GCSE Maths Quadratic and Other Graphs (Higher): check-up and exam-style questions: answers

GCSE Maths - Quadratic and Other Graphs - Higher - Test yourself

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at **websink.site/gcse/maths/ch13-quadratic-other-graphs/higher/check-up-and-exam-style-questions/**

Exercise 13Z Check-up (non-calculator) Non-calculator

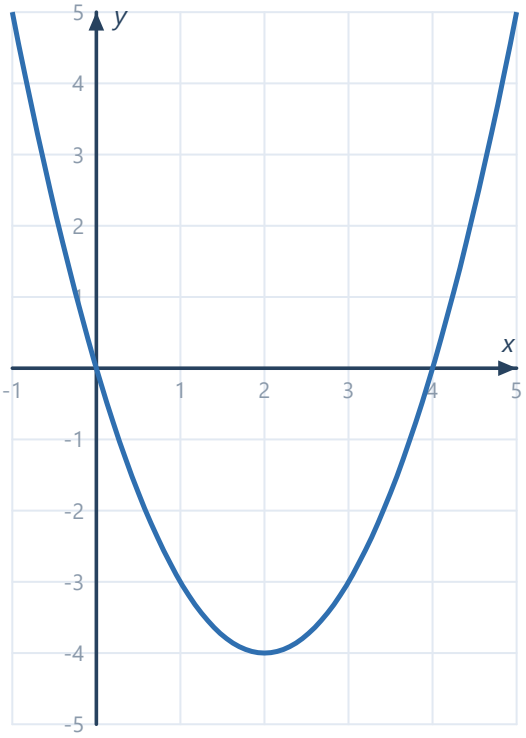
1 Complete the table of values for $y = x^2 - 3$.

x	−2	−1	0	1	2
y					

Answer:

x	−2	−1	0	1	2
y	1	−2	−3	−2	1

2 Here is the graph of $y = x^2 - 4x$. Write down (a) the roots, (b) the coordinates of the turning point.



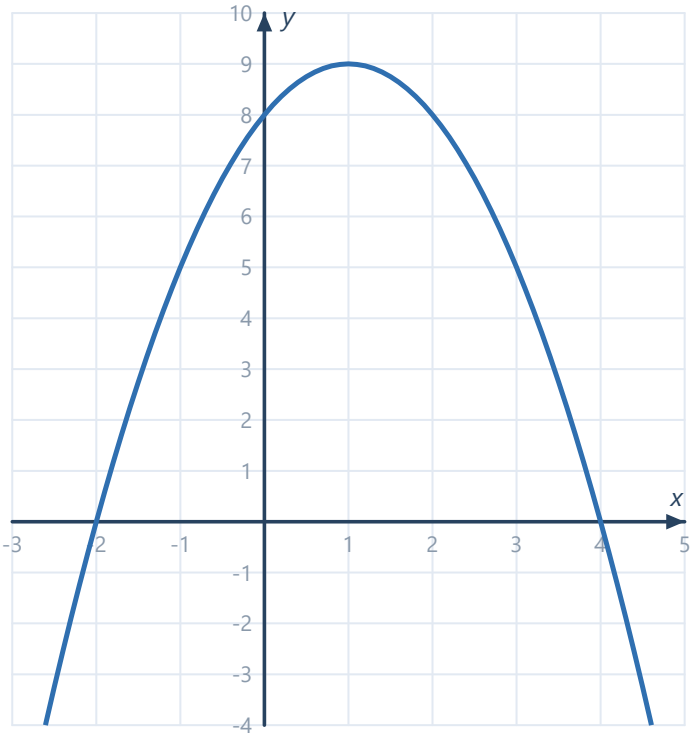
(a) the roots

Answer: $x = 0$ or 4

(b) the turning point

Answer: (2, −4)

3 **Here is the graph of $y = 8 + 2x - x^2$. Write down (a) the y-intercept, (b) the equation of the line of symmetry, (c) the maximum value of y.**



