2) 6000000           | $3.4 \times 10^4$ | 453                   | $2.12 \times 10^3$   |
| 3) 34500             | $2.3 \times 10^7$ | $3.98 \times 10^{-9}$ | 123                  |
| 4) 2million          | $3.4 \times 10^8$ | 0.000345              | $2.1 \times 10^{-3}$ |

## Week 5: Scale Diagrams

- LI: To use scales to solve distance and area problems in context

Demonstration Video:

<https://corbettmaths.com/2013/11/13/maps-scales/>

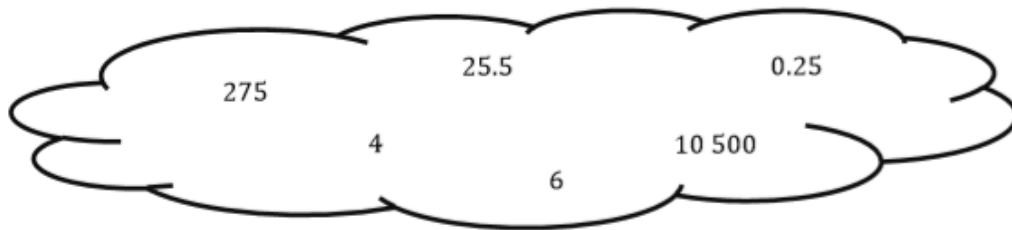
<https://www.mathsgenie.co.uk/scale-drawing.html>

Tasks:

<https://www.mathsgenie.co.uk/resources/3-scale-drawings-ws.pdf>

<https://corbettmaths.com/wp-content/uploads/2013/02/scales-and-maps-pdf.pdf>

1. The pairs of ratios written in each box are equivalent. Use the numbers in the cloud below to fill in the missing values.



1 cm : 3000 cm  
.....cm : 12 000 cm

1 : 80  
..... cm : 480 cm

1 cm : 400 cm  
..... km : 100 km

2 : 5  
110 cm : ..... cm

1 inch : 3000 cm  
3.5 inches : ..... cm

2 inches : 3 feet  
17 inch : ..... feet

2. On a diagram, the length of an aeroplane's wingspan is 22 cm.  
The diagram is drawn to the scale 1 cm : 3 m.  
What is the real length of the wingspan?

.....

3. The length of Stacey's garden fence is 18 metres. On the plan drawings it was 3 cm. What was the scale of her plan drawing?

4. Will wants to draw some scale drawings. Match up what he is trying to draw with an appropriate scale.

A house

1 cm : 1 km

A bedroom

1 :  $2.5 \times 10^7$

A city

1 cm :  $10^9$  km

The Solar System

2 cm : 1 m

The Earth

1 : 6

5. Two maps of London have different scales. Map A has a scale of 1 : 10 000 and Map B has a scale of 2 : 15 000.

a) On which map would the London Eye image be larger?

.....

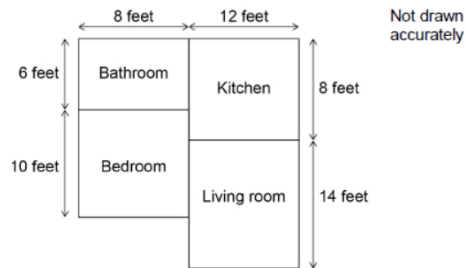
b) Explain your answer.

.....

.....



Here is a plan of a flat with four rectangular rooms.

