

Straight-line graphs

Exam questions

Foundation and Higher tiers

Please write clearly in block capitals.

Name

Class

Teacher

Time allowed: 95 minutes

Materials

For this booklet you need a black pen, a pencil, a ruler, a rubber and a calculator for Section B.

Instructions

- Use black ink or black ballpoint pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer all questions in the spaces provided.
- **Section A** (questions 1 to 13): you must not use a calculator.
- **Section B** (questions 14 to 22): you may use a calculator.
- Do all rough work in this booklet. Cross through any work you do not want marked.

Information

- The marks for each question are shown in brackets.
- The maximum mark for this booklet is 84.

Advice

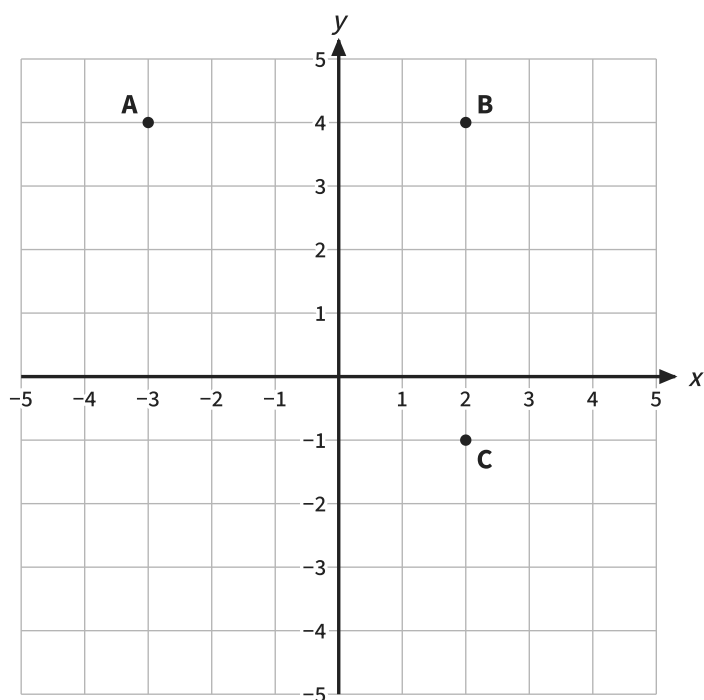
- Read each question carefully.
- In all calculations, show clearly how you work out your answer.

For teacher's use

Q	Mark	Q	Mark
1		12	
2		13	
3		14	
4		15	
5		16	
6		17	
7		18	
8		19	
9		20	
10		21	
11		22	
TOTAL			

Section A**You must not use a calculator**Do not
write
outside
the box

- 1** Points A, B and C are plotted on the grid.



- (a)** Write down the coordinates of A.

Answer _____

[1 mark]

- (b)** Plot the point D $(-4, -2)$ on the grid.
Label it D.

[1 mark]

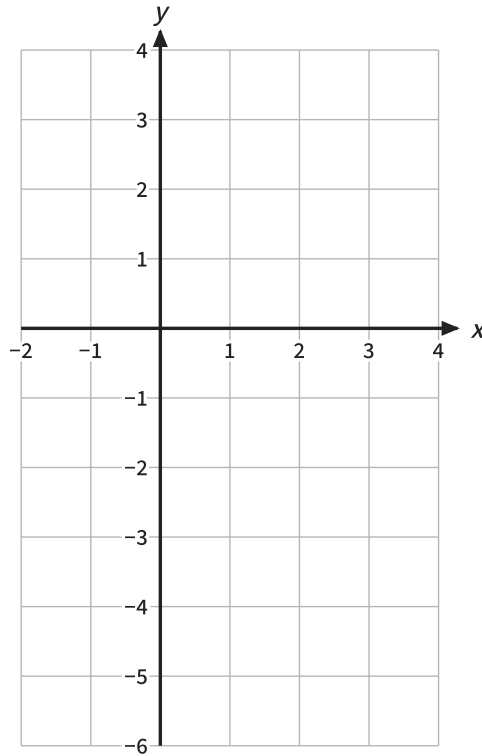
2

- (a) Complete the table of values for
- $y = 2x - 3$

x	-1	0	1	2	3
y	-5			1	

[2 marks]

- (b) On the grid, draw the graph of
- $y = 2x - 3$
- for values of
- x
- from -1 to 3



[2 marks]