(a) the y-intercept

Answer: y-intercept = 8

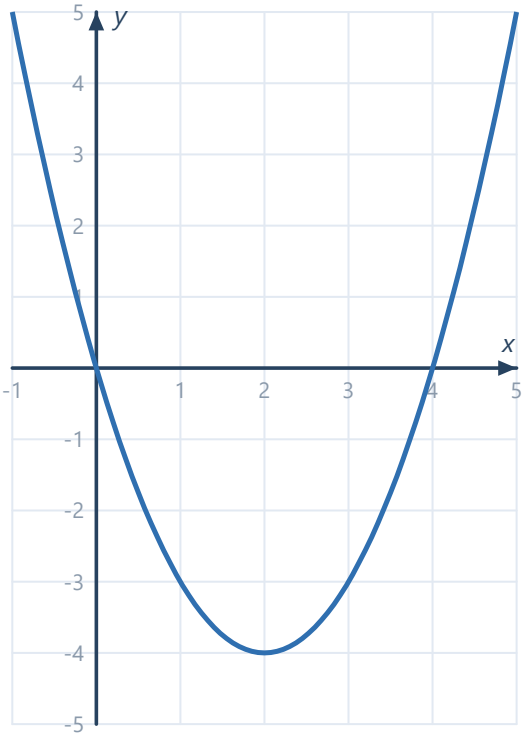
(b) the line of symmetry

Answer: $x = 1$

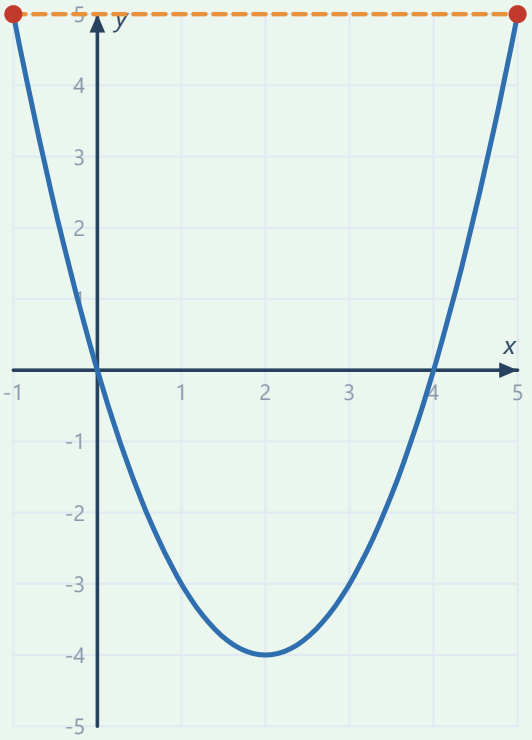
(c) the maximum value of y

Answer: maximum value of y = 9

4 **Use the graph of $y = x^2 - 4x$ (above) to solve $x^2 - 4x = 5$.**



Answer: $x = -1$ or 5



5 Name the type of graph for each equation and say what its shape is.

(a) $y = x^3 + 1$

Answer: Cubic: cubic curve rising from bottom-left to top-right

(b) $y = -x^2$

Answer: Quadratic: n-shaped parabola (has a highest point)

(c) $y = \frac{3}{x}$

Answer: Reciprocal: reciprocal curve in two branches, in the top-right and bottom-left parts of the grid

6 Complete the table of values for $y = x^3$.

x	−2	−1	0	1	2
y					

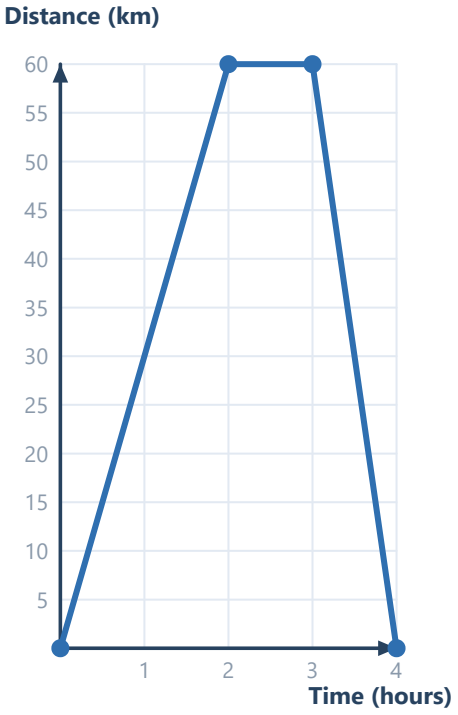
Answer:

x	−2	−1	0	1	2
y	−8	−1	0	1	8

7 Work out the value of y when $x = -3$ for $y = 12 \div x$.

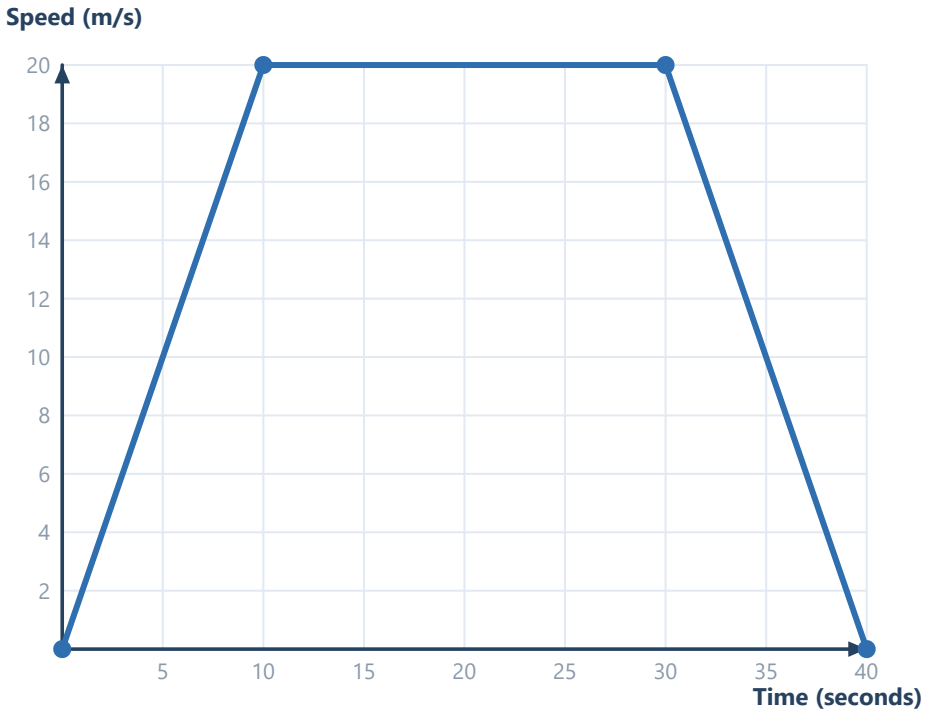
Answer: $y = -4$

8 Use the car journey graph to work out the speed on the way back (from 3 hours to 4 hours).



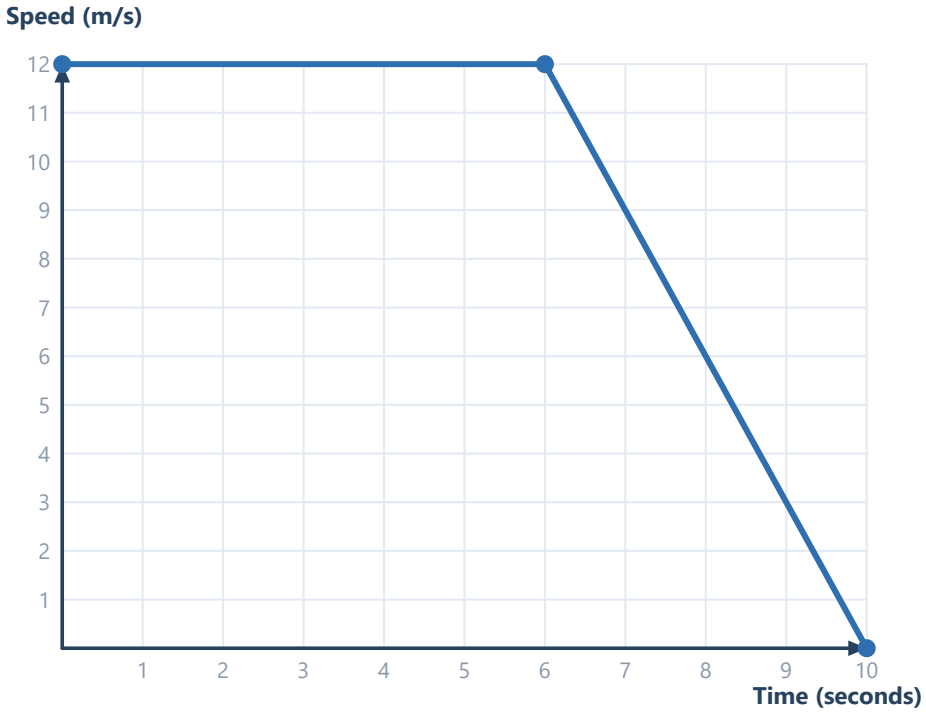
Answer: 60 km/h

9 Use the train's speed-time graph to work out its acceleration in the first 10 seconds.



Answer: 2 m/s^2

10 Use the lorry's speed-time graph to work out the total distance it travelled in 10 seconds.



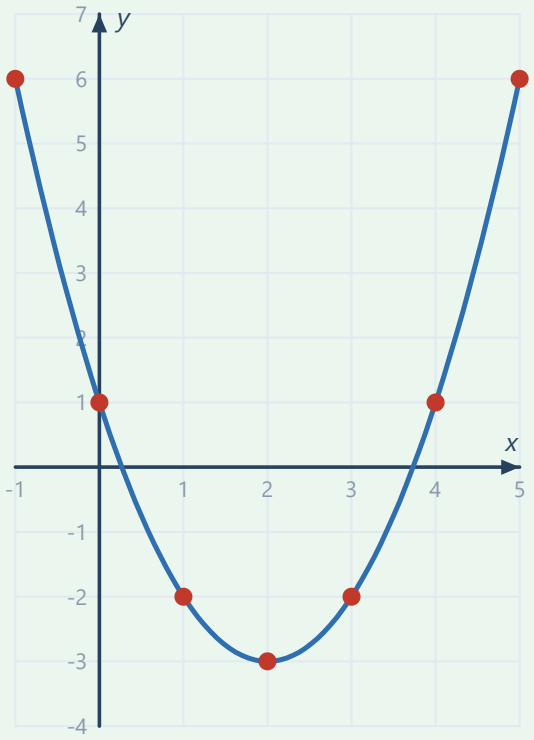
Answer: 96 m

Exercise 13X Exam-style questions Non-calculator

