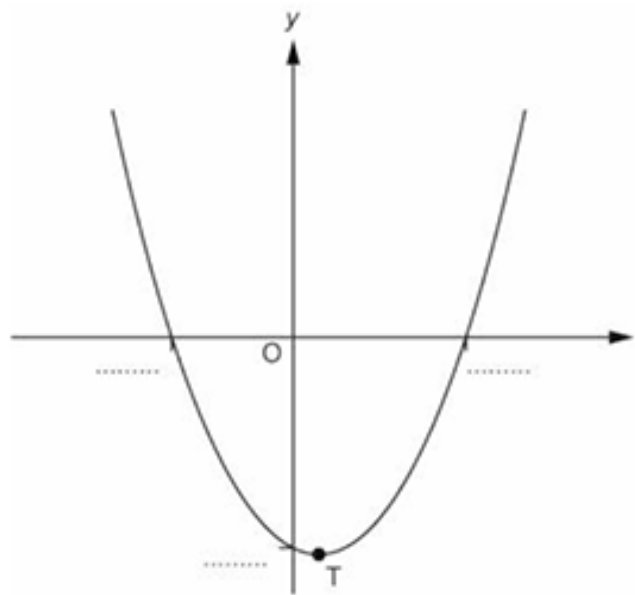


1(a).

Show that $(x + 5)(x - 7) = x^2 - 2x - 35$.

[1]

(b). The diagram shows a sketch of the graph $y = (x + 5)(x - 7)$.



Complete the diagram by adding the values of the **three** intercepts with the axes.

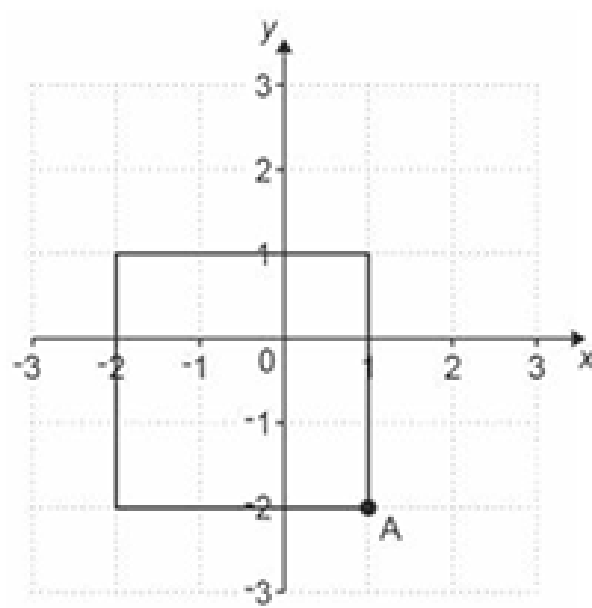
[2]

(c). The minimum point on the graph is marked T.

Write down the coordinates of the point T.

(..... ,) **[2]**

2. The diagram shows a square drawn on a one-centimetre square grid.



Write down the coordinates of point A.

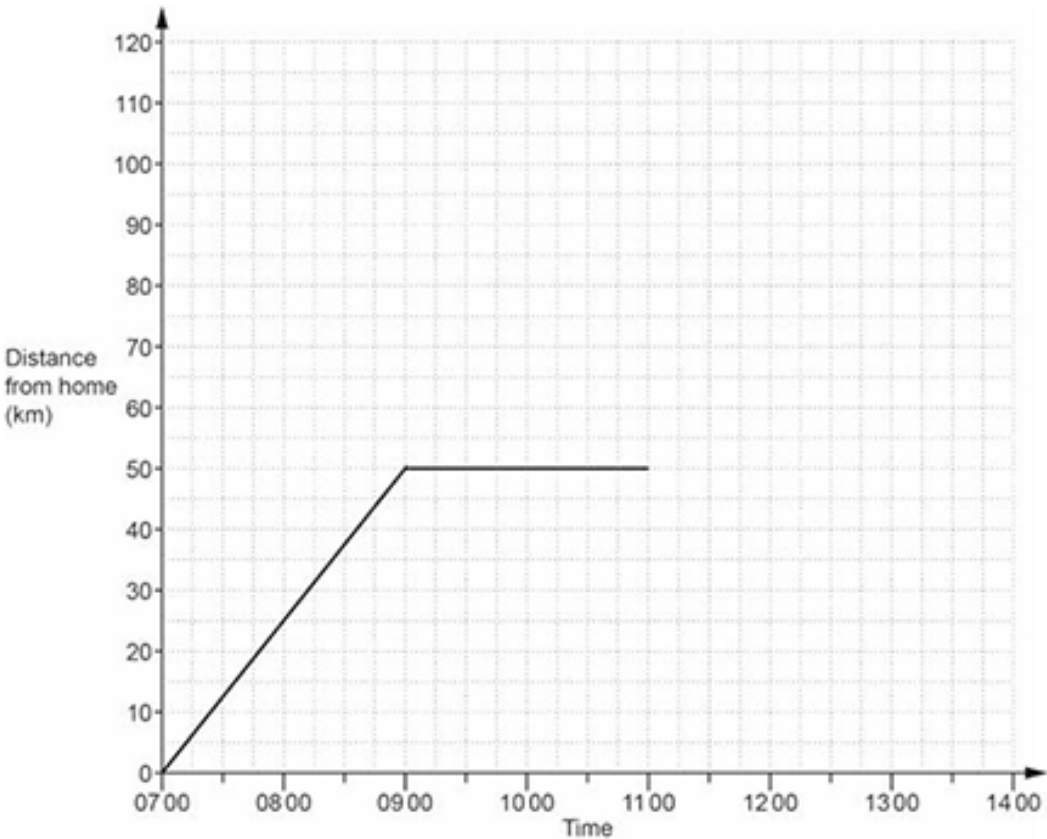
(..... ,) [1]

3. Sketch the graph of $x = 7$ on the axes below.
Show clearly the value of any intercepts.



[2]

4(a). Amari drives from home to a shopping centre.
The graph shows information about the journey and the time spent at the shopping centre.



State an assumption that has been made when the graph was drawn.

[1]

(b). Write down the distance from Amari’s home to the shopping centre.

..... km [1]

(c). Calculate Amari’s average speed, in km/h, from home to the shopping centre.

..... km/h [2]

(d). Amari leaves the shopping centre at 11 00.
Amari drives home without stopping.

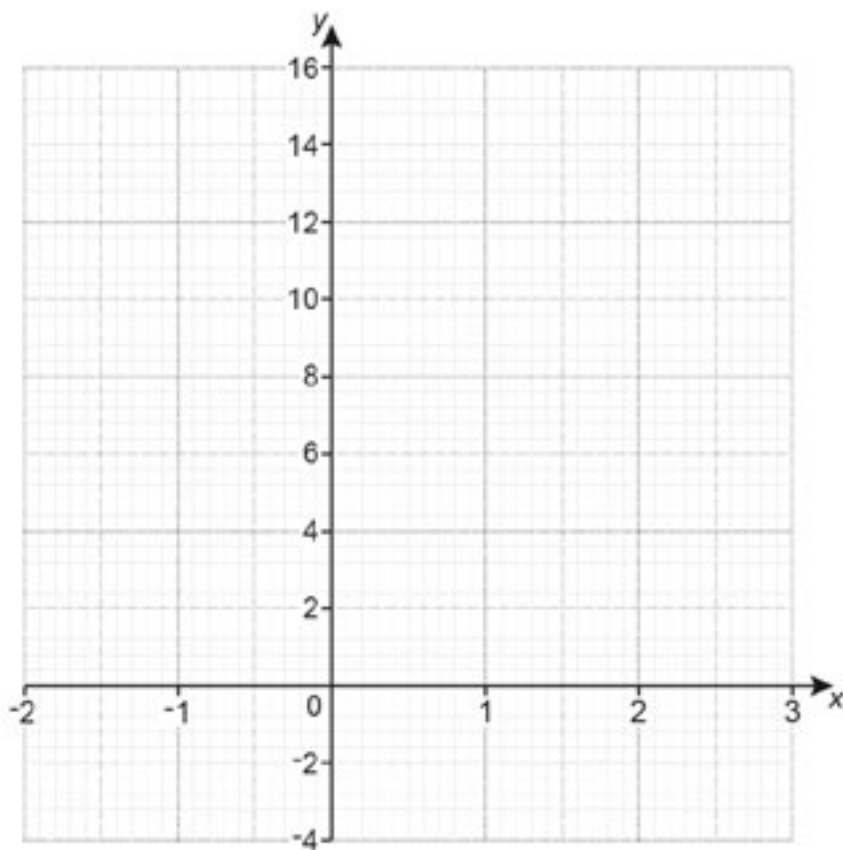
The journey home takes $1\frac{1}{4}$ hours.

Complete the graph to show this information.

5(a). Here is a table of values for $y = 2x^2 - 4x$.

x	-2	-1	0	1	2	3
y	16	6	0	-2	0	6

Draw the graph of $y = 2x^2 - 4x$ for values of x from -2 to 3.

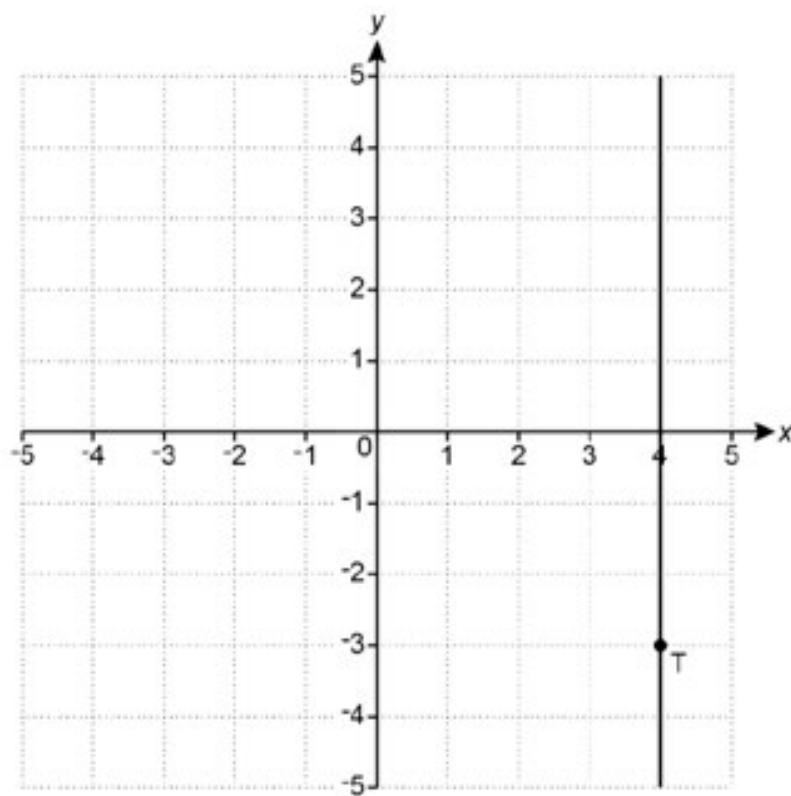


[3]

(b). Use your graph to find the x -coordinates of the points where the graph of $y = 2x^2 - 4x$ crosses the line $y = 4$.

$x = \dots\dots\dots$ and $x = \dots\dots\dots$ **[2]**

6(a). This grid shows a vertical line going through the point T.



i. Write down the coordinates of point T.

(.....,) [1]

ii. Plot the point $(-2, 3)$.

[1]

(b). Write down the equation of the vertical line going through point T.