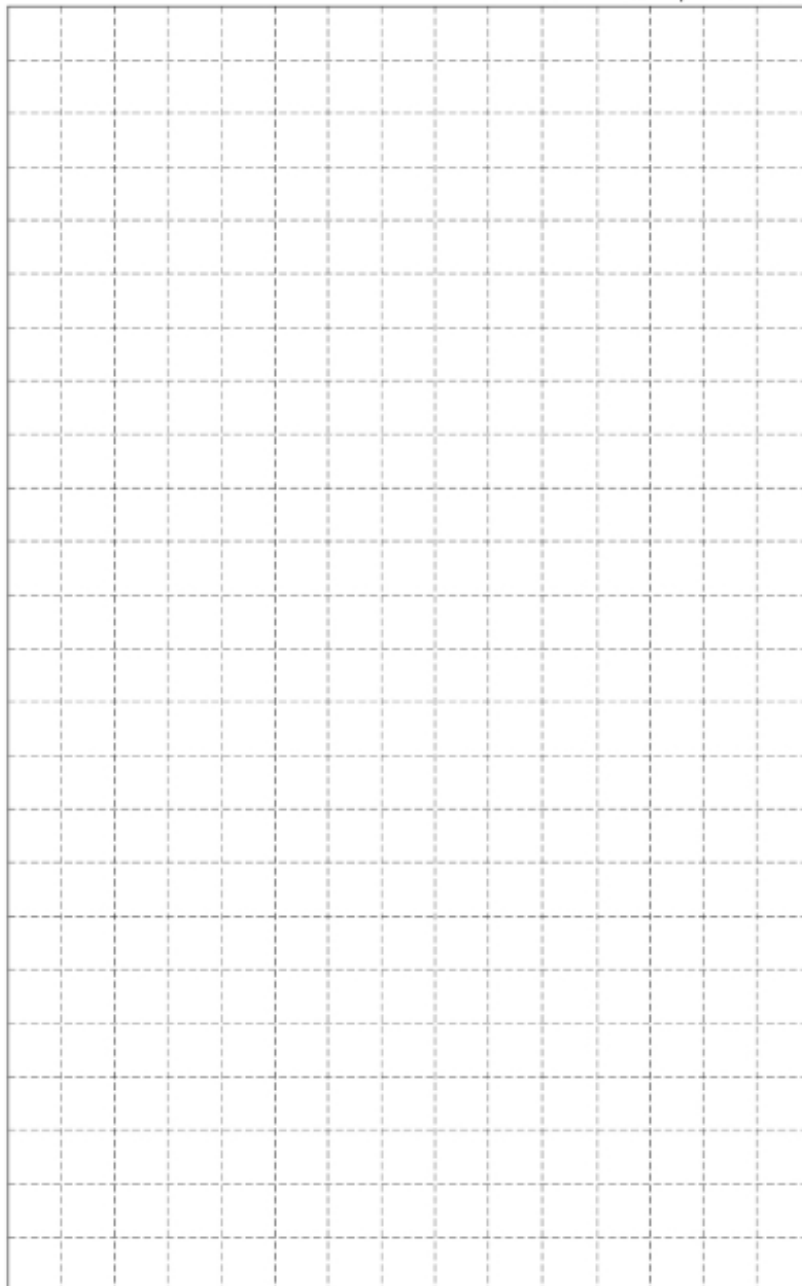


On the grid, make an accurate scale drawing of the plan.

Label each room.

Use a scale of 1 cm represents 2 feet

Scale: 1 cm represents 2 feet



Test



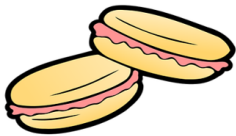
## Week 6: Proportion

- LI: To solve problems involving direct and inverse proportion, including graphical and algebraic representations

### Demonstration Videos and Examples:

<https://corbettmaths.com/2018/11/28/unitary-method-video/>

<https://corbettmaths.com/2013/05/16/recipes/>



6 biscuits need 90 g of flour.

How much flour do 8 biscuits need?

What **method** could we use to solve this problem?

Find how much flour 1 biscuit needs  
& multiply.

$$90 \text{ g of flour} \div 6 = 15 \text{ g}$$

$$15 \text{ g} \times 8 \text{ biscuits} = 120 \text{ g of flour}$$

Find how much flour 2 biscuits need  
& multiply.

$$90 \text{ g of flour} \div 3 = 30$$

$$30 \text{ g} \times 4 = 120 \text{ g of flour}$$

It is often easier to find a **common factor** of the recipe & the required output.



A recipe for  
**10 cupcakes:**

100 g of butter  
60 g of sugar  
80 g of flour  
2 eggs

$\div 2$

**5 cupcakes:**

50 g of butter  
30 g of sugar  
40 g of flour  
1 egg

$\times 3$

**15 cupcakes:**

150 g of butter  
90 g of sugar  
120 g of flour  
3 eggs

$\times 5$

**25 cupcakes:**

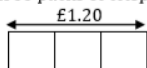
250 g of butter  
150 g of sugar  
200 g of flour  
5 eggs

Jack finds a recipe for **10** cupcakes.

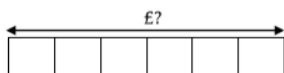
Complete calculations to find the  
ingredients he needs to make **15** or **25** cupcakes.