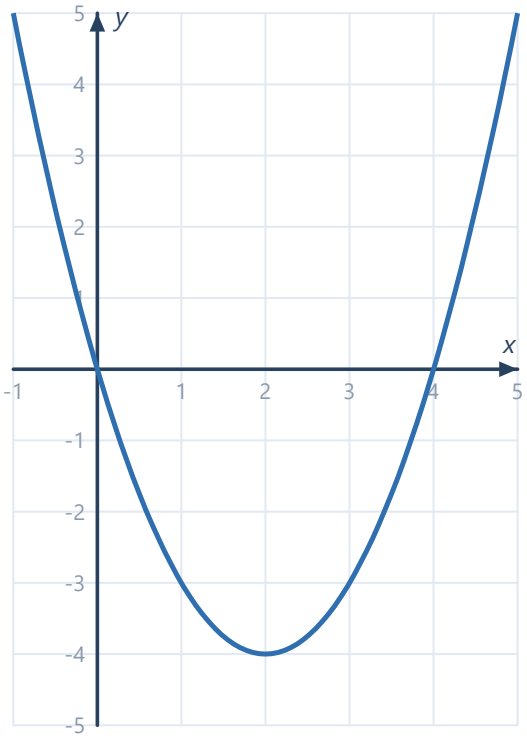
1 (a) Complete the table of values for $y = x^2 - 4x + 1$. (b) On a grid, draw the graph of $y = x^2 - 4x + 1$ for values of x from −1 to 5. (c) Write down the coordinates of the turning point of the graph. [4 marks]

x	−1	0	1	2	3	4	5
y		1		−3		1	

Answer: Points: (−1, 6), (0, 1), (1, −2), (2, −3), (3, −2), (4, 1), (5, 6). U-shaped, with its turning point at (2, −3).



2 The graph of $y = x^2 - 4x$ is shown. (a) Write down the roots of $x^2 - 4x = 0$. (b) Write down the equation of the line of symmetry. (c) Write down the coordinates of the turning point. [3 marks]