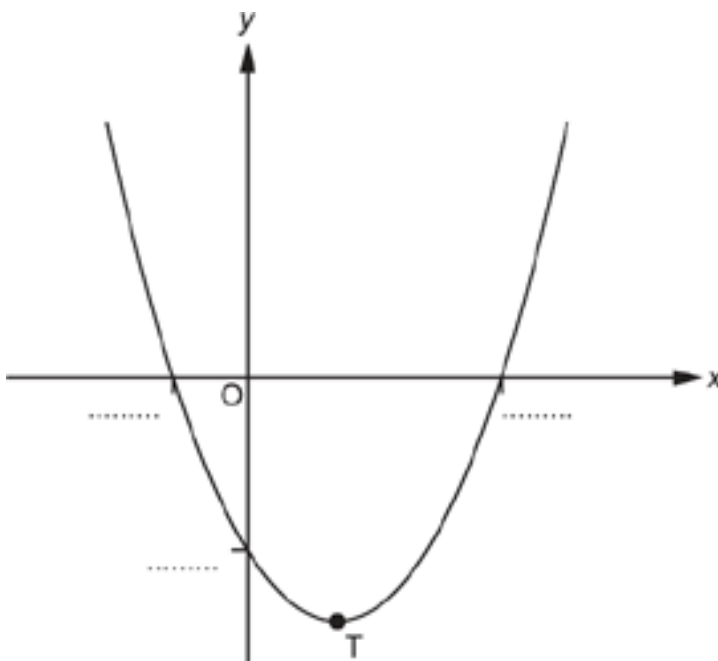
..... [1]

7(a).

Show that $(x + 3)(x - 5) = x^2 - 2x - 15$.

[1]

(b). The diagram shows a sketch of the graph $y = (x + 3)(x - 5)$.



Complete the diagram by adding the values of the **three** intercepts with the axes.

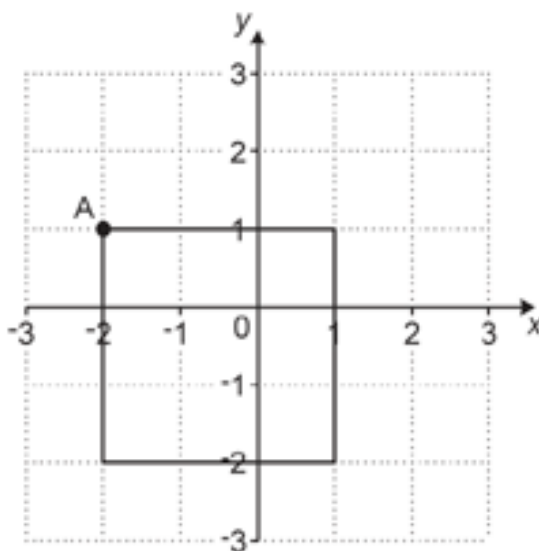
[2]

(c). The minimum point on the graph is marked T.

Write down the coordinates of the point T.

(.....,) [2]

8. The diagram shows a square drawn on a one-centimetre square grid.



Write down the coordinates of point A.

(.....,) [1]

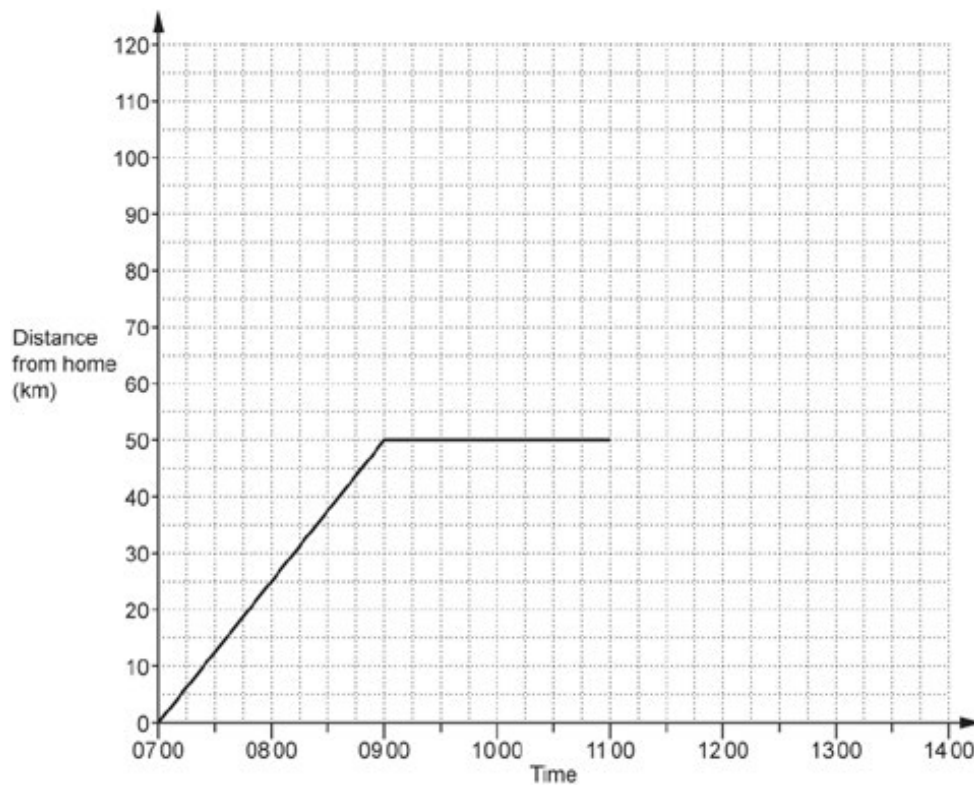
9. Sketch the graph of $y = 4$ on the axes below.
Show clearly the value of any intercepts.



[2]

- 10(a). Zayn drives from home to a shopping centre.

The graph shows information about the journey and the time spent at the shopping centre.



State an assumption that has been made when the graph was drawn.

[1]

(b). Write down the distance from Zayn's home to the shopping centre.

..... km [1]

(c). Calculate Zayn's average speed, in km/h, from home to the shopping centre.

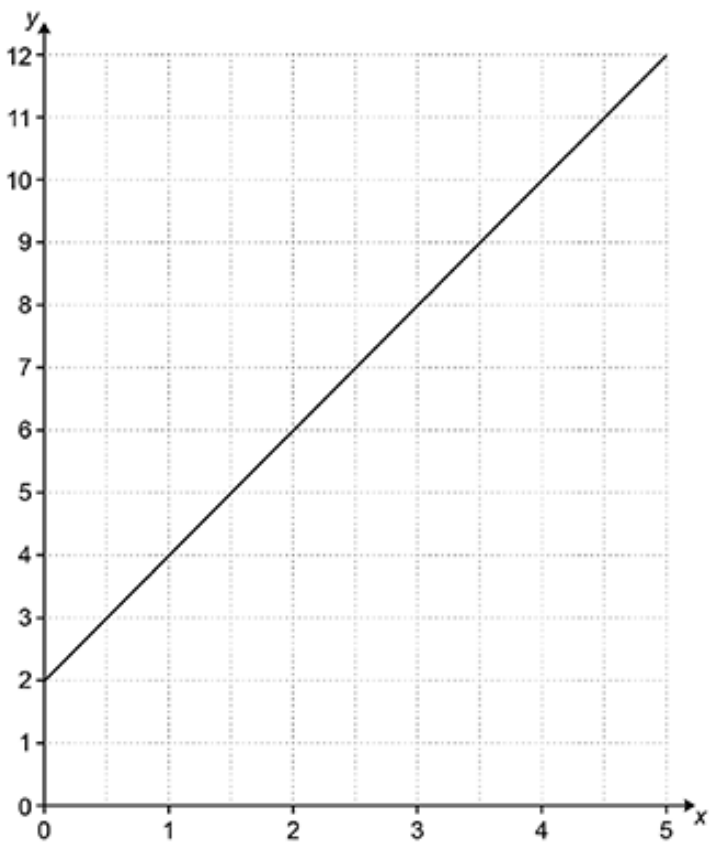
..... km/h [2]

(d). Zayn leaves the shopping centre at 1100.
Zayn drives home without stopping.
The journey home takes $1\frac{3}{4}$ hours.

Complete the graph to show this information.

[2]

11(a). Part of the graph of $y = 2x + 2$ is drawn on this grid.



Write down the y-intercept.

..... [1]

(b). The line continues to the right.

Will the line pass above, below or through the point (40, 83)?
Show how you decide.

The line $y = 2x + 2$ will pass _____ the point (40, 83) because _____

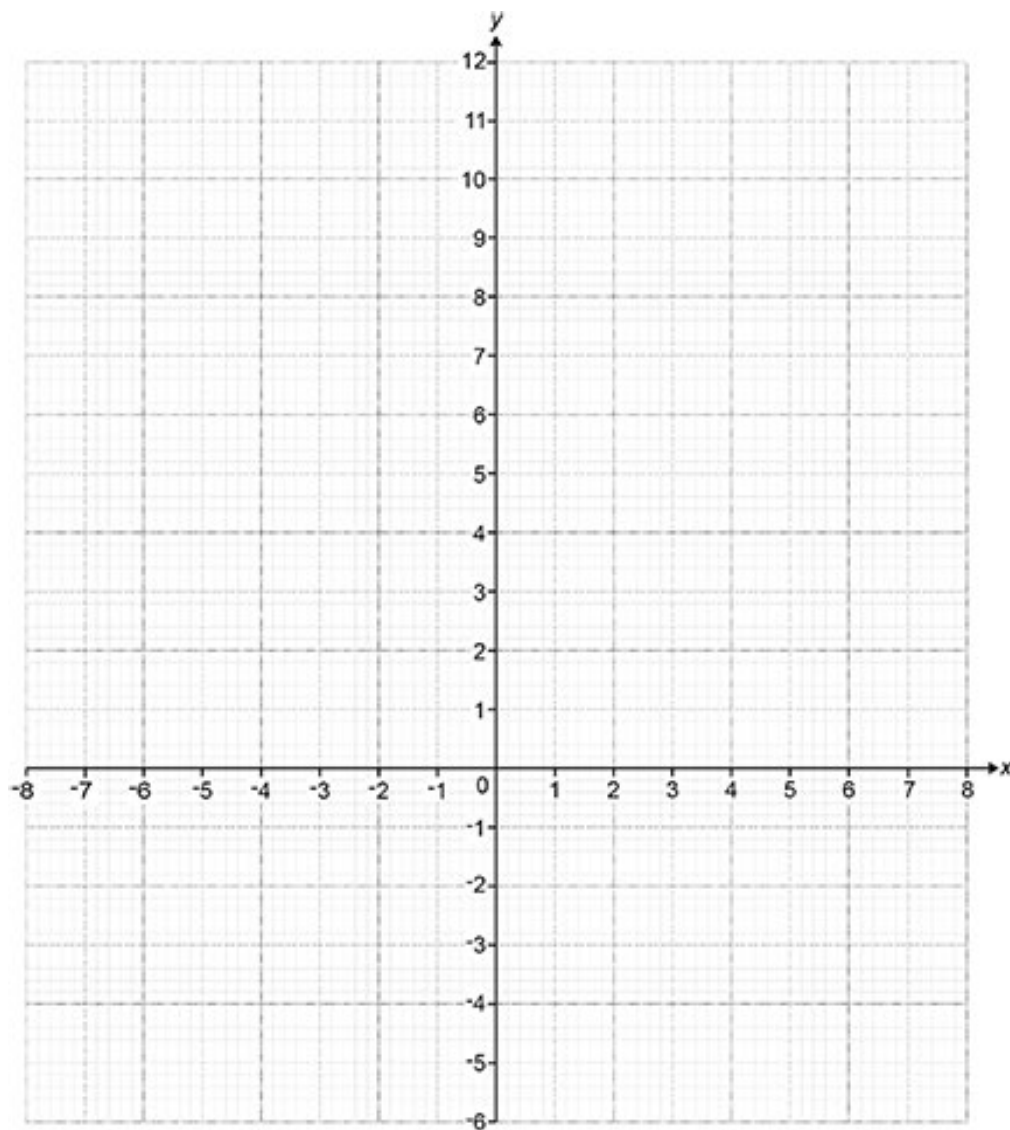
_____ **[2]**

(c). Write down the equation of a line that is parallel to $y = 2x + 2$.
..... **[1]**

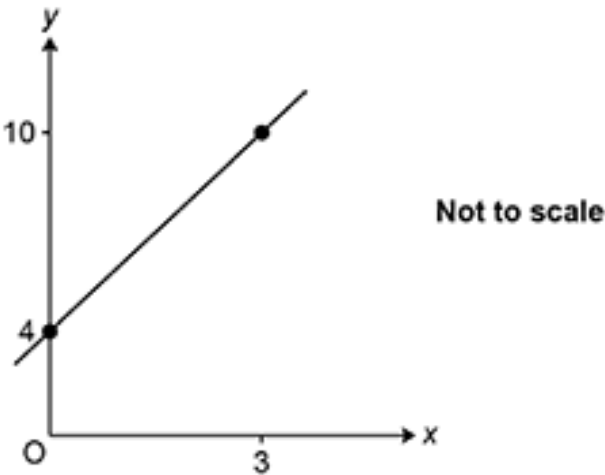
12. Here is a table of values for $y = \frac{8}{x} + 3$.

x	-8	-4	-2	-1	1	2	4	8
y	2	1	-1	-5	11	7	5	4

Draw the graph of $y = \frac{8}{x} + 3$ for $-8 \leq x \leq 8$, $x \neq 0$.



