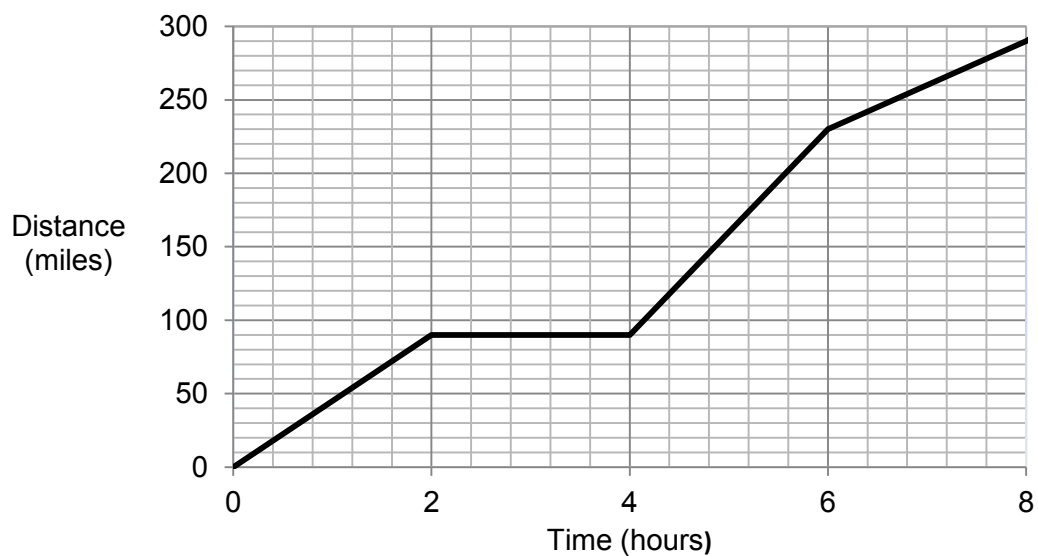
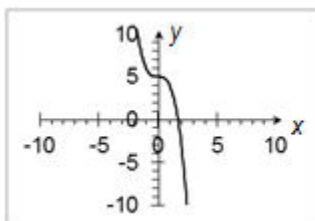


## OCR 07 Graphs of Equations and Functions (Foundation)

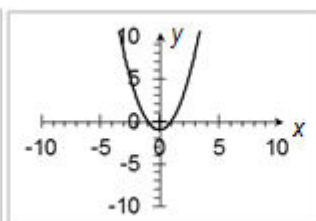
1. The equation of a straight line is  $y = 10 - 2x$ . Write down the gradient of the line.
2. The equation of a straight line is  $3y = 9x + 1$ . Find the coordinates of the point where the line intercepts the  $y$ -axis.
3. Use the graph below to calculate the speed during the first two hours of this journey.



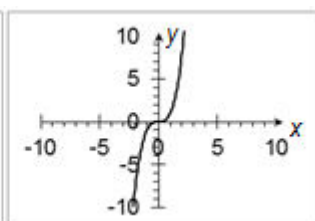
4. Which graph below shows the equation  $y = x^3$ ?



