

Name: _____

Level 2 Further Maths

Quadratic Graphs



Corbettmaths

Ensure you have: Pencil or pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Revision for this topic

www.corbettmaths.com/more/further-maths/

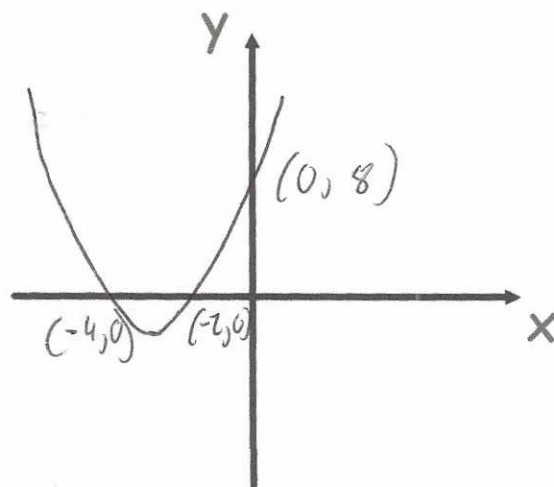


1. Sketch the graph of $y = x^2 + 6x + 8$
Clearly show the coordinates of any points of intersection with the axes.

$$(x+2)(x+4) \quad x=0 \quad 0^2 + 0 + 8$$

$$x = -2 \quad x = -4 \quad y = 8 \quad (0, 8)$$

$$(-2, 0) \quad (-4, 0)$$



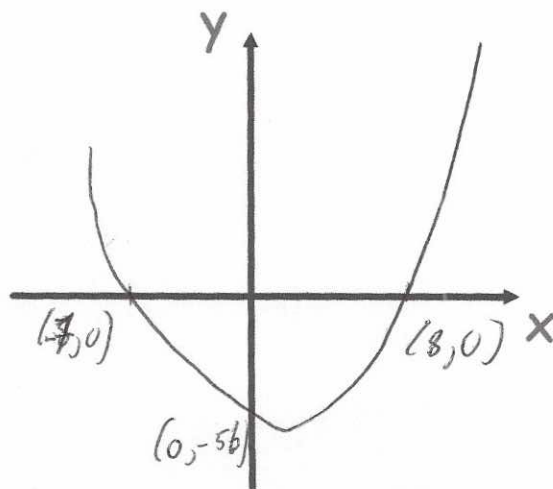
(3)

2. Sketch the graph of $y = x^2 - x - 56$
Clearly show the coordinates of any points of intersection with the axes.

$$(x-8)(x+7)$$

$$x = 8 \quad x = -7$$

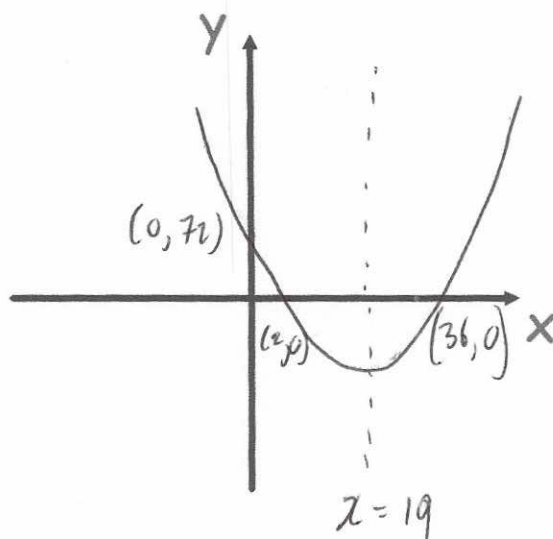
$$(8, 0) \quad (-7, 0)$$



(3)

3. (a) Sketch the graph of $y = x^2 - 38x + 72$
Clearly show the coordinates of any points of intersection with the axes.