### Tasks:

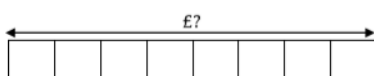
1. **Three** packs of crisps cost £1.20.



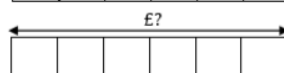
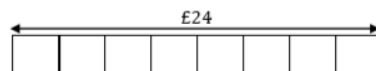
- a) How much will **six** packs of crisps cost?



- b) How much will **eight** packs of crisp cost?



2. **Eight** small cheese pizzas cost £24.  
How much will **six** small cheese pizzas cost?



- Question 1: Keith buys 6 pencils for 90p



- (a) How much does one pencil cost?  
(b) How much would five pencils cost?  
(c) How much would eleven pencils cost?



- Question 2: Jack and Harry are waiters in a restaurant.



They are both paid the same amount of money for each hour that they work.  
Jack worked 6 hours and is paid £48  
Harry worked 8 hours.  
How much money is Harry paid?



- Question 3: A car travels 120 miles in 3 hours at a steady speed.



- (a) How far does the car travel in 1 hour?  
(b) How far does the car travel in 8 hours?

- Question 4: A plumber charges £140 for a 4 hour job.



How much does the plumber charge for a 3 hour job?

## Answer GRID

Cross off each answer, then total the remaining 5.

Jason is calculating the amount of flour he needs for different recipes.

14 cakes need 120g So 21 need...	18 cookies need 220g So 27 need...	15 pancakes need 150g So 20 need...	16 flapjacks need 80g So 24 need...	8 chapatis need 60g So 12 need...
20 rolls need 300g So 60 need...	30 shortbreads need 250g So 36 need...	45 fairy cakes need 240g So 30 need...	40 doughnuts need 260g So 60 need...	30 baguettes need 390g So 40 need...
15 scones need 210g So 10 need...	16 crumbles need 180g So 12 need...	18 pizzas need 60g So 45 need...	28 sponges need 100g So 35 need...	12 loaves need 200g So 42 need...
25 naans need 300g So 40 need...	27 cheesecakes need 120g So 63 need...	15 meatballs need 120g So 50 need...	12 tarts need 140g So 30 need...	48 dumplings need 180g So 72 need...

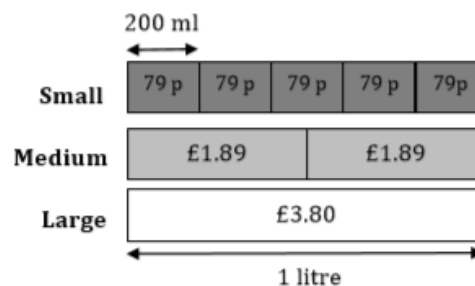
140g	160g	200g	245g	125g
72g	900g	150g	400g	90g
280g	135g	120g	180g	80g
230g	330g	520g	350g	390g
300g	270g	700g	480g	273g

Total:

11. Anne is buying some orange juice.

The following sizes are available:

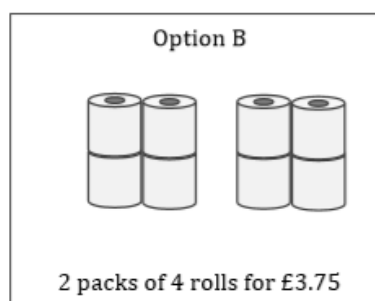
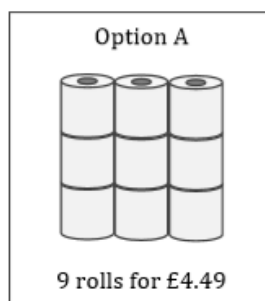
Small	200 ml	79p
Medium	500 ml	£1.89
Large	1 litre	£3.80



Which is the best value for money? Justify your answer, using the bar model to help you.

.....

12. Jason wants to buy some toilet roll. He has the following two options:



Which option is the best value for money?