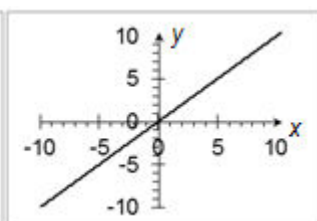
Graph 1



Graph 2

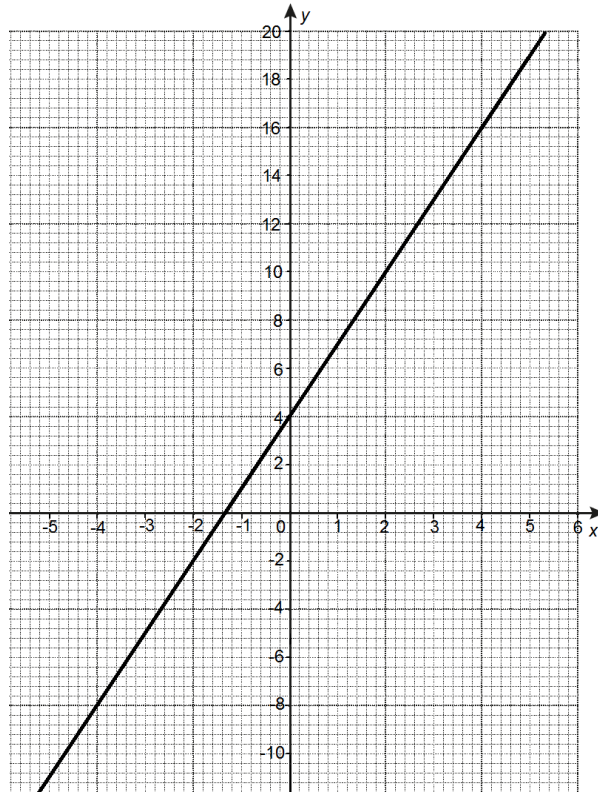


Graph 3

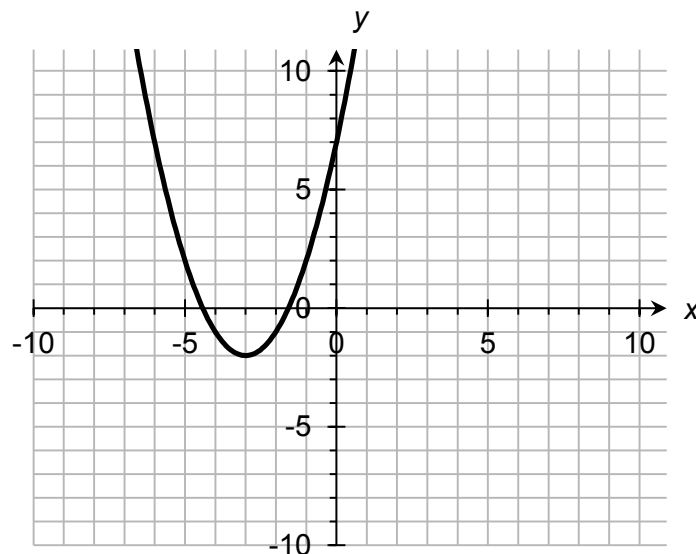


Graph 4

5. Find the equation of the straight line below.



6. Write down the coordinates of the turning point of the graph below.

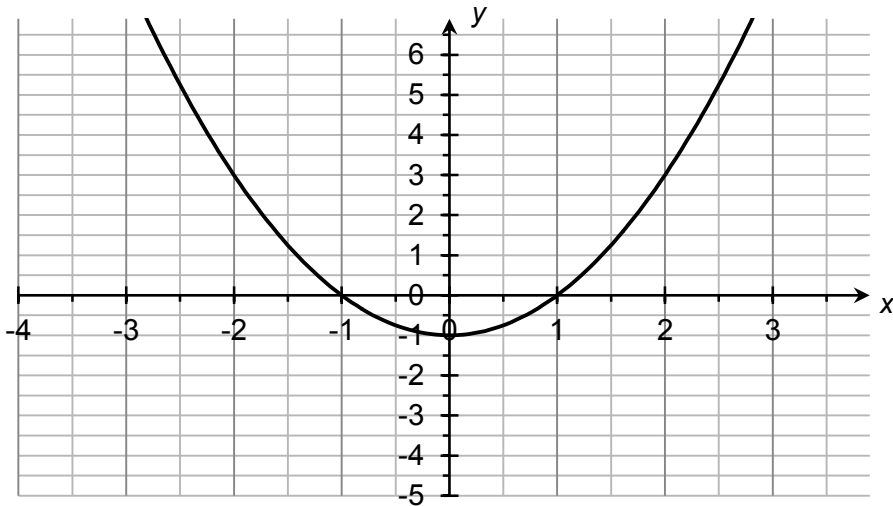


7. Find the equation of the line that is parallel to  $y = 5x + 7$  and that passes through the point  $(1, 3)$ .
8. Find the equation of the straight line that passes through the points  $(1, 11)$  and  $(3, 16)$ .
9. A graph has the equation  $y = 2x^2 - 18$ . Find the coordinates of the points where the line intercepts the x-axis.