$$\begin{aligned} (x-36)(x-2) & \quad 0^2 - 0 + 72 \\ x=36 \quad x=2 & \quad (0, 72) \\ (36, 0) \quad (2, 0) & \end{aligned}$$



(3)

- (b) Work out the equation of the line of symmetry of the graph of $y = x^2 - 38x + 72$

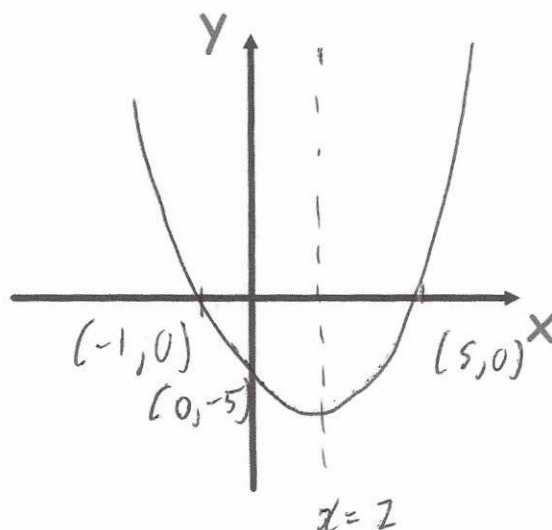
$$x = 19$$

(1)

4. (a) Sketch the graph of $y = x^2 - 4x - 5$
Clearly show the coordinates of any points of intersection with the axes.

$$(x-5)(x+1) \quad (0, -5)$$

$$(5, 0) \quad (-1, 0)$$



(3)

- (b) Work out the equation of the line of symmetry of the graph of $y = x^2 - 4x - 5$

$$x = 2$$

(1)

- (c) Use your answer to (b) to find the coordinates of the minimum point of $y = x^2 - 4x - 5$

$$y = 2^2 - 4 \times 2 - 5$$

$$y = -9$$

$$(2, -9)$$

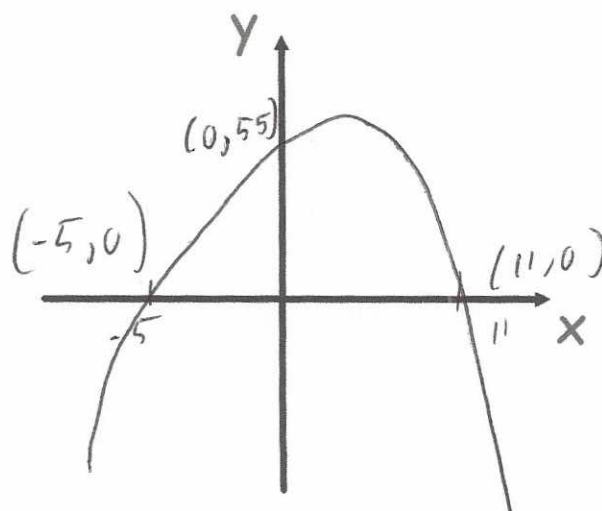
(2)

5. Sketch the graph of $y = -x^2 + 6x + 55$
Clearly show the coordinates of any points of intersection with the axes.

$$x^2 - 6x - 55$$

$$(x-11)(x+5)$$

$$x=11 \quad x=-5$$

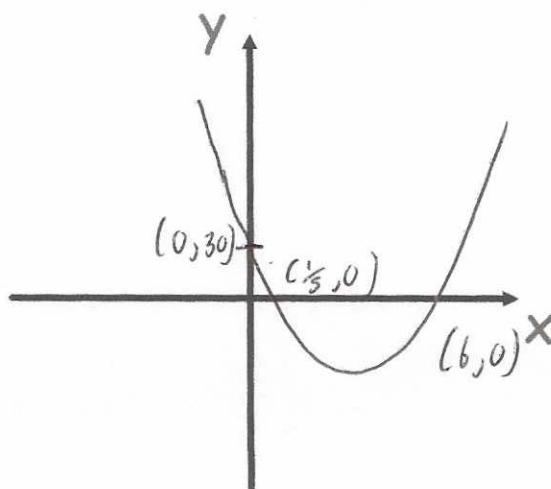


(3)