(a) the roots

Answer: $x = 0$ or 4

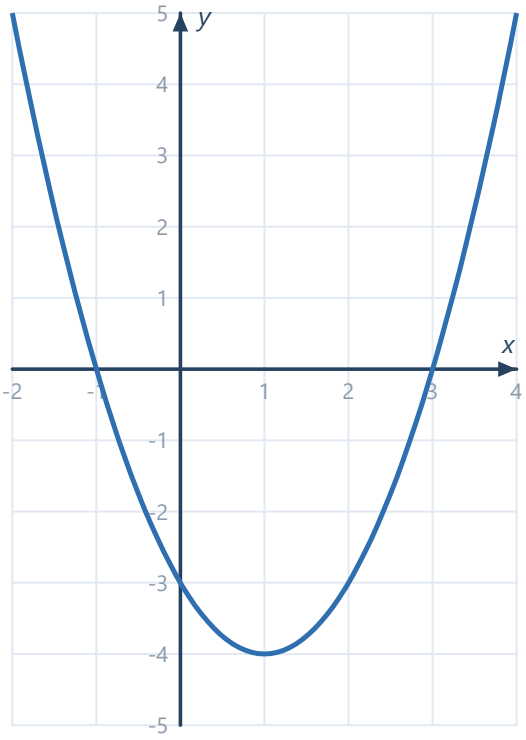
(b) the line of symmetry

Answer: $x = 2$

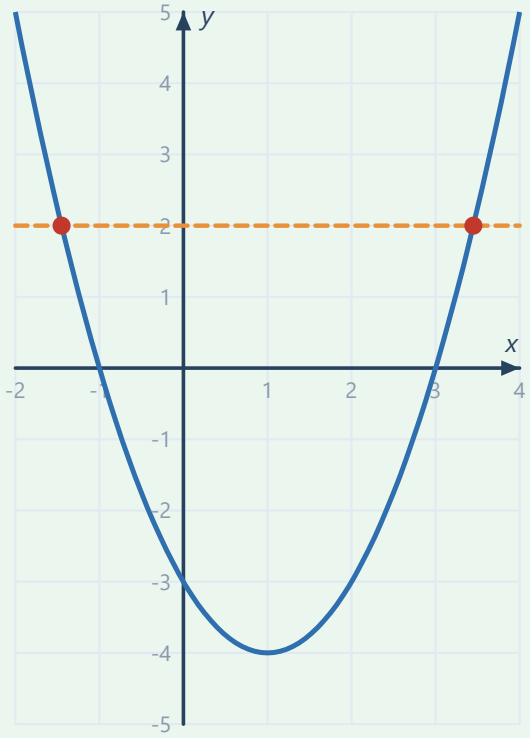
(c) the turning point

Answer: $(2, -4)$

3 The graph of $y = x^2 - 2x - 3$ is shown. Use it to find estimates of the solutions of $x^2 - 2x - 3 = 2$. Give your answers to 1 decimal place. [3 marks]

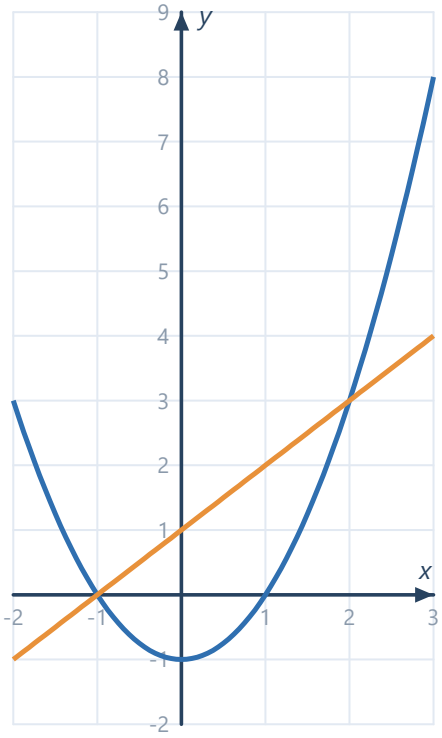


Answer: $x \approx -1.4$ or 3.4 (accept answers within 0.1)

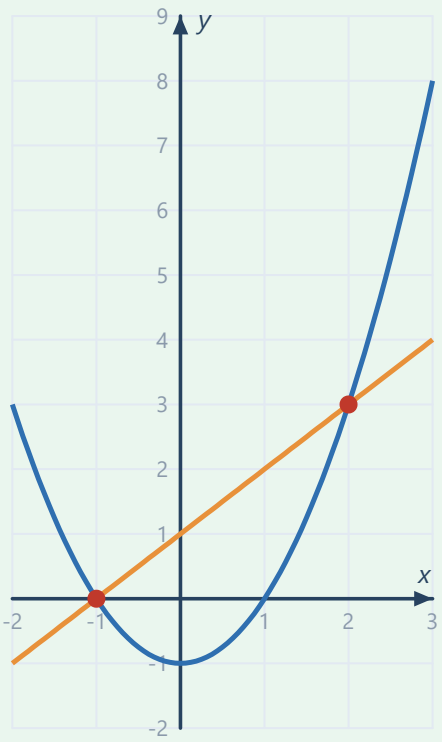


4 The graphs of $y = x^2 - 1$ and $y = x + 1$ are drawn on the grid. Use the graphs to solve $x^2 - 1 = x + 1$.

[3 marks]



Answer: $x = -1$ or 2



5 Here are four equations: A: $y = 4 - x$, B: $y = x^2 + 2$, C: $y = x^3$, D: $y = -4 \div x$. Write down the type of graph for each equation and describe its shape. [4 marks]

(a) A: $y = -x + 4$

Answer: Linear: straight line going down as you move right

(b) B: $y = x^2 + 2$

Answer: Quadratic: U-shaped parabola (has a lowest point)