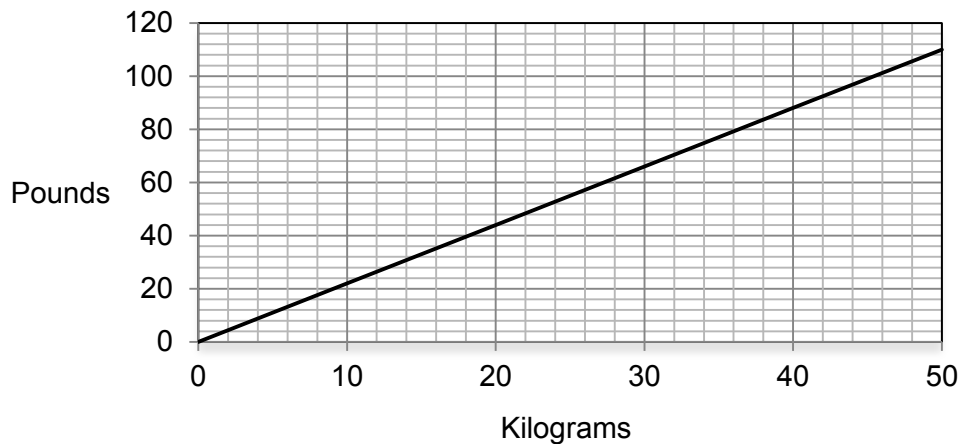
10. Complete the table below of values for  $y = x^3 - 3x$  and use this table to plot the graph.

$x$	-3	-2	-1	0	1	2	3
$y$	-18		2	0		2	

11. The graph below shows  $y = x^2 + x - 2$ . Explain how the graph can be used to find the solutions to the equation  $x^2 + x - 2 = 0$  and write down these solutions.



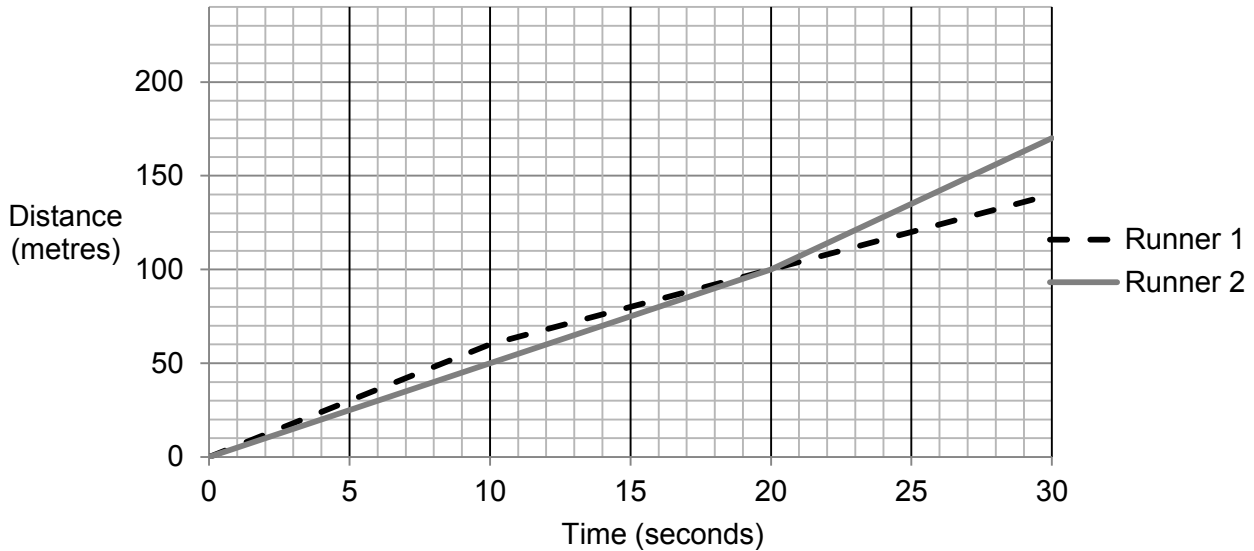
12. Jacob says that the graph below illustrates direct proportion. Is he correct? Explain your answer.