6. Sketch the graph of $y = 5x^2 - 31x + 30$
Clearly show the coordinates of any points of intersection with the axes.

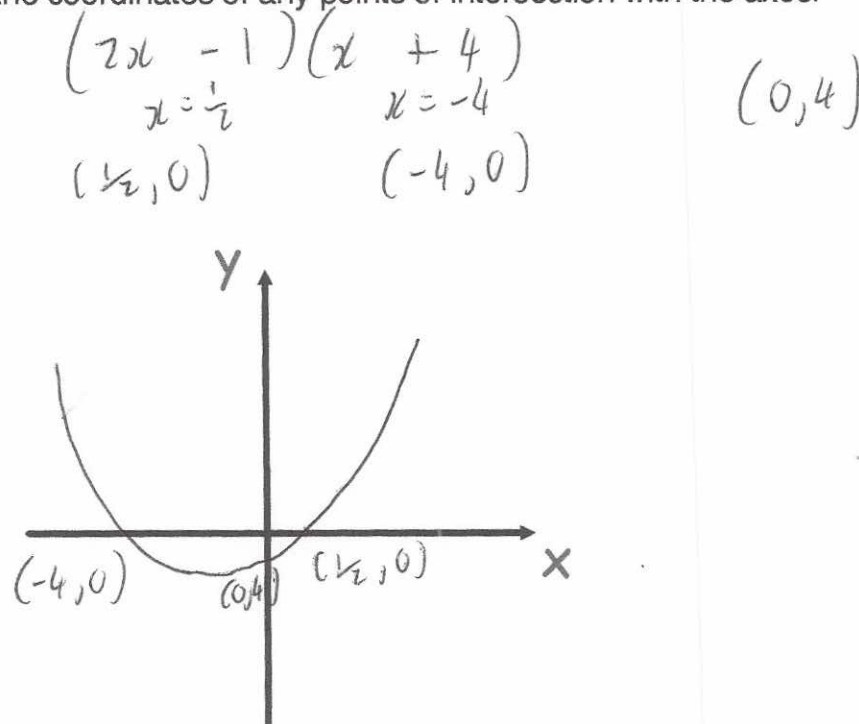
$$(5x-6)(x-5)$$

$$x = \frac{6}{5} \quad x=5$$



(4)

7. Sketch the graph of $y = 2x^2 + 7x - 4$
Clearly show the coordinates of any points of intersection with the axes.



(3)

- (b) Work out the equation of the line of symmetry of the graph of $y = 2x^2 + 7x - 4$

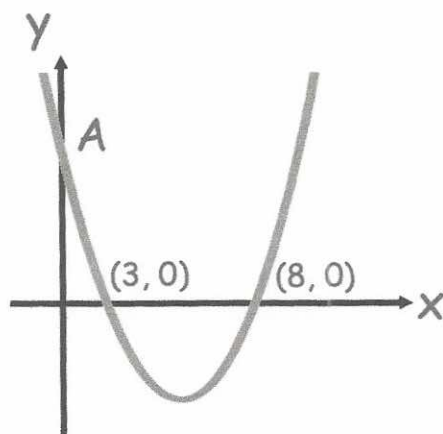
$$\frac{-4 + 0.5}{2}$$

$$x = -1.75$$

.....