13. A straight line passes through the points (0, 4) and (3, 10).



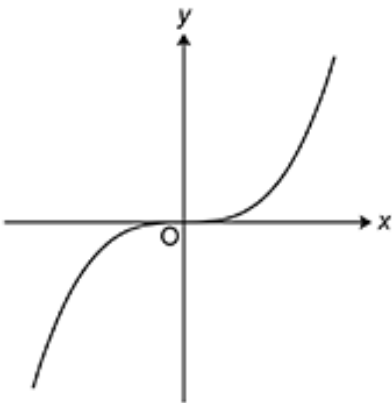
Find the equation of the line in the form $y = mx + c$.

..... [4]

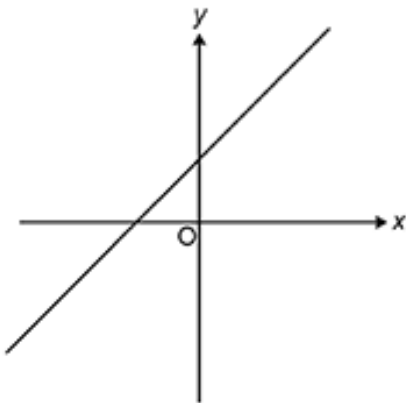
14. For each graph below, select its possible equation from this list.

- A** $y = -3$
- B** $y = x$
- C** $y = x + 1$
- D** $y = x^2$
- E** $x = -3$
- F** $y = x^3$

Write the letter of the equation beneath each graph.



.....

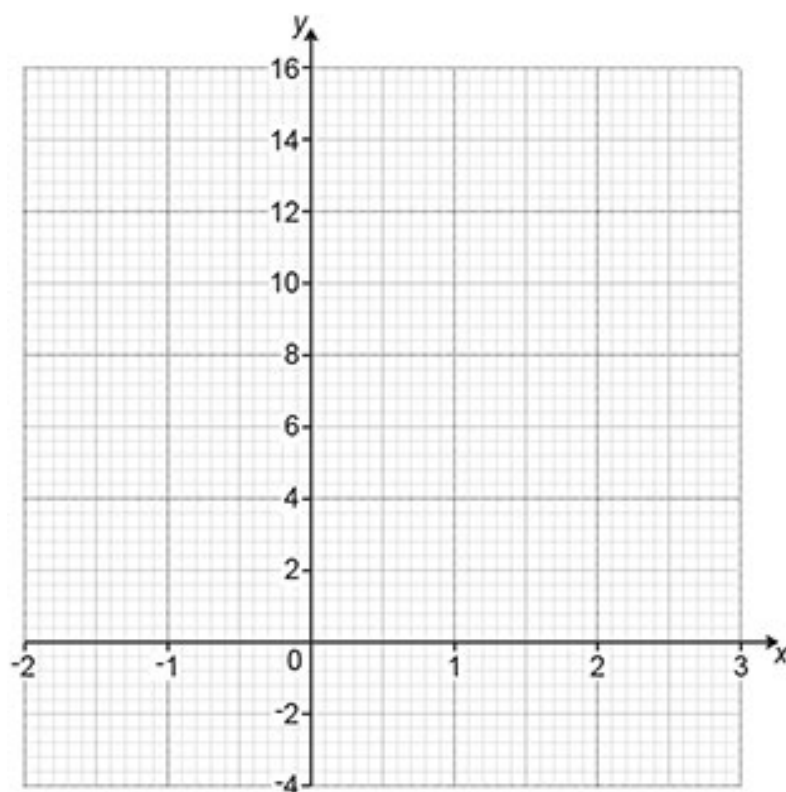


.....

15(a). Here is a table of values for $y = 2x^2 - 3x$

x	-2	-1	0	1	2	3
y	14	5	0	-1	2	9

Draw the graph of $y = 2x^2 - 3x$ for values of x from -2 to 3.

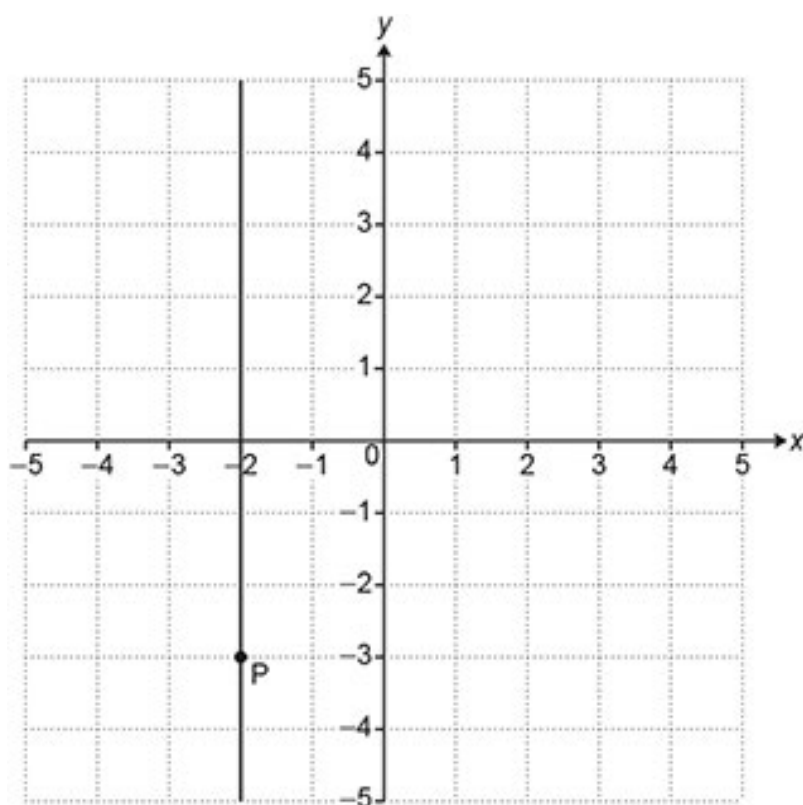


[3]

(b). Use your graph to find the x -coordinates of the points where the graph of $y = 2x^2 - 3x$ crosses the line $y = 6$.

$x = \dots\dots\dots$ and $x = \dots\dots\dots$ **[2]**

16(a). This grid shows a vertical line going through the point P.



i. Write down the coordinates of point P.

(..... ,) [1]

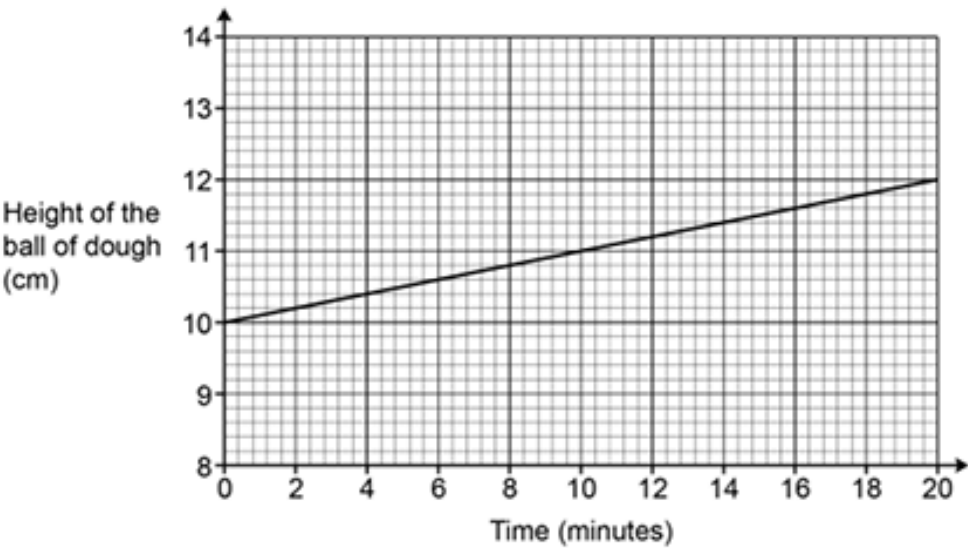
ii. Plot the point $(4, -1)$.

[1]

(b). Write down the equation of the vertical line going through point P.

..... [1]

17(a). A ball of dough is left to rise before it is baked.
The graph shows the height of the ball of dough over the first 20 minutes.



Work out the gradient of the line as a decimal, giving the units of your answer.
Show how you work out your answer.

..... **[3]**

(b). A baker works out the height of the ball of dough at the end of 30 minutes as 13 cm.

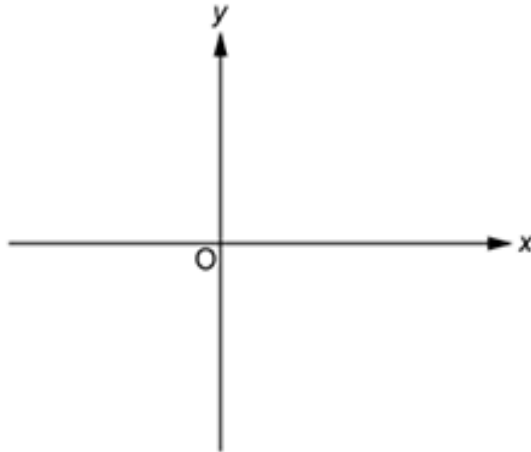
- i. Use your gradient to show that the baker could be correct.

[2]

- ii. What assumption has the baker made?

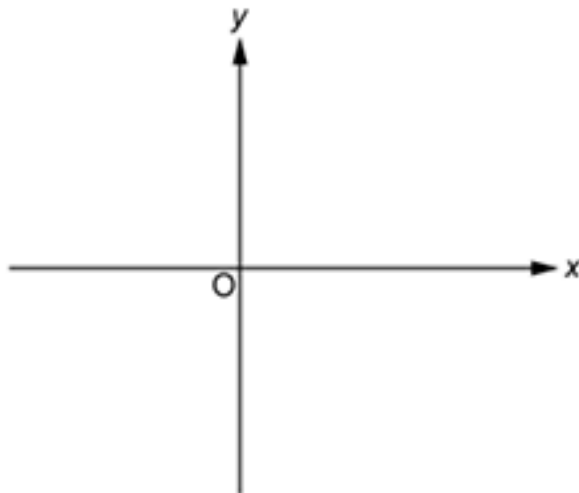
..... **[1]**

18(a). Sketch the graph of $x = -3$.
Show clearly the value of any intercepts.