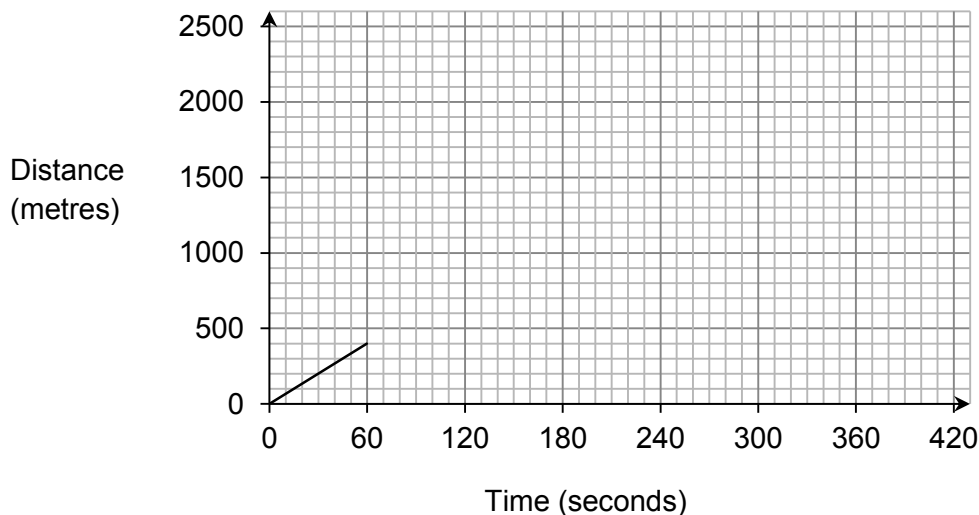
13. Mrs Bates travels from Liverpool to Leeds, which is a distance of 70 miles. During the first 30 minutes, she travels at a constant speed of 40 mph. She then stops for half an hour to pick up a friend. She then travels at a constant speed of 50 mph until she reaches Leeds. Draw a distance-time graph for Mrs Bates complete journey.

14. Ethan is asked to identify a straight line parallel to the line  $y = 3x + 2$ . His answer is  $y = 2 - 3x$ . Is he correct? Explain your answer.

15. Below is a distance-time graph for two runners over a time period of 30 seconds. Bella says that Runner 2 is faster than Runner 1 over the first 10 seconds but Runner 1 is faster than Runner 2 over the 30 seconds. Is she correct? Explain your answer.



16. The straight line  $y = 6$  crosses the graph  $y = x^2 + 2$  at two points. Find the coordinates of these two points.
17. Identify if  $\left(\frac{1}{2}, 8\frac{1}{2}\right)$ ,  $(4, 19)$  and  $(7, 29)$  are on a straight line.
18. The straight line  $y = 4x + 3$  goes through the points  $(a, -5)$  and  $(a^2 + 4, b)$ . Find the values of  $a$  and  $b$ .
19. ABCD is a rectangle. A is the point  $(5, 6)$ , B is the point  $(10, 6)$  and D is the point  $(5, 3)$ . Find the gradient of the line AC.
20. Corrida's record time for a 2400 metre distance race is 360 seconds. The distance-time graph below shows the first 400 m of her latest race. State whether you think she will beat her record time, along with any assumptions you make.



**Answers**

1. -2

2.  $(0, \frac{1}{3})$ 

3. 45 mph

4. Graph 3

5.  $y = 3x + 4$ 

6. (-3, -2)

7.  $y = 5x - 2$ 8.  $y = 2.5x + 8.5$ 9. Line intercepts the x-axis when  $y = 0$ .