- (c) Use your graph to find the value of
- x
- when
- $y = 2$

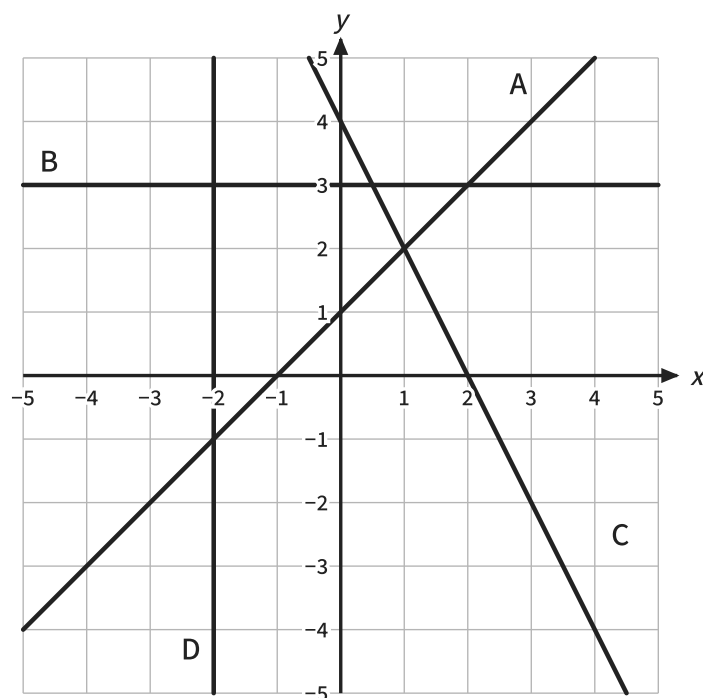
Answer _____

[1 mark]

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outside
the box

- 3 Four straight lines, **A**, **B**, **C** and **D**, are drawn on the grid.

Do not
write
outside
the box



Write the letter of each line next to its equation.

Equation	Line
$y = -2x + 4$	
$x = -2$	
$y = x + 1$	
$y = 3$	

[3 marks]

- 4** (a) P is the point $(-3, 5)$ and Q is the point $(7, -1)$
Work out the coordinates of the midpoint of PQ.

Answer _____

[2 marks]

- (b) M is the midpoint of RS.
R is the point $(1, 4)$ and M is the point $(4, -1)$
Work out the coordinates of S.

Answer _____

[2 marks]

- 5** A straight line has equation $2y = 6x - 5$

- (a) Write down the gradient of the line.

Answer _____

[1 mark]

- (b) Write down the coordinates of the point where the line crosses the y -axis.

Answer _____

[1 mark]

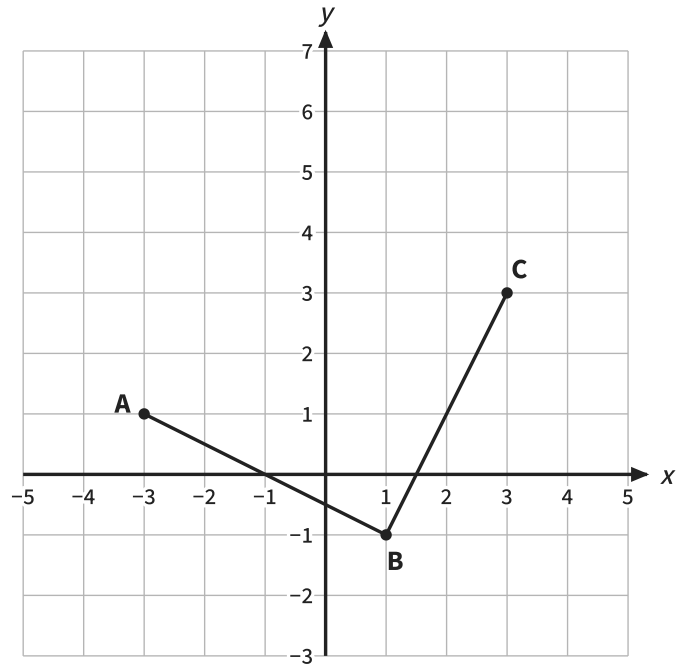
- (c) Circle the equation of the line that is parallel to $2y = 6x - 5$

$y = 6x - 5$ $y = 3x + 2$ $y = -3x - 5$ $y = \frac{1}{3}x - 5$

[1 mark]

- 6 A, B and C are three vertices of a parallelogram ABCD.