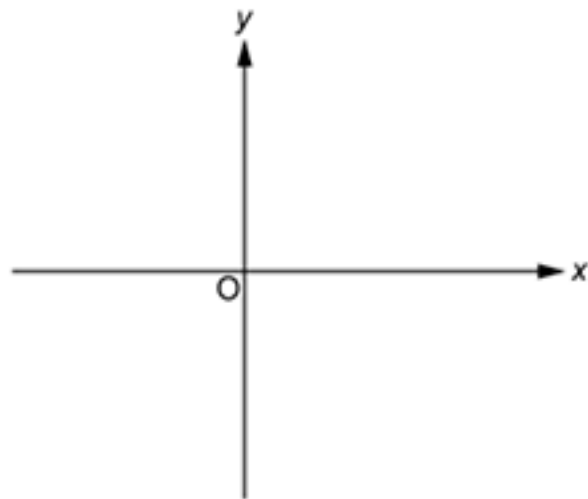
[2]

(b). Sketch the graph of $y = x - 2$.
Show clearly the value of any intercepts.



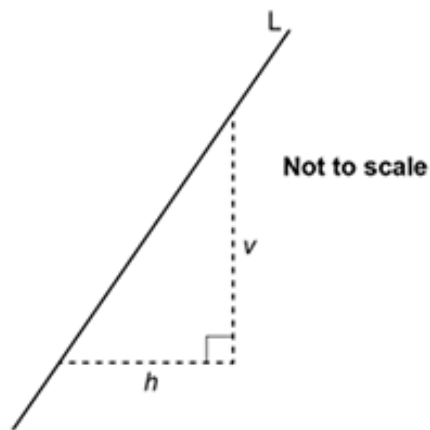
[3]

(c). Sketch the graph of $y = x^3$.



[1]

19(a). A straight line, L, is shown below.



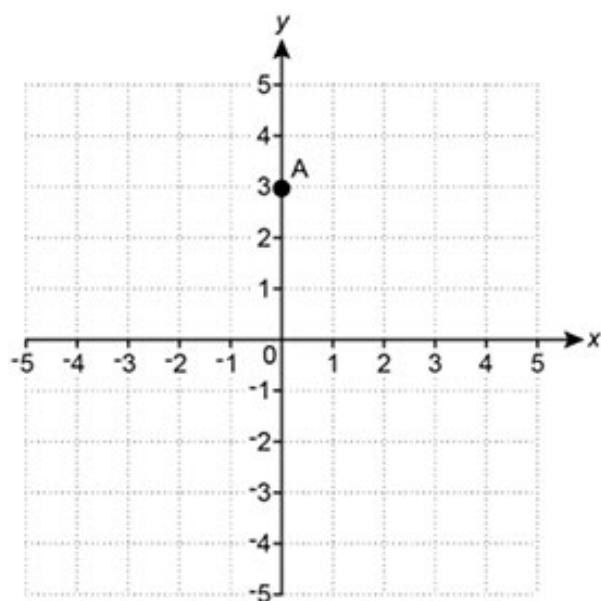
Write down the ratio $v : h$ when the gradient of line L is 5.

..... : [1]

(b). Find the gradient of line L as a fraction in its simplest form when $v : h = 8 : 14$.

..... [2]

20(a). Point A is shown on this grid.



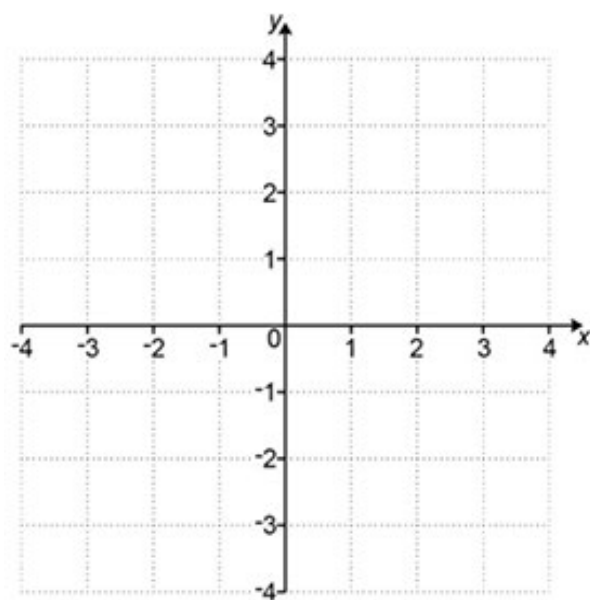
Write down the coordinates of point A.

(.....,) [1]

(b). Plot point B on the grid at $(-4, 4)$.

[1]

21(a). This is a one-centimetre square grid.



On the grid, plot point A at $(3, 2)$.

[1]

(b). The line AB joins point A to point B.
Point B is at (3, −3).

Find the length of the line AB.

..... cm **[1]**

(c). On the grid, draw the line $y = -3$.

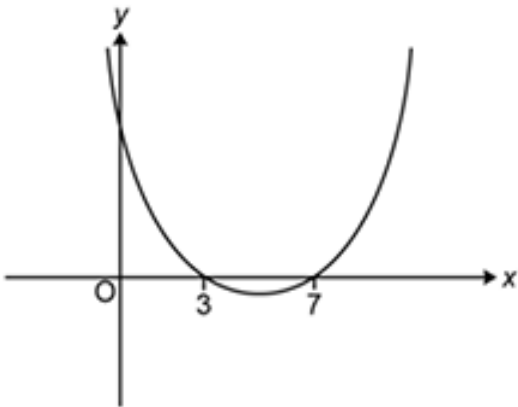
[1]

(d). ABCD is a square that fits on the grid.
Point C is on the line $y = -3$.

Find the coordinates of point D.

D is at (..... ,) **[2]**

22(a). This is a sketch of the graph of $y = x^2 - 10x + 21$.



Not to scale

Write down the value of the y -intercept.

..... **[1]**

(b). Write down the x -coordinate of the turning point.

..... **[1]**

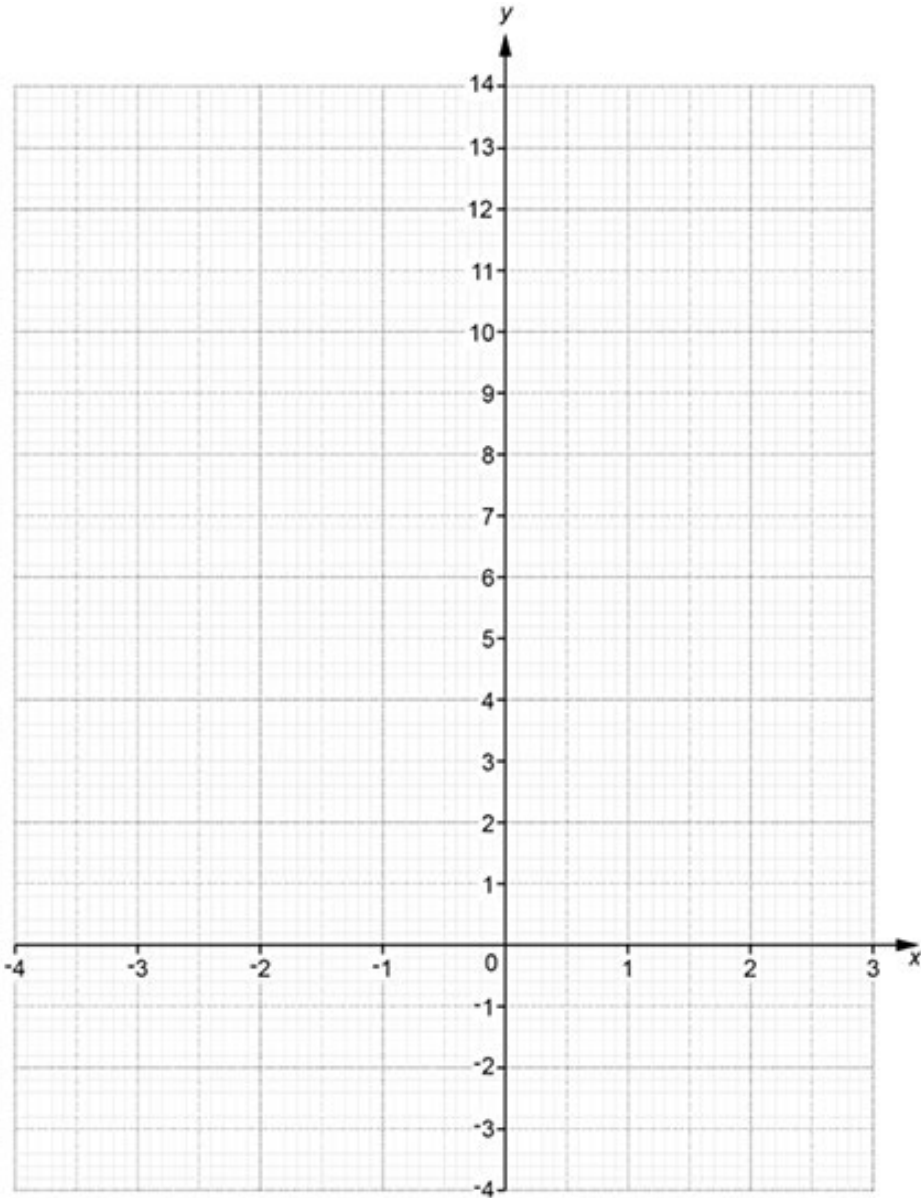
23(a).

Complete this table for $y = x^2 - 3$.

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

[2]

(b). Draw the graph of $y = x^2 - 3$ for the values of x from -4 to 3.

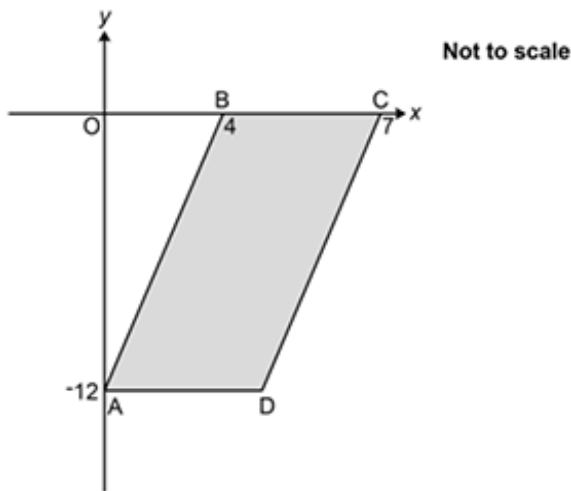


[3]

(c). Use the graph to solve the equation $x^2 - 3 = 0$.
Give your answers to 1 decimal place.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [2]

24. The graph shows a parallelogram ABCD.



A has coordinates (0, -12), B has coordinates (4, 0) and C has coordinates (7, 0).

Find the equation of the line that passes through the points C and D, giving your answer in the form $y = mx + c$. You must show your working.