$$0 = 2x^2 - 18$$

$$2x^2 = 18$$

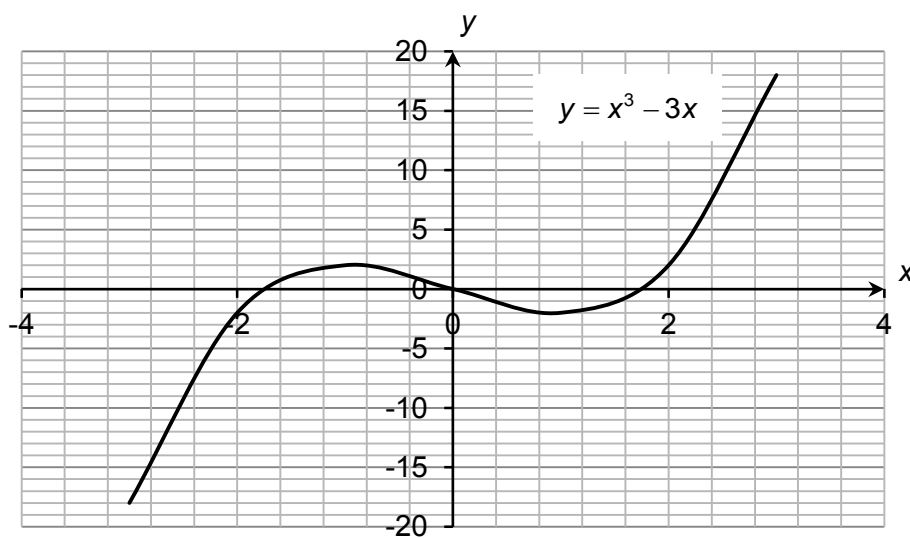
$$x^2 = 9$$

$$x = \pm 3$$

Coordinates of points are (3, 0) and (-3, 0).

10.

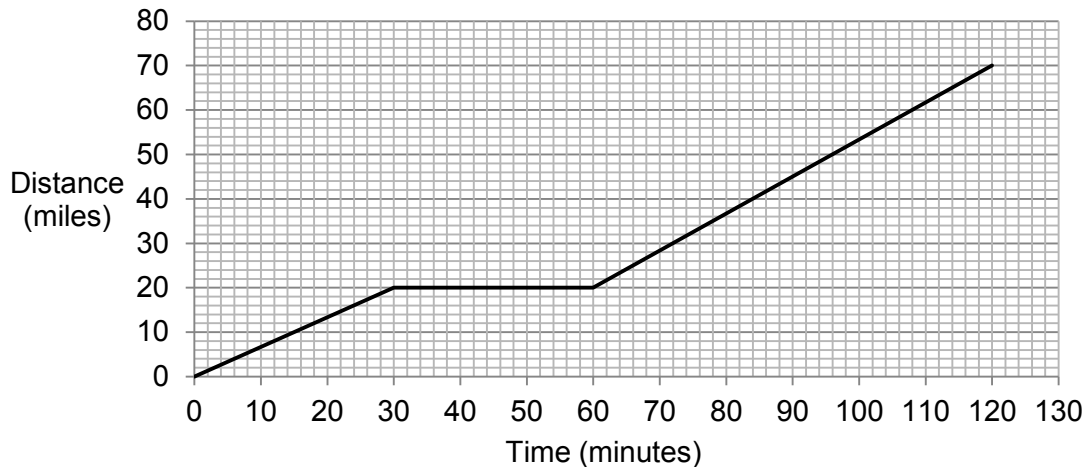
x	-3	-2	-1	0	1	2	3
y	-18	-2	2	0	-2	2	18



11. The solutions of the quadratic are the x-axis intercepts of the graph so the solutions are  $x = -2$  and  $x = 1$ .

12. Jacob is correct. The graph goes through  $(0, 0)$  and as the amount in kg increases, the amount in pounds also increases at a constant rate.

13.



14. The line  $y = 3x + 2$  has a gradient of 3 and the line  $y = 2 - 3x$  has a gradient of -3. The gradients are different so the lines are not parallel.

15. The statement is not correct as Runner 1 is faster than Runner 2 over the first 10 seconds but Runner 2 is faster than Runner 1 over the 30 seconds.

16.  $x^2 + 2 = 6$

$$x^2 = 4$$

$$x = \pm 2$$

Coordinates are  $(2, 6)$  and  $(-2, 6)$ .

17. No. The line between  $\left(\frac{1}{2}, 8\frac{1}{2}\right)$  and  $(4, 19)$  is  $y = 3x + 7$ , but the point  $(7, 29)$  is not on this line.

18. At  $(a, -5)$ :

$$-5 = 4a + 3$$

$$-8 = 4a$$

$$a = -2$$

$$(a^2 + 4, b) = (8, b)$$

At  $(8, b)$ :

$$b = 4 \times 8 + 3$$

$$b = 35$$

19. C is the point  $(10, 3)$

$$\text{Gradient} = \frac{6-3}{5-10} = -\frac{3}{5}$$

20. No, as she will probably not be able to keep up the same speed over the whole race distance as she has done in the first 400 m.