Do not
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outside
the box



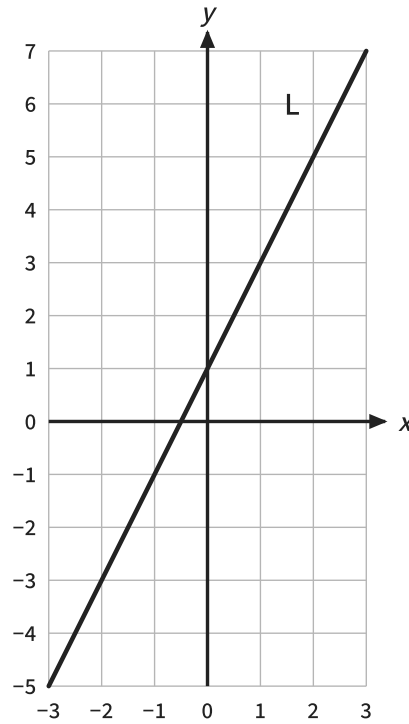
Work out the coordinates of D.

Answer _____

[2 marks]

- 7 Line **L** is drawn on the grid.

Do not
write
outside
the box



- (a) Work out the gradient of line **L**.

Answer _____

[2 marks]

- (b) Write down the equation of line **L**.

Answer _____

[1 mark]

- 8** A straight line passes through the points $(-1, 7)$ and $(3, -1)$

Work out the equation of the line.

Answer _____

[3 marks]

- 9** Line **L** has equation $3x + 2y = 12$

Line **M** is parallel to line **L** and passes through the point $(4, 1)$

Work out the coordinates of the point where line **M** crosses the y -axis.

Answer _____

[3 marks]

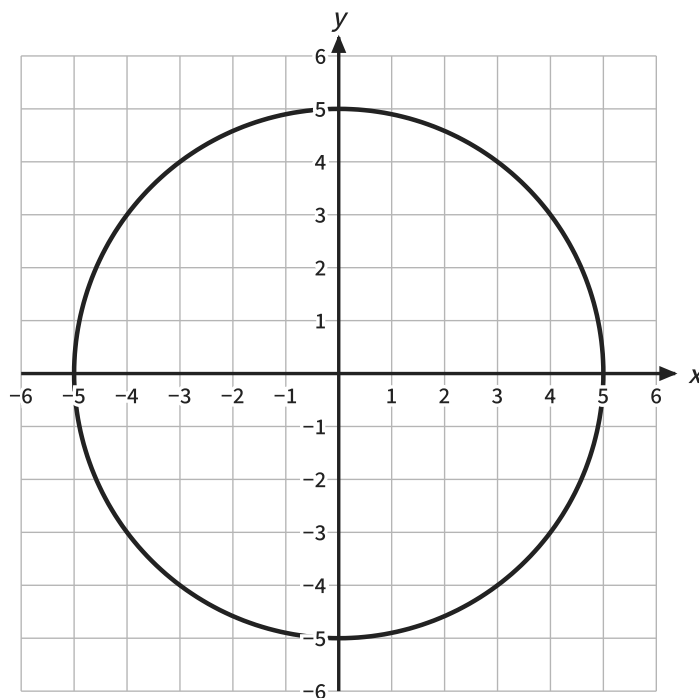
- 10** P is the point $(-2, 1)$, Q is the point $(4, 4)$ and R is the point $(1, 10)$

Use gradients to show that angle PQR is a right angle.

[3 marks]

- 11** A circle, centre O, is drawn on the grid.

Do not
write
outside
the box



- (a)** Write down the equation of the circle.

Answer _____

[1 mark]

- (b)** The point $(k, -2)$ lies on the circle, where k is positive.
Work out the exact value of k .

Answer _____

[2 marks]

- 12** A is the point $(-1, 2)$ and B is the point $(5, 6)$
Line **L** is the perpendicular bisector of AB.

Work out the equation of line **L**.

Give your answer in the form $y = mx + c$

Answer _____

[4 marks]

- 13** The point $(2, 4)$ lies on the circle $x^2 + y^2 = 20$
The tangent to the circle at $(2, 4)$ crosses the x -axis at A and the y -axis at B.
O is the origin.

Work out the area of triangle OAB.

Answer _____ units²

[5 marks]