..... [5]

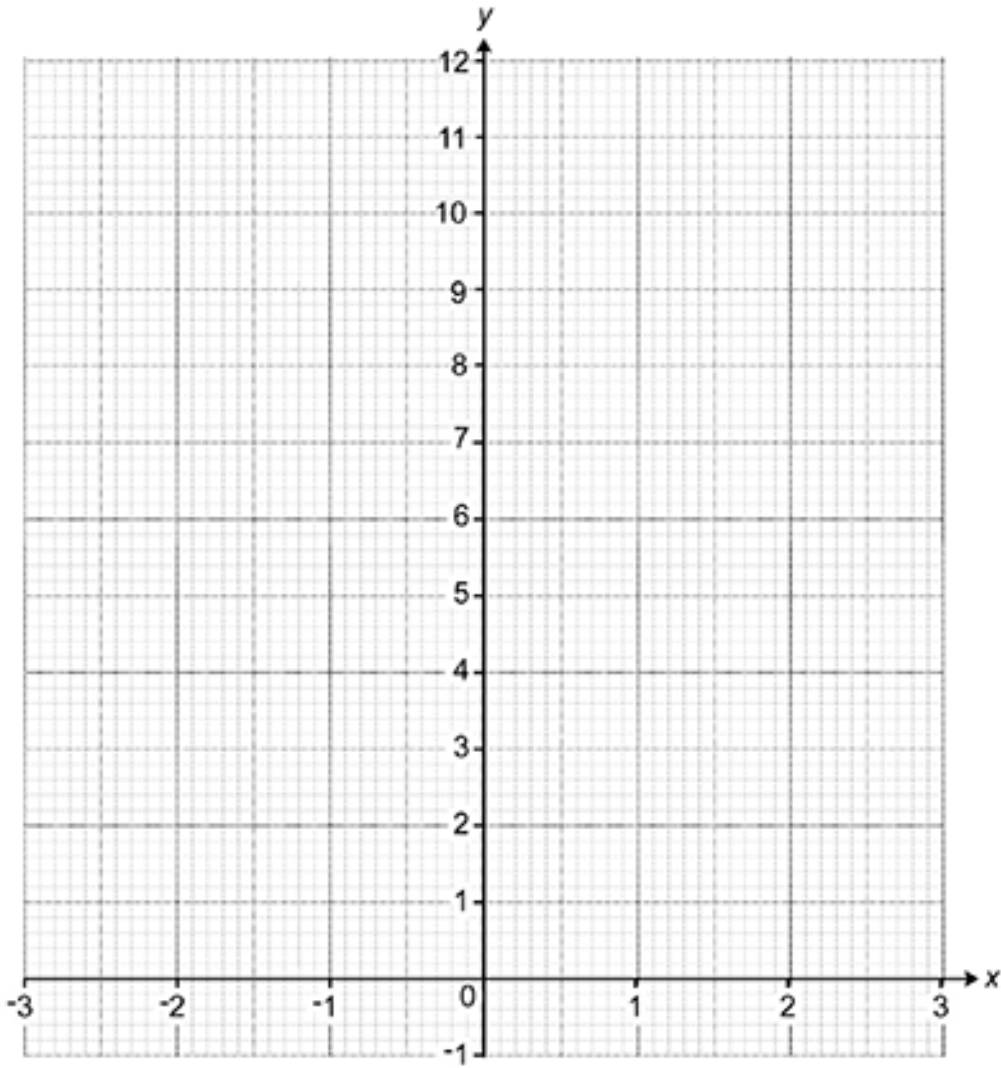
25(a).

Complete this table for $y = x^2 + 2$.

x	-3	-2	-1	0	1	2	3
y		6	3		3	6	11

[2]

(b). Draw the graph of $y = x^2 + 2$ for values of x from -3 to 3.

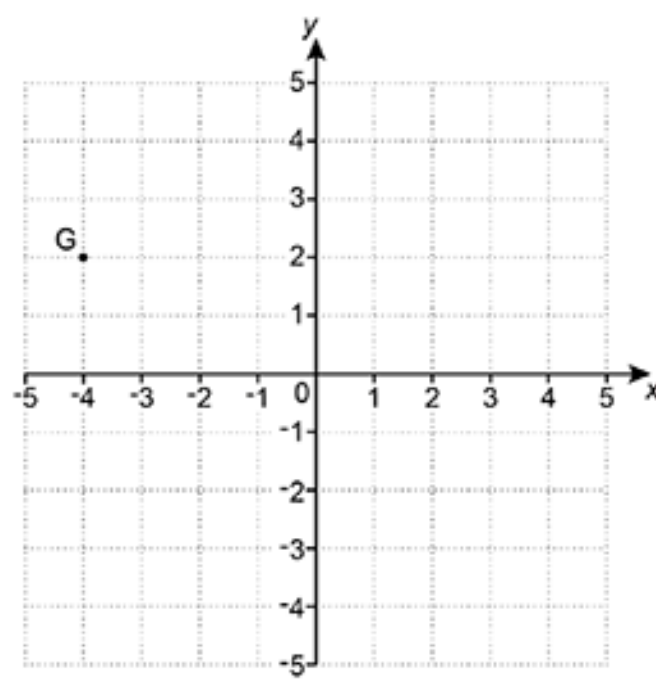


[3]

(c). Use your graph to solve $x^2 + 2 = 8$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [2]

26(a). Point G is shown on this grid.



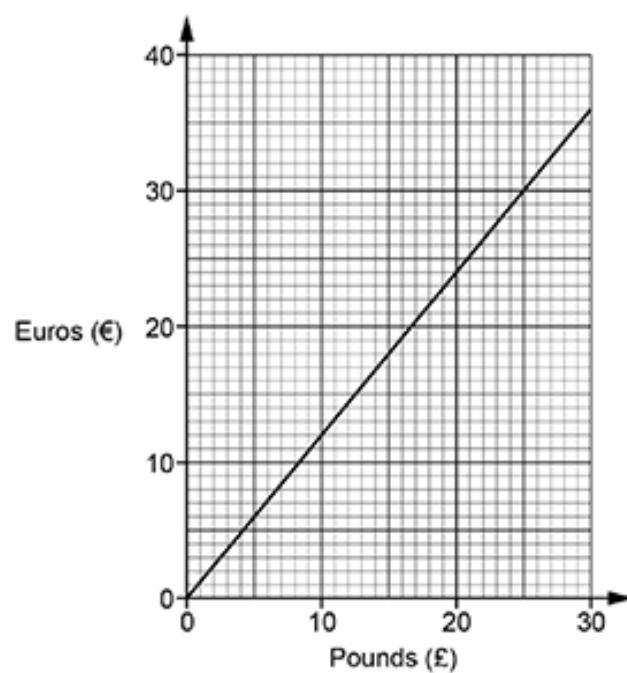
Write down the coordinates of point G.

(.....,) [1]

(b). Plot point H on the grid at (1, -3).

[1]

27(a). A conversion graph between pounds (£) and euros (€) is shown below.



Explain fully how the graph shows that the number of euros is directly proportional to the number of pounds.

..... [2]

(b). Use the conversion graph to change £20 into euros.

€ [1]

(c). Some trainers cost £180 in the UK.
The same trainers cost €195 in France.

Show that the trainers cost less in France.

..... [4]

(d). If the trainers are brought from France there is an extra charge for tax and delivery.

Kai wants to pay the lowest total amount for the trainers.

Write down the maximum extra charge for tax and delivery that Kai should be willing to pay.
Give your answer in euros.

€ [1]

28. For each graph below, select its possible equation from this list.

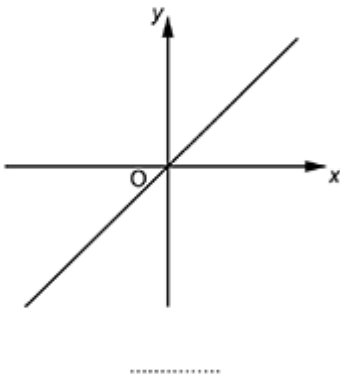
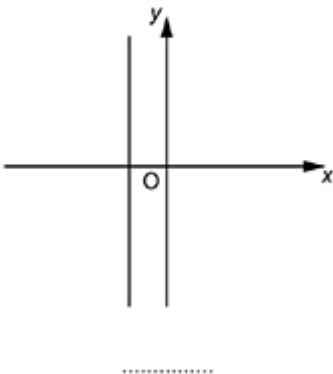
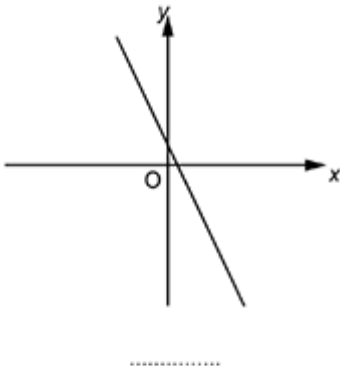
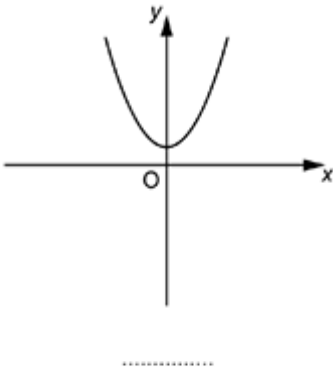
- A $y = x^3$

D $x = -2$
- B $y = -2$

E $y = x^2 + 2$
- C $y = x$

F $y = -2x + 1$

Write the letter of the equation beneath each graph.



[4]

29(a). A straight line has the equation $y = 5x - 3$.

Write down the gradient of the line.

..... [1]

(b). Here are the equations of four straight lines.

- $y = 3x + 4$
- $y = 5x + 3$
- $y = 3 - x$
- $y = \frac{1}{5}x - 3$

i. Which of the four straight lines is parallel to $y = 5x - 3$?

..... [1]

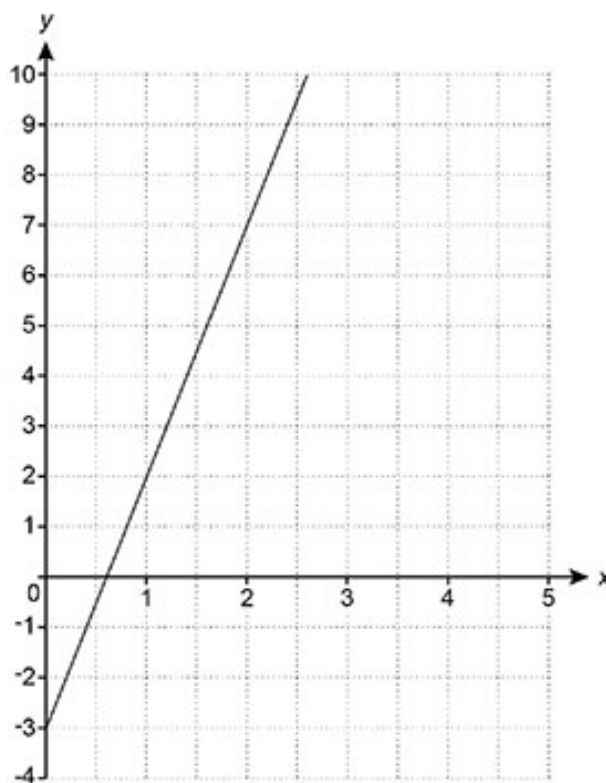
ii. A student says

$y = 3x + 4$ is the steepest of the four straight lines because it has the largest number added.

Explain why the student is wrong.

[1]

(c). Here is part of the graph of $y = 5x - 3$.



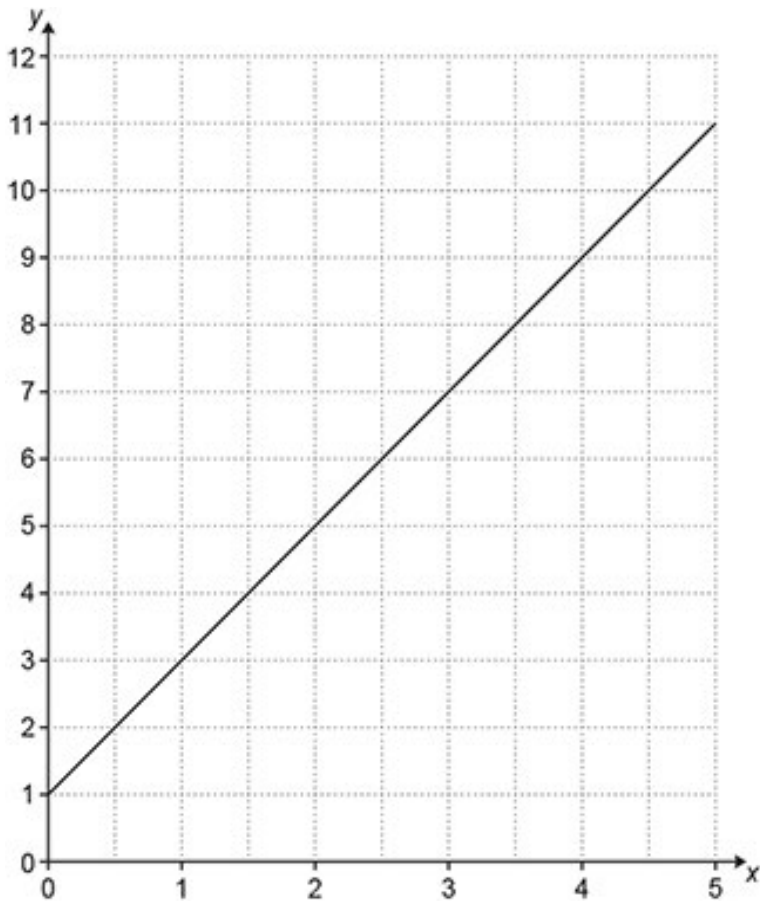
The line continues upwards.