(1)

8. Shown is the graph of $y = x^2 + bx + c$



- (a) Find the values of b and c

$$y = (x-3)(x-8)$$

$$y = x^2 - 11x + 24$$

$$b = -11 \quad c = 24$$

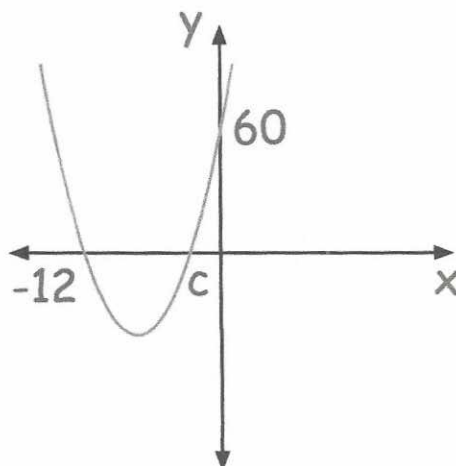
(2)

- (b) Find the coordinates of point A

$$(0, 24)$$

(2)

9. Shown is the graph of $y = x^2 + ax + b$



- (a) Find the values of a and b

$$(x+12)(x+p) = x^2 + ax + 60$$

$$p = 5$$

$$x^2 + 17x + 60$$

$$a = 17$$

$$b = 60$$

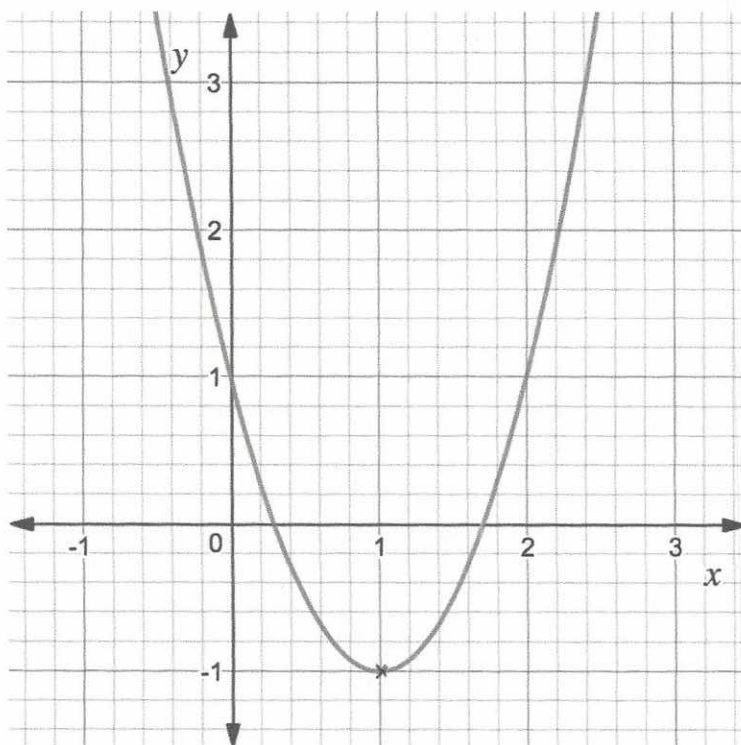
(2)

- (b) Find the coordinates of point c

$$(-5, 0)$$

(2)