Section B



You may use a calculator

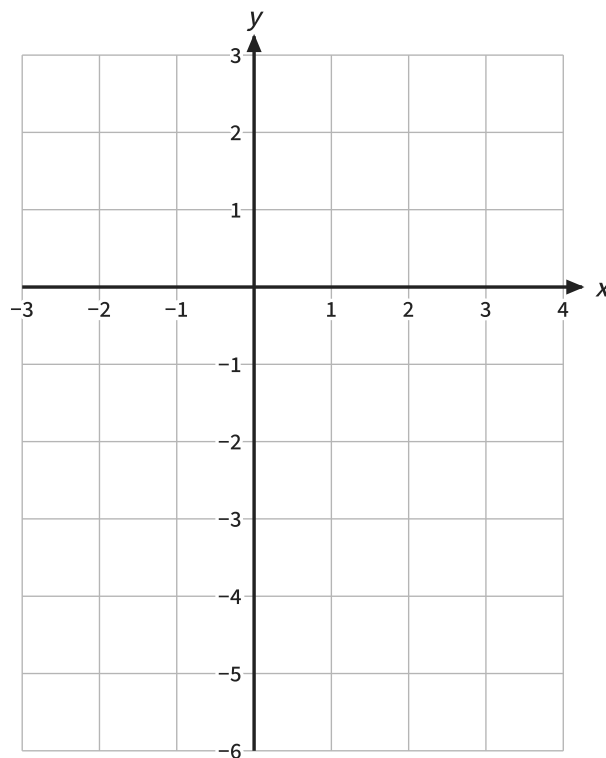
Do not
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outside
the box

- 14** (a) Complete the table of values for $y = 1.5x - 2.5$

x	-2	-1	0	1	2	3
y		-4			0.5	

[2 marks]

- (b) On the grid, draw the graph of $y = 1.5x - 2.5$ for values of x from -2 to 3



[2 marks]

- (c) Is the point (13.6, 17.9) on the line $y = 1.5x - 2.5$?
You must show your working.

[1 mark]

- 15** Kai uses a tablet computer. The battery charge, $C\%$, after t hours of use is given by

$$C = 96 - 12t$$

- (a) What does the number 96 represent?

[1 mark]

- (b) What does the number -12 represent?

[1 mark]

- (c) After how many hours of use will the charge be 30%?

Answer _____ hours

[2 marks]

- 16** A is the point $(-2, -7)$
B is the point $(1, -1)$
C is the point $(5, 8)$
Ellie says that A, B and C lie on the same straight line.

Is Ellie correct?

You must show your working.

[3 marks]

17

A 3D printer uses plastic from a reel.

While the printer is working, the mass of the reel goes down at a constant rate.

After 2.5 hours of printing, the mass of the reel is 836.4 g

After 6 hours of printing, the mass of the reel is 715.3 g

- (a) Work out the rate at which the mass of the reel goes down.
Give your answer in grams per hour.

Answer _____ g per hour
[2 marks]

- (b) Work out the mass of the reel before any printing started.

Answer _____ g
[2 marks]

- (c) The printer gives a warning when the mass of the reel reaches 250 g
How long after the start of printing does it give the warning?
Give your answer in hours and minutes, to the nearest minute.

Answer _____
[2 marks]

18 A straight line passes through the points (2.5, 7.3) and (6.5, 1.3)

- (a)** Work out the equation of the line.
Give your answer in the form $y = mx + c$

Answer _____

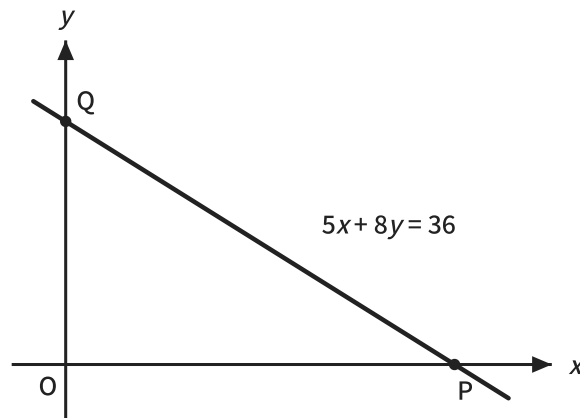
[3 marks]

- (b)** Ama says the point (−4.2, 17.4) lies on the line.
Is Ama correct?
You must show your working.

[2 marks]

- 19** The line with equation $5x + 8y = 36$ crosses the x -axis at P and the y -axis at Q. O is the origin.

Work out the size of angle OPQ.
Give your answer to 1 decimal place.



Not drawn accurately

Answer _____ degrees
[4 marks]

- 20** Line **L** has gradient -0.8 and passes through the point $(3.5, 2)$
Line **M** has equation $y = 1.2x - 4$

Work out the coordinates of the point where line **L** meets line **M**.

Answer _____
[4 marks]

- 21** Line **L** has equation $2x + 5y = 20$
C is the point (6, 9)
Line **M** is perpendicular to line **L** and passes through C.
Line **M** meets line **L** at the point P.

Work out the length of CP.

Give your answer to 3 significant figures.

Answer _____

[6 marks]

- 22** A is the point (1.2, 0.5)
B is the point (5.7, 2.3)
C is the point (4.8, 4.3)
D is the point (0.3, 2.5)
Kofi says that ABCD is a rectangle.

Is Kofi correct?

You must show your working.

[4 marks]

END OF QUESTIONS