Will the line pass above, below or through the point (30, 150)?
Show how you decide.

The line $y = 5x - 3$ will pass _____ the point (30, 150) because _____

[2]

30(a). Part of the graph of $y = 2x + 1$ is drawn on this grid.



Write down the y-intercept. [1]

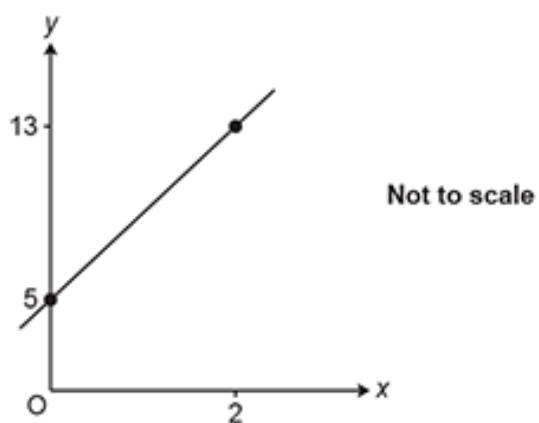
(b). The line continues to the right.

Will the line pass above, below or through the point (40, 80)?
Show how you decide.

The line $y = 2x + 1$ will pass _____ the point (40, 80) because _____
..... [2]

(c). Write down the equation of a line that is parallel to $y = 2x + 1$ [1]

31. A straight line passes through the points (0, 5) and (2, 13).



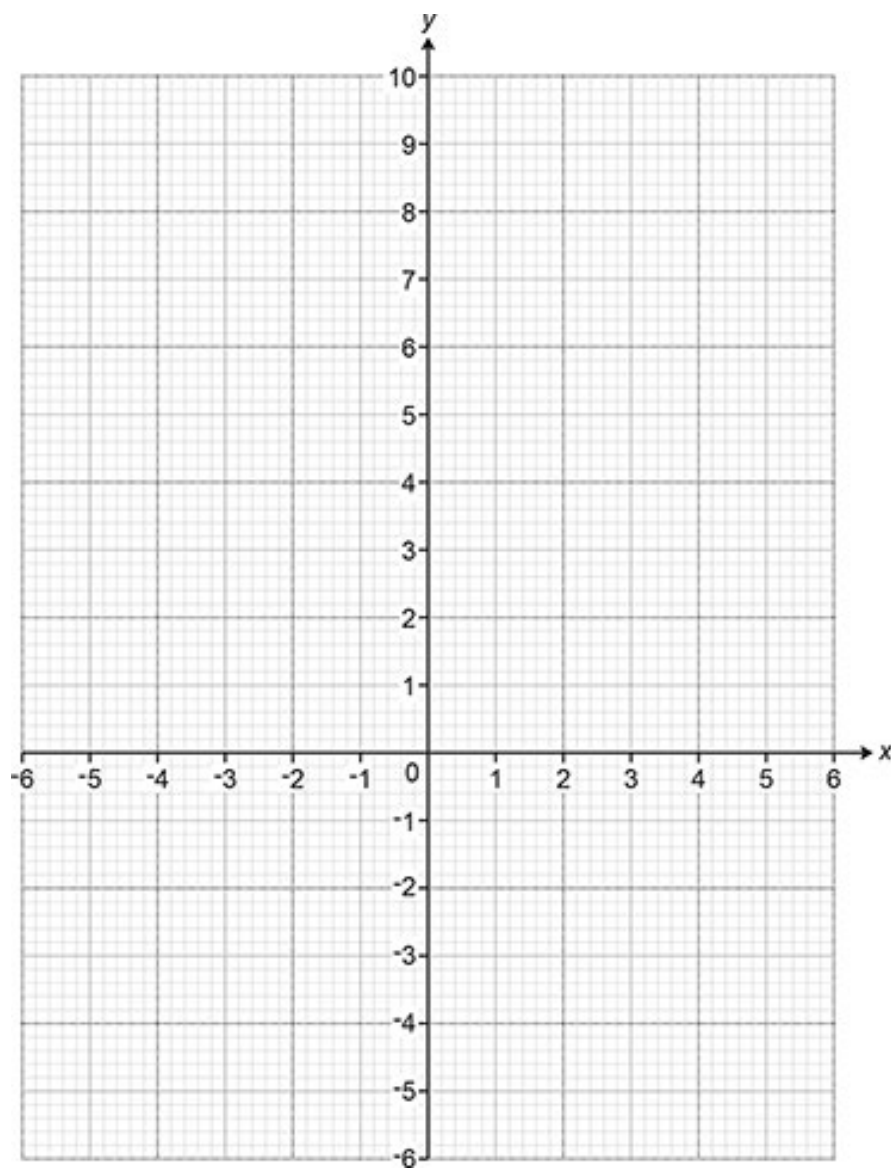
Find the equation of the line in the form $y = mx + c$.

..... **[4]**

32. Here is a table of values for $y = \frac{6}{x} + 2$.

x	-6	-3	-2	-1	1	2	3	6
y	1	0	-1	-4	8	5	4	3

Draw the graph of $y = \frac{6}{x} + 2$ for $-6 \leq x \leq 6$, $x \neq 0$.



33. For each graph below, select its possible equation from this list.

A $y = -3$

B $y = x$

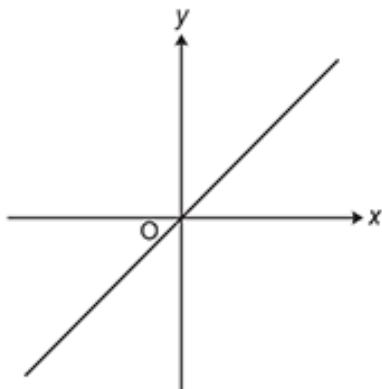
C $y = x + 1$

D $y = x^2$

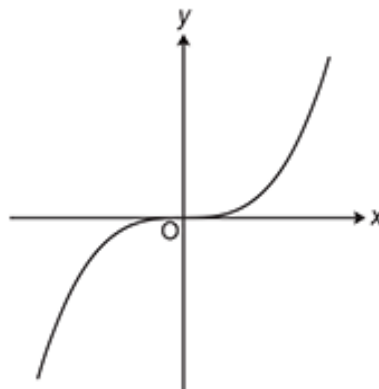
E $x = -3$

F $y = x^3$

Write the letter of the equation beneath each graph.



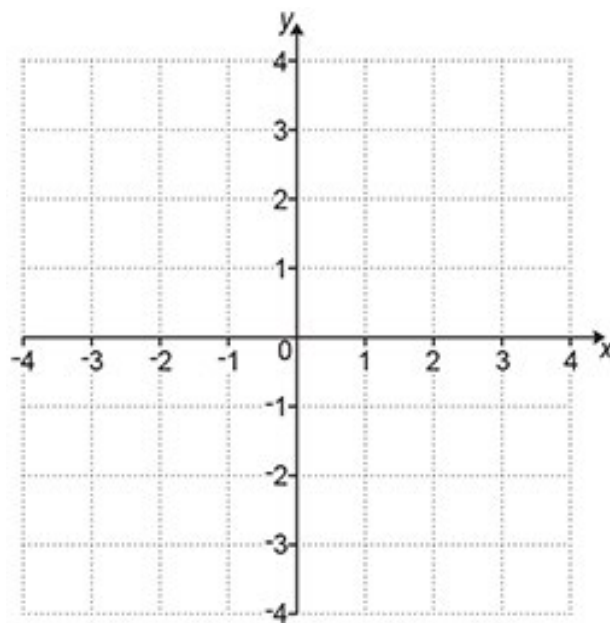
.....



.....

[2]

34(a). This is a one-centimetre square grid.



On the grid, plot point A at $(-3, 3)$.

[1]

(b). The line AB joins point A to point B.
Point B is at (2, 3).

Find the length of the line AB.

..... cm [1]

(c). On the grid, draw the line $x = 2$.

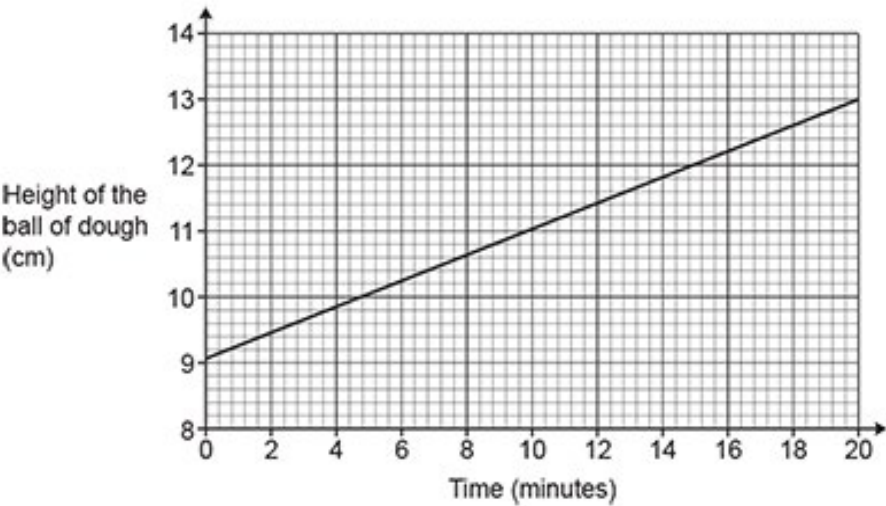
[1]

(d). ABCD is a square that fits on the grid.
Point C is on the line $x = 2$.

Find the coordinates of point D.

D is at (..... ,) [2]

35(a). A ball of dough is left to rise before it is baked.
The graph shows the height of the ball of dough over the first 20 minutes.



Work out the gradient of the line as a decimal, giving the units of your answer.
Show how you work out your answer.

..... [3]

(b). A baker works out the height of the ball of dough at the end of 25 minutes as 14 cm.

- i. Use your gradient to show that the baker could be correct.

[2]

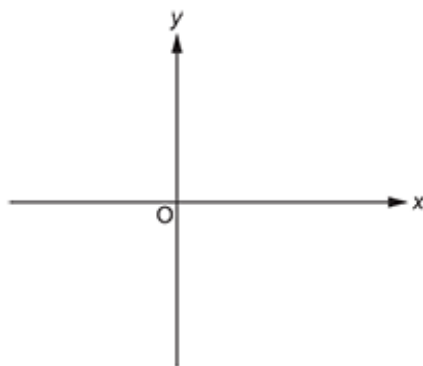
- ii. What assumption has the baker made?

[1]

36(a).

Sketch the graph of $y = -2$.