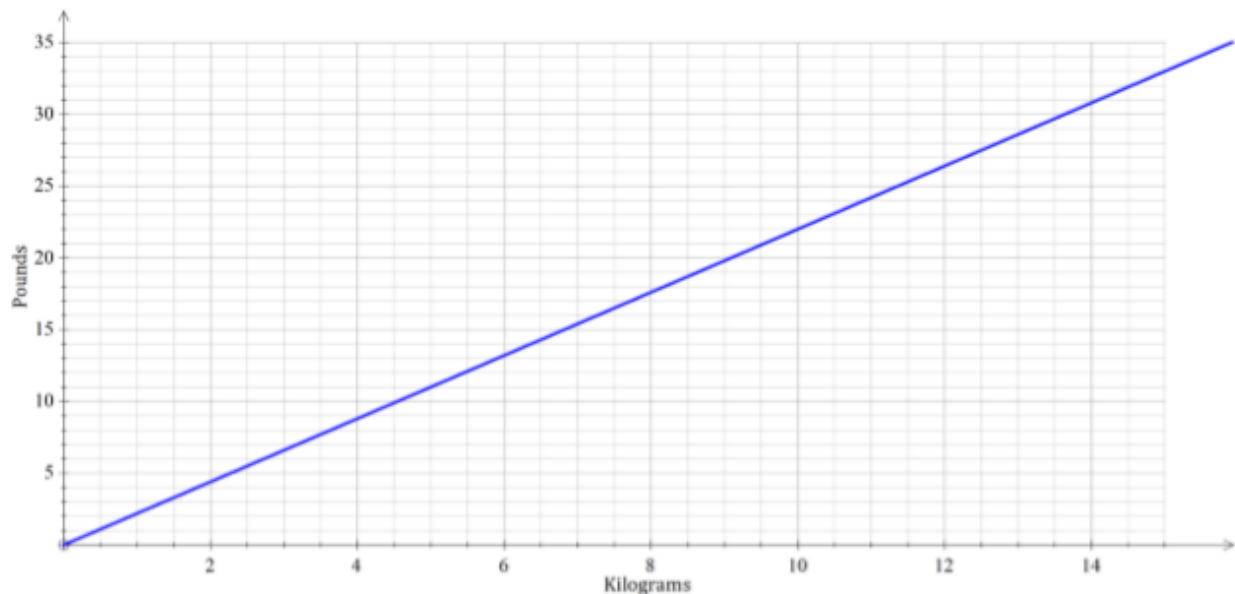
Show your working.

Demonstration Video:

<https://corbettmaths.com/2012/08/09/conversion-graphs/>

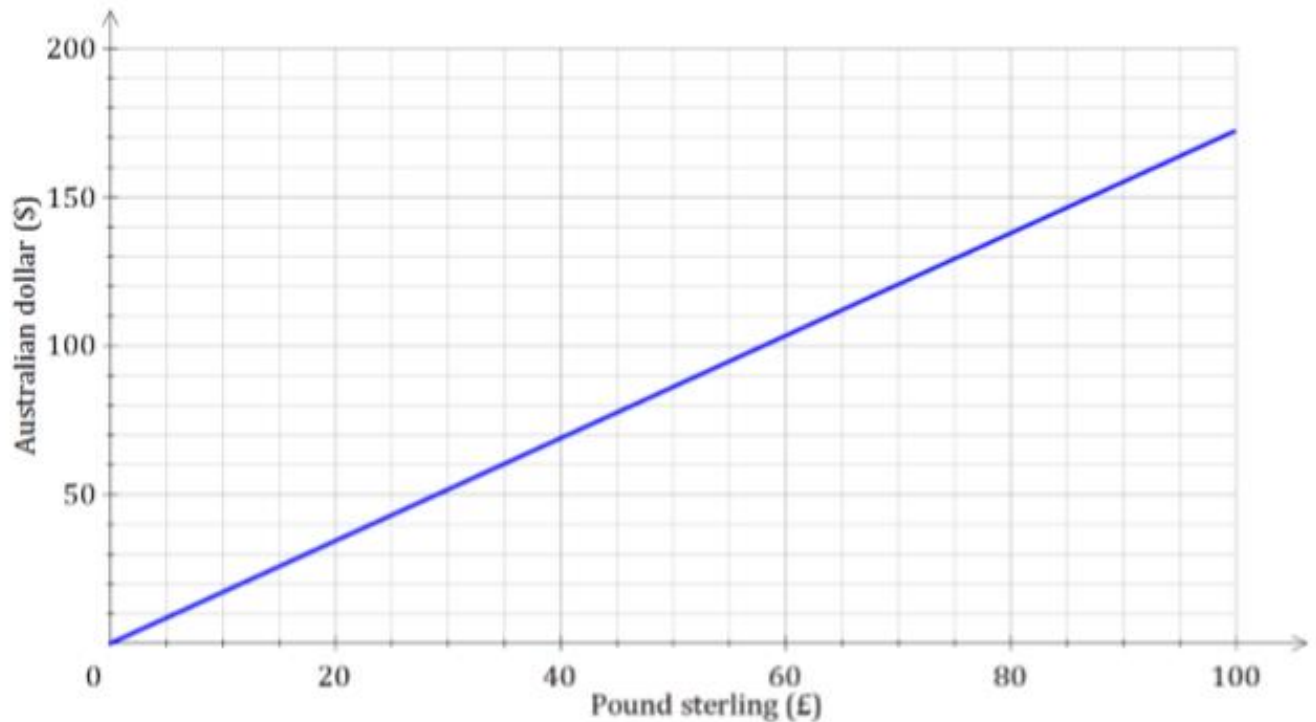
Tasks:

14. The graph below shows the approximate conversion between pounds (lb) and kilograms (kg).



- Use the graph to convert 10 kilograms to pounds.
- Use the graph to convert 10 pounds to kilograms.
- What is the difference between 10 kilograms and 10 pounds?  
Give your answer in pounds and kilograms.
- What is the difference between 15 kilograms and 15 pounds?  
Give your answer in pounds and kilograms.
- Sofia weighs 75kg. She says that she is heavier than Jack who weighs 154 pounds.  
Is she correct?

15. Here is a conversion graph between pound sterling (£) and the Australian dollar (\$).



- Change £40 to Australian dollars.
- Change 100 Australian dollars to pounds sterling.
- What is the difference between £100 and \$100?  
Give your answer in pound sterling and Australian dollars.
- Caitlin converted £560 to dollars.  
How many dollars did she receive?

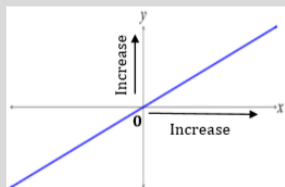
More Practice:

<https://corbettmaths.com/wp-content/uploads/2013/02/conversion-graphs-pdf.pdf>

## Concept corner

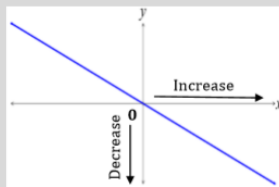
**Direct proportion** can be represented graphically with the line  $y = ax$  passing through the origin.

1. when  $a > 0$



The gradient is positive.

2. when  $a < 0$

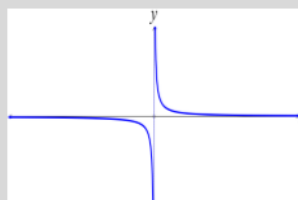


The gradient is negative.

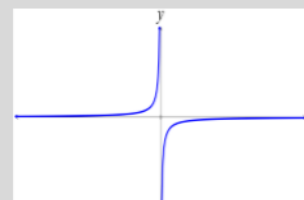
## Concept corner

**Inverse proportion** can be represented graphically using  $y = \frac{a}{x}$ . This is a curved line.

1. when  $a > 0$

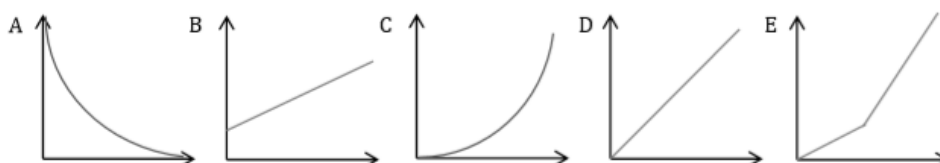


2. when  $a < 0$



Task:

5. The graphs below show data collected from some events.



Identify whether each of the graphs represent direct proportion, inverse proportion or neither.

Graph	Direct	Inverse	Neither
A			
B			
C			
D			
E			

3.

- a) A table of values for  $a$  and  $b$  is shown below.  
 $a$  is directly proportional to  $b$ .

Complete the table.

$a$	2	3	7	10	20	50	100
$b$		15		50			
$b \div a$		5					

- b) A table of values for  $m$  and  $n$  is shown below.  
 $m$  is inversely proportional to  $n$ .

Complete the table.

$m$	2	4	5	10	20	40
$n$	250			50		
$m \times n$	500					

- c) Explain what you notice about the values of  $b \div a$  and  $m \times n$ .

Assessment Ladder