11. Shown below is the graph of $y = 2x^2 - 4x + 1$



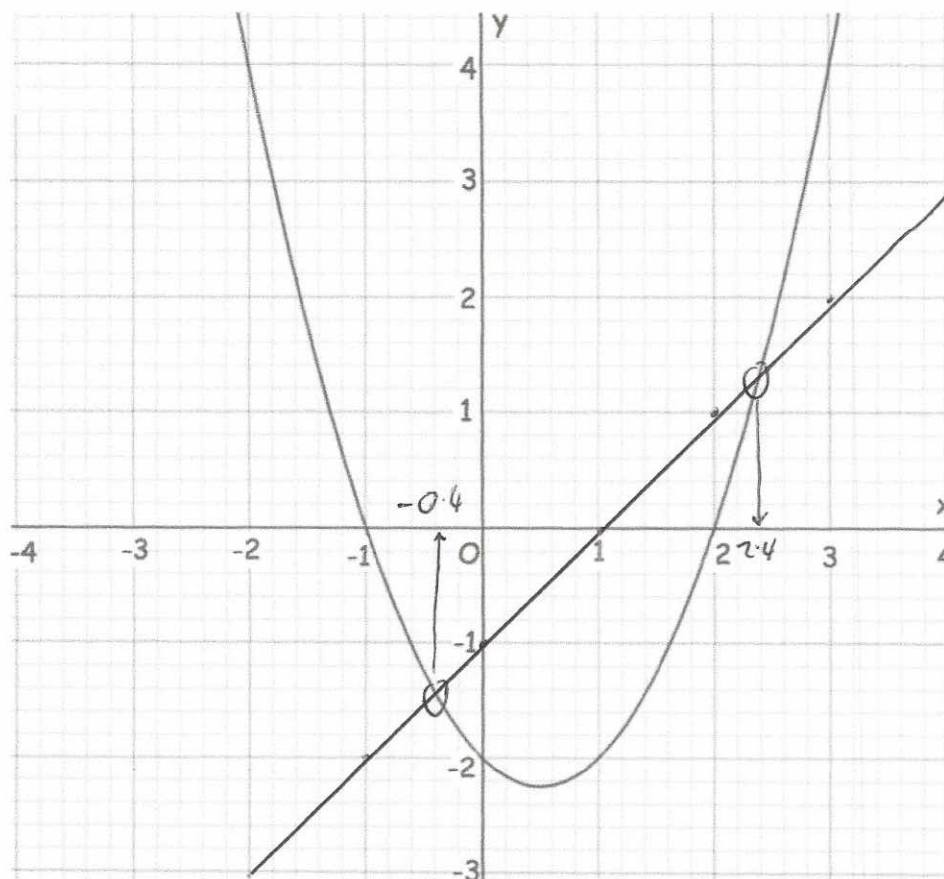
The graph of $2x^2 - 4x + 1 = k$ has exactly one solution.

Use the graph to find the value of k

$$k = -1$$

(2)

12. Shown below is $y = x^2 - x - 2$



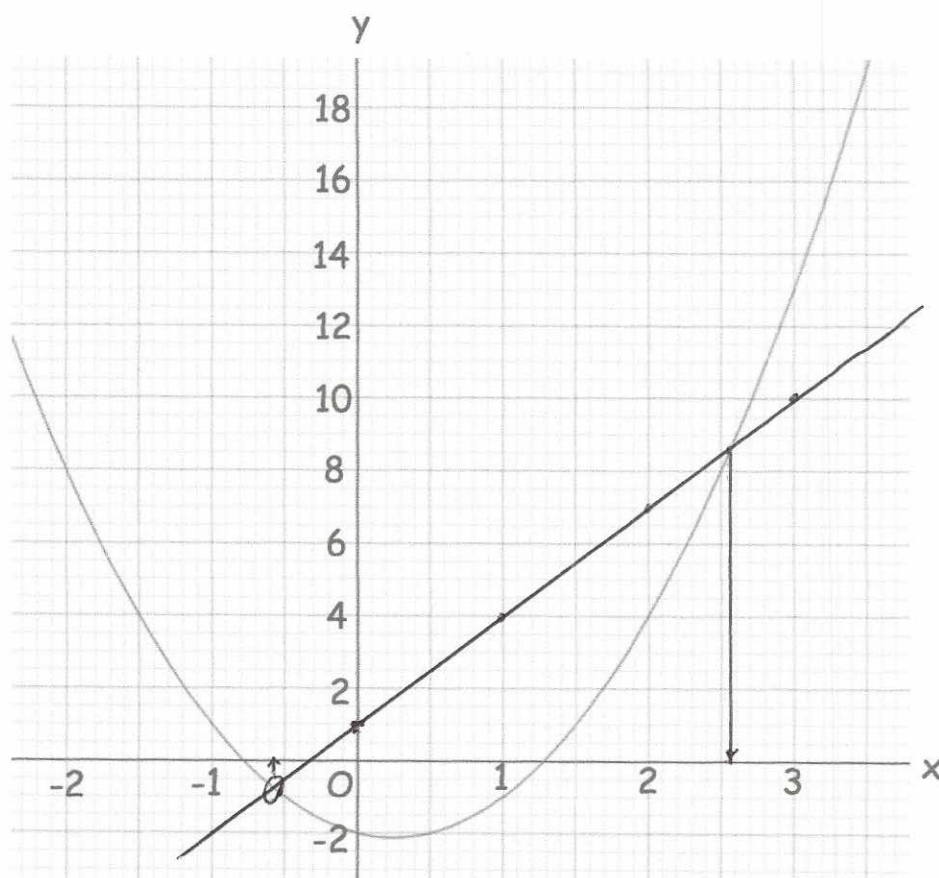
By drawing an appropriate straight line, use your graph to find estimates for the solutions of $x^2 - 2x - 1 = 0$