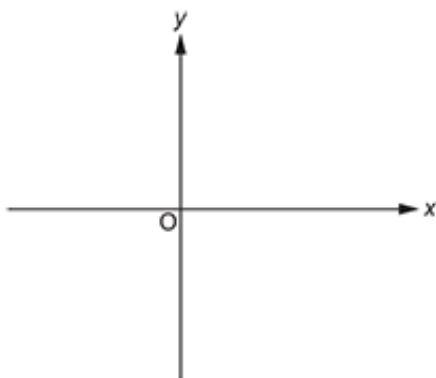
Show clearly the value of any intercepts.



[2]

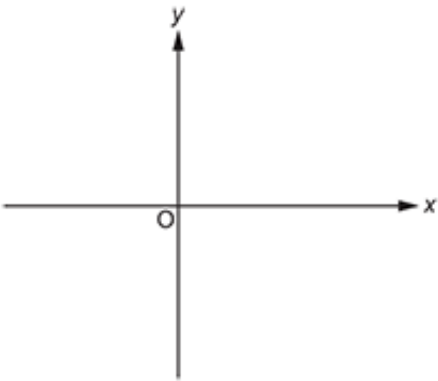
(b). Sketch the graph of $y = x - 3$.

Show clearly the value of any intercepts.



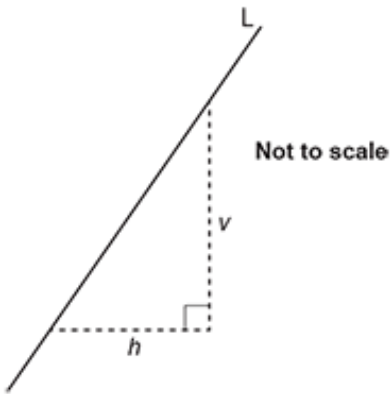
[3]

(c). Sketch the graph of $y = x^2$.



[1]

37(a). A straight line, L, is shown below.



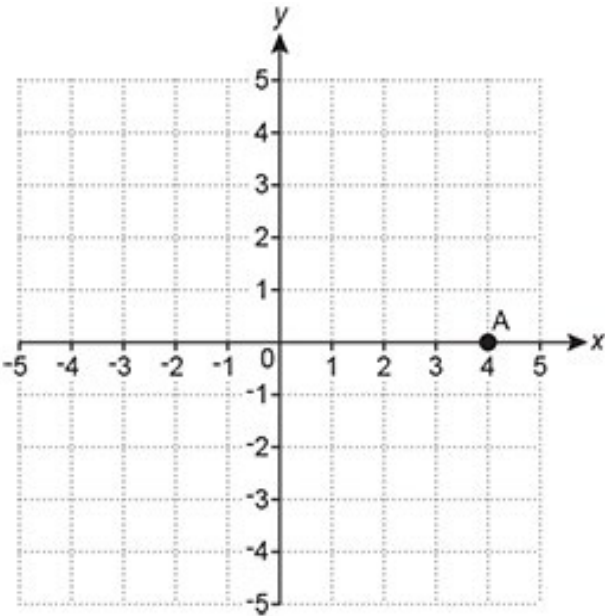
Write down the ratio $v : h$ when the gradient of line L is 4.

..... : [1]

(b). Find the gradient of line L as a fraction in its simplest form when $v : h = 14 : 6$.

..... [2]

38(a). Point A is shown on this grid.



Write down the coordinates of point A.

(..... ,) [1]

(b). Plot point B on the grid at (3, -3).

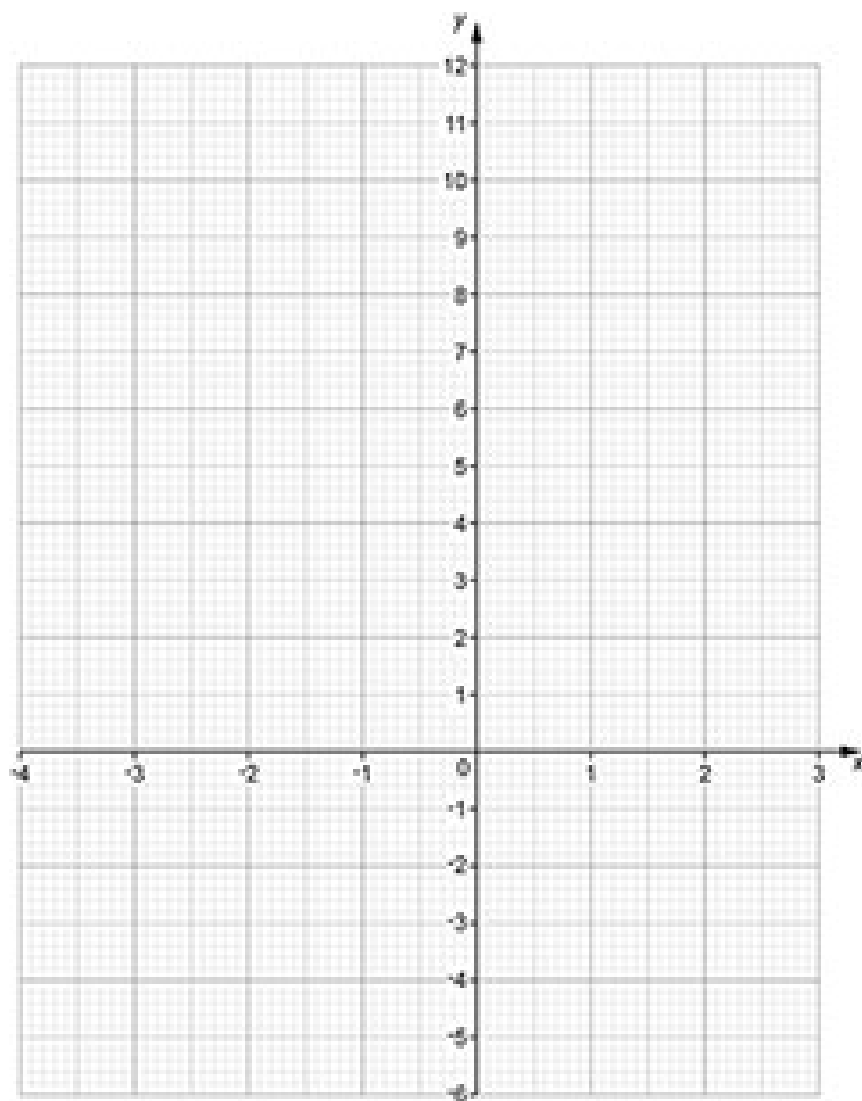
[1]

39(a). Complete this table for $y = x^2 - 5$.

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

[2]

(b). Draw the graph of $y = x^2 - 5$ for the values of x from -4 to 3 .

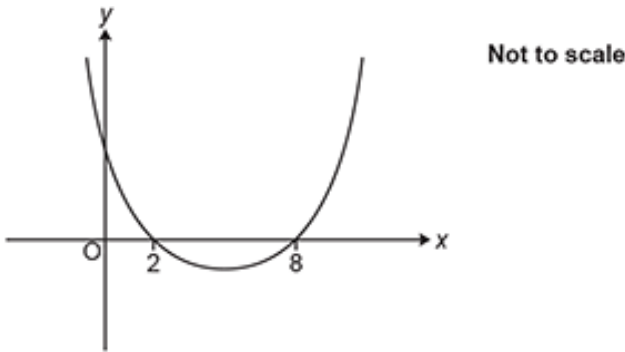


[3]

(c). Use the graph to solve the equation $x^2 - 5 = 0$.
Give your answers to **1** decimal place.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ **[2]**

40(a). This is a sketch of the graph of $y = x^2 - 10x + 16$.



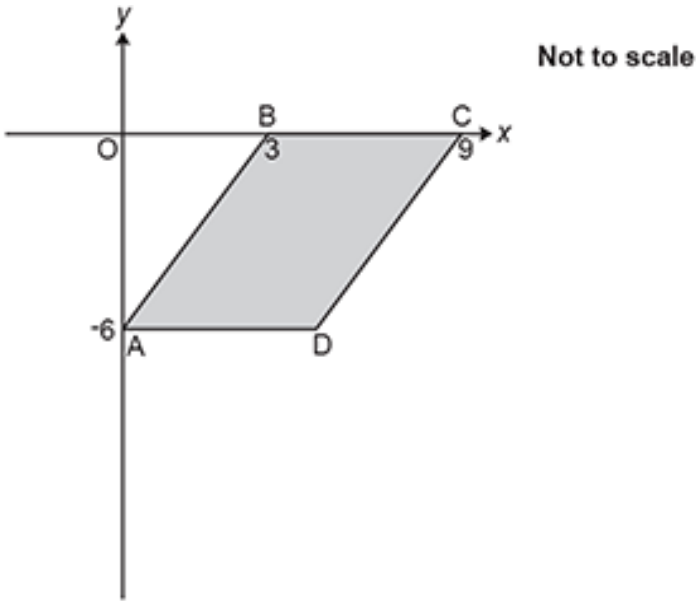
Write down the value of the y-intercept.

..... [1]

(b). Write down the x-coordinate of the turning point.

..... [1]

41. The graph shows a parallelogram ABCD.



A has coordinates (0, -6), B has coordinates (3, 0) and C has coordinates (9, 0).

Find the equation of the line that passes through the points C and D, giving your answer in the form $y = mx + c$.
You must show your working.

..... [5]

42(a). A straight line has the equation $y = 2x - 1$. Write down the gradient of the line.

..... [1]

(b). Here are the equations of four straight lines.

$y = 2x + 3$

$y = 1 - x$

$y = \frac{1}{2}x + 4$

$y = x - 1$

i. Which of the four straight lines is parallel to $y = 2x - 1$?

(i) [1]

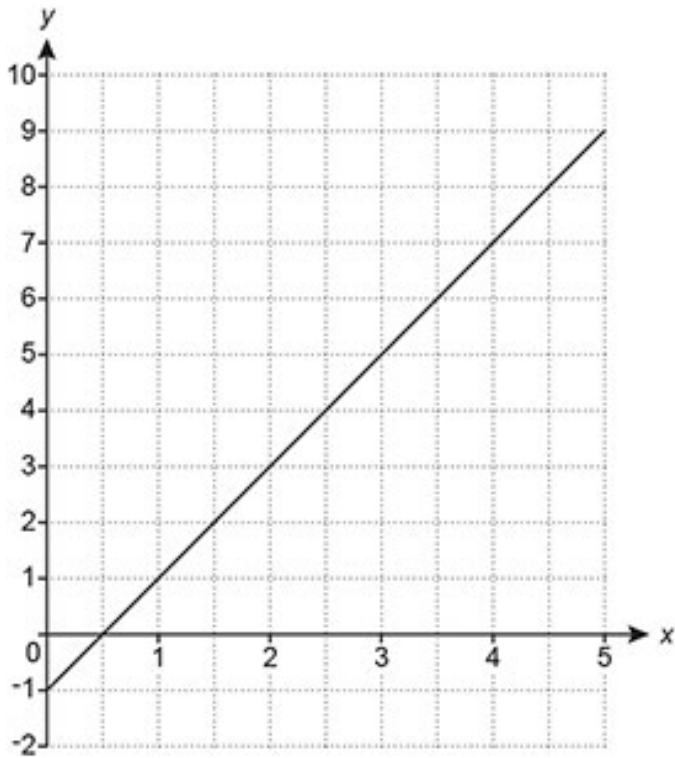
ii. A student says

$y = \frac{1}{2}x + 4$ is the steepest of the four straight lines because it has the largest number added.

Explain why the student is wrong.

..... [1]

(c). Here is part of the graph of $y = 2x - 1$.