(c) C: $y = x^3$

Answer: Cubic: cubic curve rising from bottom-left to top-right

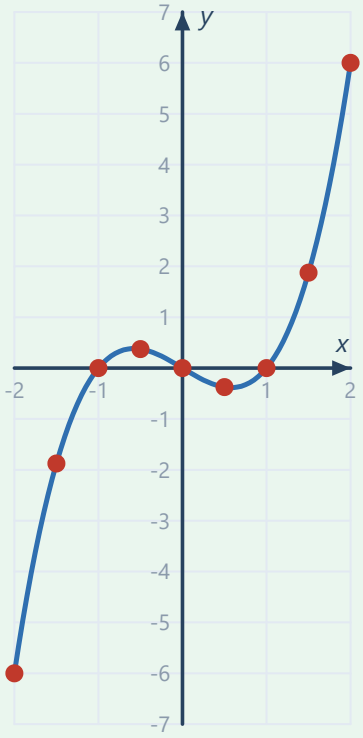
(d) D: $y = -\frac{4}{x}$

Answer: Reciprocal: reciprocal curve in two branches, in the top-left and bottom-right parts of the grid

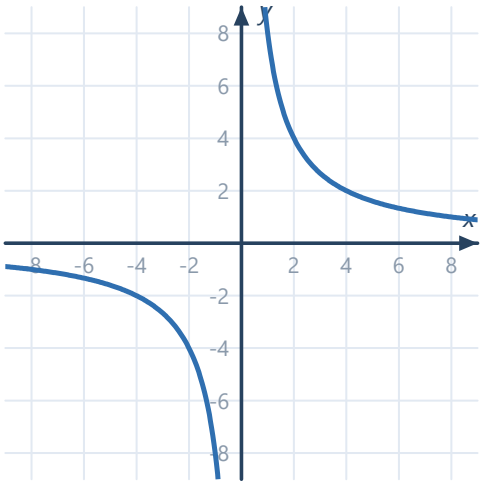
6 (a) Complete the table of values for $y = x^3 - x$. (b) Draw the graph of $y = x^3 - x$ for x from -2 to 2. [4 marks]

x	−2	−1.5	−1	−0.5	0	0.5	1	1.5	2
y		−1.875		0.375		−0.375		1.875	

Answer: Points: (−2, −6), (−1.5, −1.875), (−1, 0), (−0.5, 0.375), (0, 0), (0.5, −0.375), (1, 0), (1.5, 1.875), (2, 6).

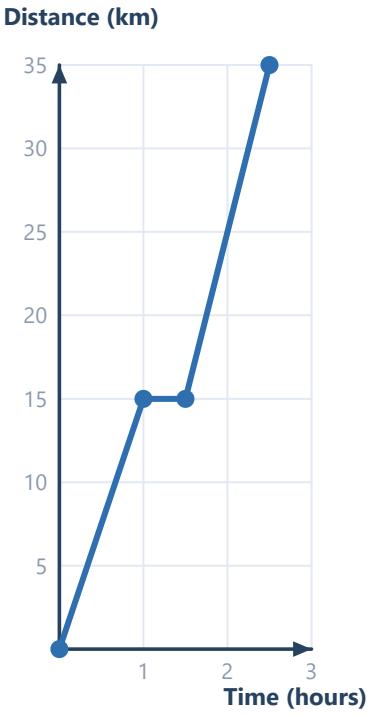


7 The graph of $y = 8 \div x$ is shown. Use it to find the value of x when $y = 3.2$. [2 marks]



Answer: $x = 2.5$

8 The graph shows a cycle ride. (a) Work out the speed in the first hour. (b) For how long did the cyclist stop? (c) Work out the average speed for the whole ride. [4 marks]