OR

Assuming she can keep the same speed over the whole distance, she should match her record.

We'd like to know your view on the resources we produce. By clicking on '[Like](#)' or '[Dislike](#)' you can help us to ensure that our resources work for you. When the email template pops up please add additional comments if you wish and then just click 'Send'. Thank you.

Whether you already offer OCR qualifications, are new to OCR, or are considering switching from your current provider/awarding organisation, you can request more information by completing the Expression of Interest form which can be found here:

[www.ocr.org.uk/expression-of-interest](http://www.ocr.org.uk/expression-of-interest)

Looking for a resource? There is now a quick and easy search tool to help find free resources for your qualification:

[www.ocr.org.uk/i-want-to/find-resources/](http://www.ocr.org.uk/i-want-to/find-resources/)

#### **OCR Resources: *the small print***

OCR's resources are provided to support the delivery of OCR qualifications, but in no way constitute an endorsed teaching method that is required by the Board, and the decision to use them lies with the individual teacher. Whilst every effort is made to ensure the accuracy of the content, OCR cannot be held responsible for any errors or omissions within these resources. This formative assessment resource has been produced as part of our free GCSE teaching and learning support package. All the GCSE teaching and learning resources, including delivery guides, topic exploration packs, lesson elements and more are available on the qualification webpages. If you are looking for examination practice materials, you can find Sample Assessment Materials (SAMs) and Practice Papers on the qualification webpage <http://www.ocr.org.uk/qualifications/gcse-mathematics-j560-from-2015/>

© OCR 2017 - This resource may be freely copied and distributed, as long as the OCR logo and this message remain intact and OCR is acknowledged as the originator of this work.

OCR acknowledges the use of the following content: n/a

Please get in touch if you want to discuss the accessibility of resources we offer to support delivery of our qualifications: [resources.feedback@ocr.org.uk](mailto:resources.feedback@ocr.org.uk)

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Find the gradient of a straight line using $y = mx + c$			
AO1	2	Find the intercept of a straight line using $y = mx + c$			
AO1	3	Interpret the gradient of a distance-time graph			
AO1	4	Recognise the graph of $y = x^3$			
AO1	5	Use $y = mx + c$ to find the equation of a straight line			
AO1	6	Identify a turning point			
AO1	7	Find the equation of a parallel line			
AO1	8	Find the equation of a line through two given points			
AO1	9	Identify intercepts of a quadratic graph			
AO1	10	Use a table of values to plot a polynomial graph			
AO2	11	Identify intercepts and explain how a graph can be used to find solutions to a quadratic equation			
AO2	12	Recognise a graph that illustrates direct proportion			
AO2	13	Construct a graph in a real-world context			
AO2	14	Use $y = mx + c$ to identify parallel lines			
AO2	15	Interpret a graph in a real-world context			
AO3	16	Find intercepts between a straight line and a quadratic graph			
AO3	17	Use $y = mx + c$ to identify straight lines			
AO3	18	Identify points on a straight line with algebra			
AO3	19	Solve a gradient problem			
AO3	20	Use gradient in context			

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Find the gradient of a straight line using $y = mx + c$			
AO1	2	Find the intercept of a straight line using $y = mx + c$			
AO1	3	Interpret the gradient of a distance-time graph			
AO1	4	Recognise the graph of $y = x^3$			
AO1	5	Use $y = mx + c$ to find the equation of a straight line			
AO1	6	Identify a turning point			
AO1	7	Find the equation of a parallel line			
AO1	8	Find the equation of a line through two given points			
AO1	9	Identify intercepts of a quadratic graph			
AO1	10	Use a table of values to plot a polynomial graph			
AO2	11	Identify intercepts and explain how a graph can be used to find solutions to a quadratic equation			
AO2	12	Recognise a graph that illustrates direct proportion			
AO2	13	Construct a graph in a real-world context			
AO2	14	Use $y = mx + c$ to identify parallel lines			
AO2	15	Interpret a graph in a real-world context			
AO3	16	Find intercepts between a straight line and a quadratic graph			
AO3	17	Use $y = mx + c$ to identify straight lines			
AO3	18	Identify points on a straight line with algebra			
AO3	19	Solve a gradient problem			
AO3	20	Use gradient in context			