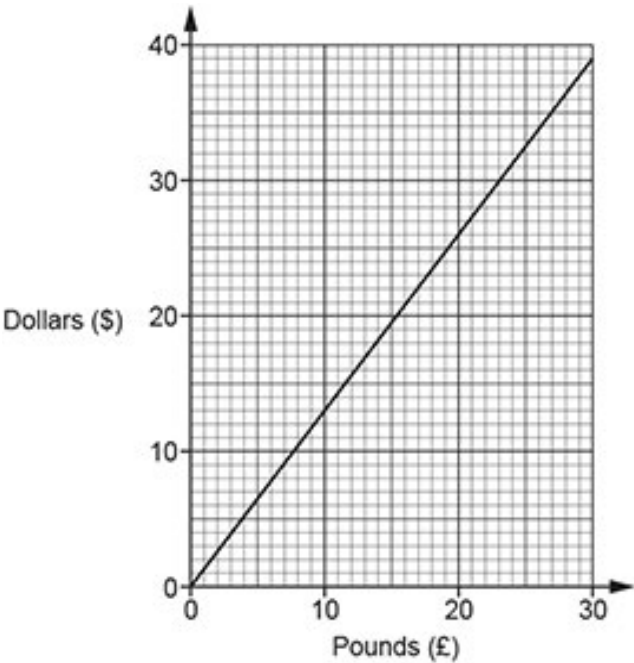
The line continues to the right.

Will the line pass above, below or through the point (45, 90)?
Show how you decide.

The line $y = 2x - 1$ will pass _____ the point (45, 90) because _____

[2]

43(a). A conversion graph between pounds (£) and dollars (\$) is shown below.



Explain fully how the graph shows that the number of dollars is directly proportional to the number of pounds.

[2]

(b). Use the conversion graph to change £20 into dollars.

\$ [1]

(c). Some trainers cost £170 in the UK.
The same trainers cost \$195 in the USA.

Show that the trainers cost less in the USA.

[4]

(d). If the trainers are brought from the USA there is an extra charge for tax and delivery.

Alex wants to pay the lowest total amount for the trainers.

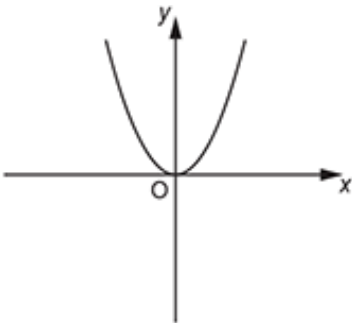
Write down the maximum extra charge for tax and delivery that Alex should be willing to pay.
Give your answer in dollars.

\$ [1]

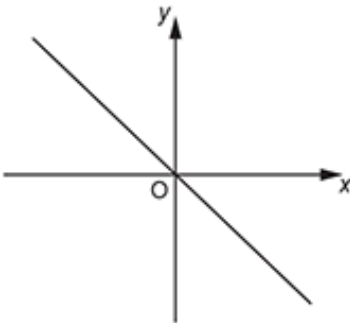
44. For each graph below, select its possible equation from this list.

- A $y = x^3$
- B $y = -2$
- C $y = -x$
- D $x = -2$
- E $y = x^2$
- F $y = 2x + 1$

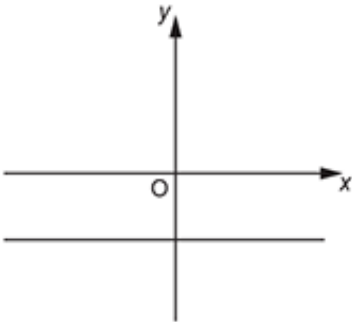
Write the letter of the equation beneath each graph.



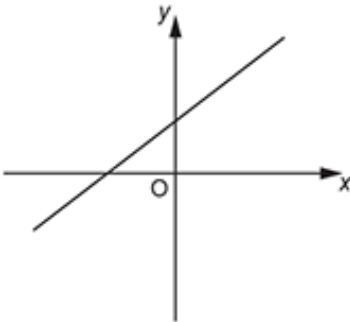
.....



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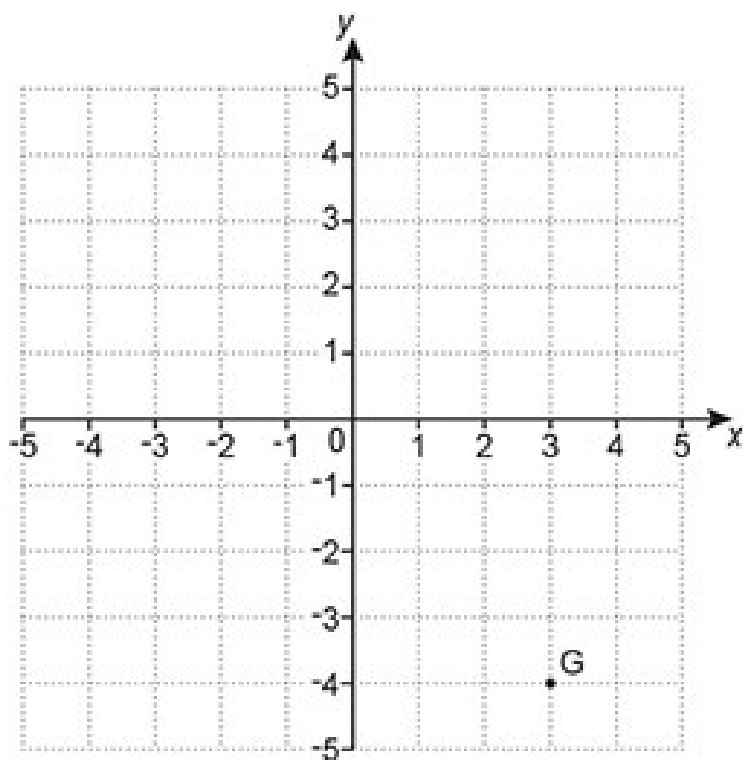


.....



.....

45(a). Point G is shown on this grid.



Write down the coordinates of point G.

(.....,) [1]

(b). Plot point H on the grid at $(-2, 4)$.

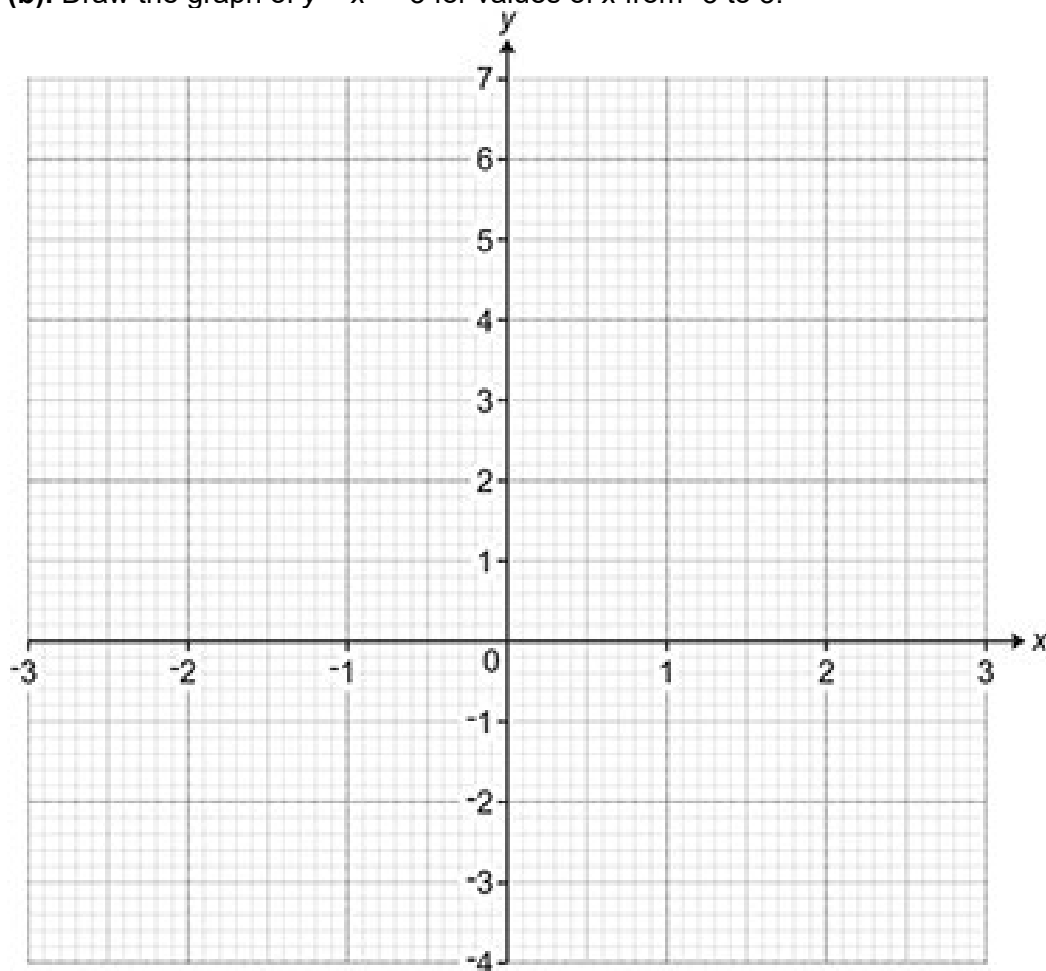
[1]

46(a). Complete this table for $y = x^2 - 3$.

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

[2]

(b). Draw the graph of $y = x^2 - 3$ for values of x from -3 to 3.

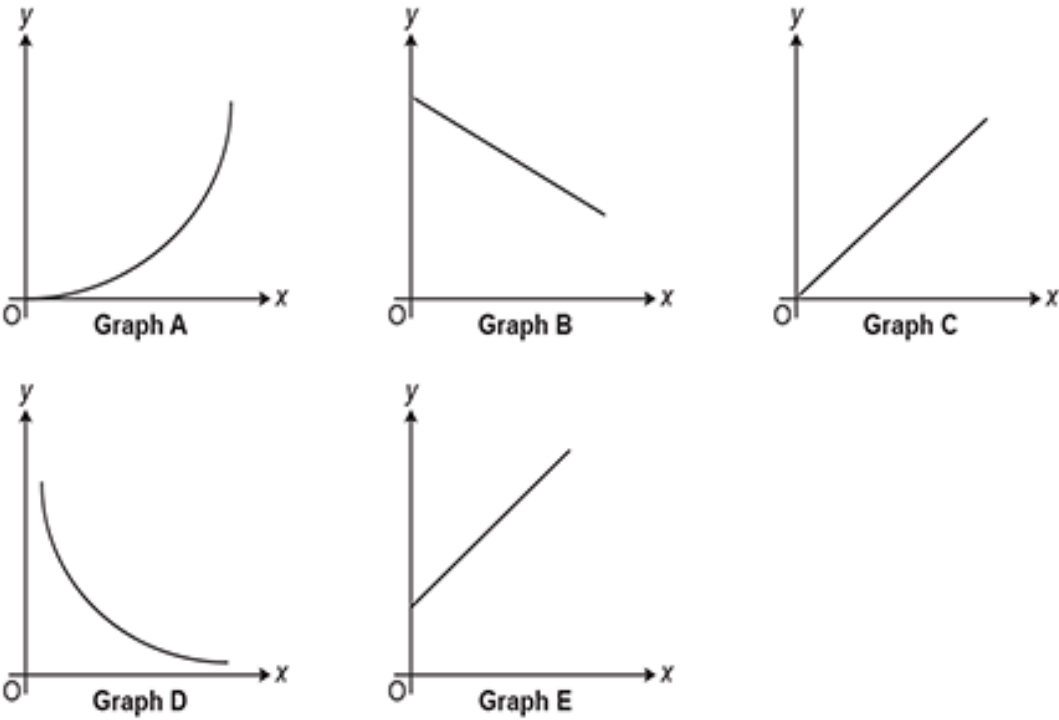


[3]

(c). Use your graph to solve $x^2 - 3 = 2$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [2]

47(a). Here are sketches of five graphs.



Write the letter of the graph that represents the following relationship.

y is directly proportional to x .

..... [1]

(b). y is inversely proportional to x .

..... [1]

END OF QUESTION PAPER