(a) the speed in the first hour

Answer: 15 km/h

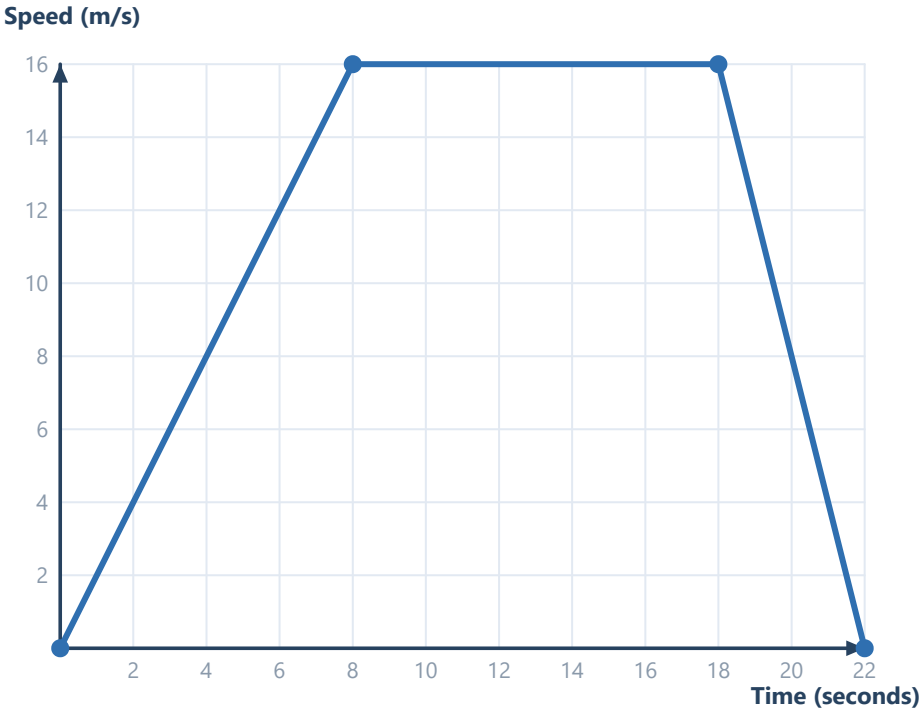
(b) how long the cyclist stopped

Answer: 0.5 hours

(c) the average speed

Answer: 14 km/h

9 The speed-time graph shows a car. (a) Work out the acceleration in the first 8 seconds. (b) Work out the total distance travelled by the car. [5 marks]



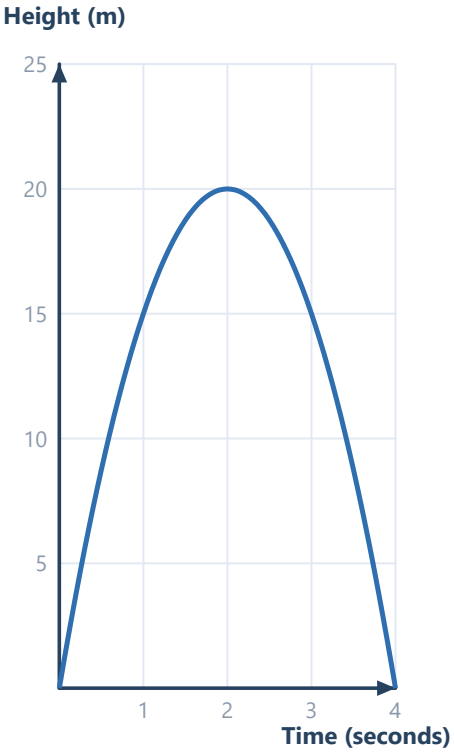
(a) the acceleration

Answer: 2 m/s^2

(b) the total distance

Answer: 256 m

10 The graph shows the height of a ball thrown upwards, $h = 20t - 5t^2$. (a) Write down the greatest height of the ball. (b) Find the times when the ball is 15 m above the ground. (c) For how long is the ball in the air? [3 marks]



(a) the greatest height

Answer: 20 m (at 2 s)

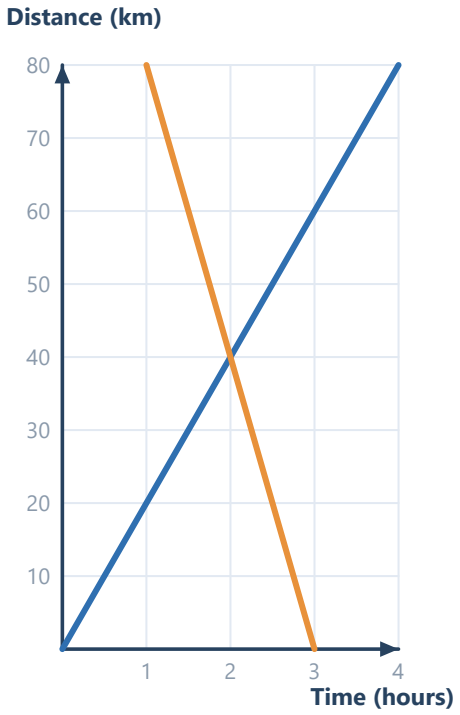
(b) the times at 15 m

Answer: 1 and 3 s

(c) time in the air

Answer: 4 s

11 Priya cycles from A to B, 80 km, at a steady speed. Quinn leaves B one hour later and travels towards A. Use the graph to find (a) when they meet, (b) how far from A they meet. [3 marks]