$$\begin{array}{r}
 y = x^2 - x - 2 \\
 0 = x^2 - 2x - 1 \\
 \hline
 y = x - 1
 \end{array}$$

$$x = -0.4 \text{ or } x = 2.4$$

(4)

13. Shown below is $y = 2x^2 - x - 2$



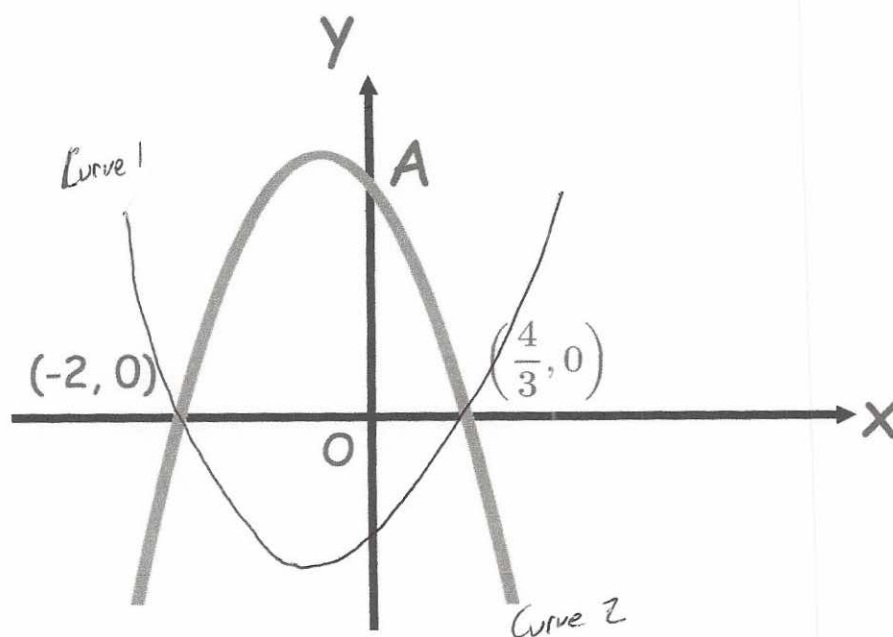
By drawing an appropriate straight line, use your graph to find estimates for the solutions of $2x^2 - 4x - 3 = 0$

$$\begin{array}{r}
 y = 2x^2 - x - 2 \\
 - \\
 0 = 2x^2 - 4x - 3 \\
 \hline
 y = 3x + 1
 \end{array}$$

$$x = -0.6 \text{ or } x = 2.55$$

.....
(4)

14. Here is the graph of $y = a + bx - 3x^2$



Work out the coordinates of the point A.

Curve 1

$$y = (x+2)(3x-4)$$

$$y = 3x^2 - 4x + 6x - 8$$

$$y = 3x^2 + 2x - 8$$

Curve 2

$$y = -3x^2 - 2x + 8$$

$$y = 8 - 2x - 3x^2$$

$$a = 8$$

$$b = -2$$

(4)