(a) when they meet

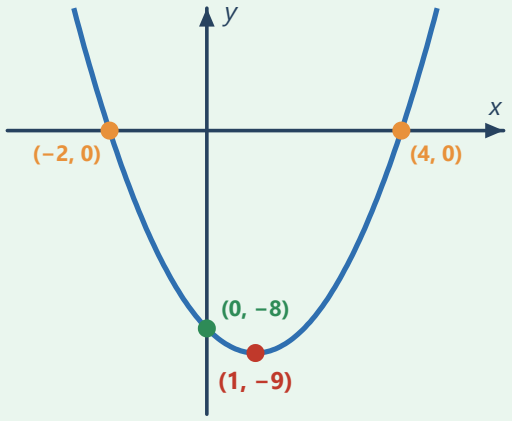
Answer: 2 hours after Priya leaves

(b) how far from A

Answer: 40 km

12 Sketch the graph of $y = x^2 - 2x - 8$. Show the coordinates of the points where the graph crosses the axes and of the turning point. [4 marks]

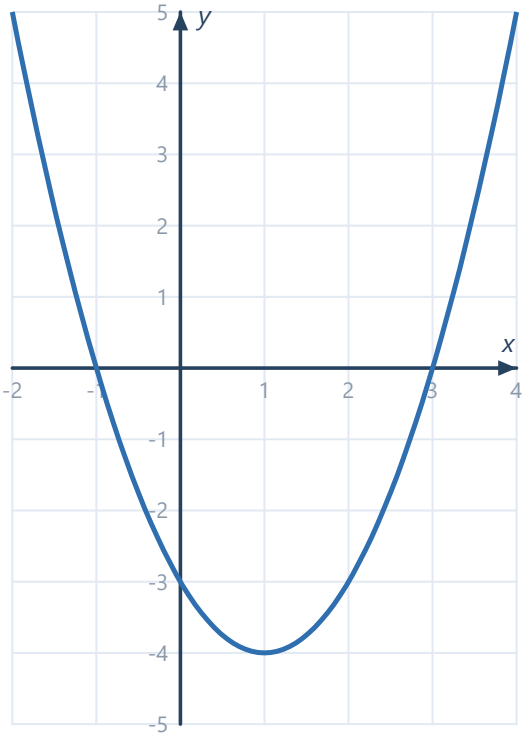
Answer: U-shaped; y-intercept (0, −8); roots (−2, 0) and (4, 0); turning point (1, −9).



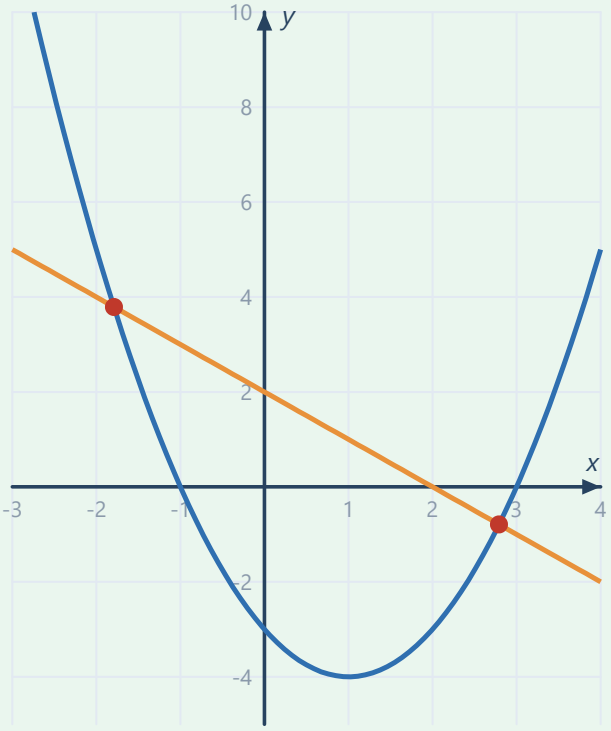
13 (a) Write $x^2 + 8x + 3$ in the form $(x + p)^2 + q$. (b) Write down the coordinates of the turning point of the graph of $y = x^2 + 8x + 3$. [3 marks]

Answer: (−4, −13)

14 The graph of $y = x^2 - 2x - 3$ is shown. By drawing a suitable straight line on the grid, find estimates of the solutions of $x^2 - x - 5 = 0$. [4 marks]



Answer: $x \approx -1.8$ or 2.8 (accept answers within 0.1)



15 Solve $x^2 - 4x + 1 = 0$ by completing the square. Give your answers in the form $a \pm \sqrt{b}$. [3 marks]

Answer: $x = 2 \pm \sqrt{3}$

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