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.

$(x+2)(x+4)$

$x = -2 \quad x = -4$

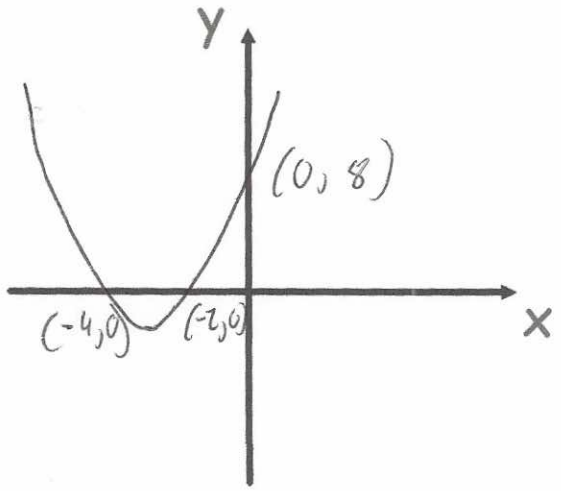
$(-2, 0) \quad (-4, 0)$

$x = 0$

$0^2 + 0 + 8$

$y = 8$

$(0, 8)$



(3)

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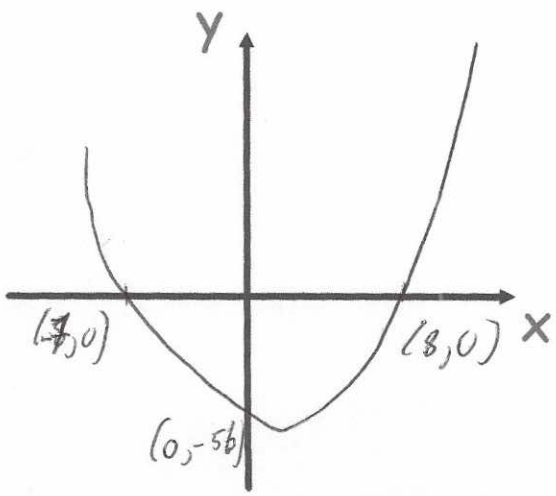
2. Sketch the graph of $y = x^2 - x - 56$

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.

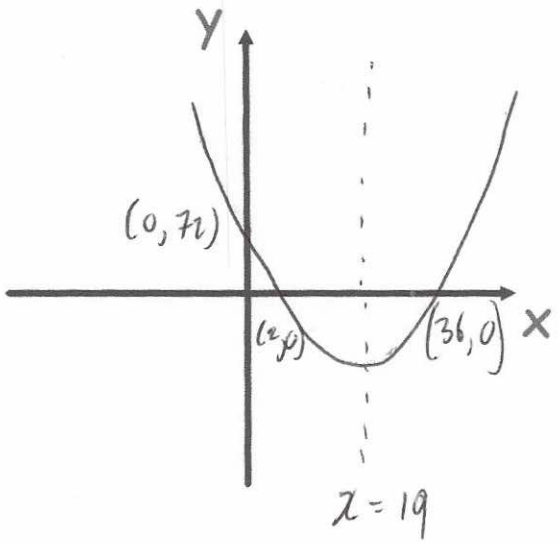
$(x-36)(x-2)$

$x=36 \quad x=2$

$(36,0) \quad (2,0)$

$0^2 - 0 + 72$

$(0,72)$



(3)

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

$x = 19$

.....

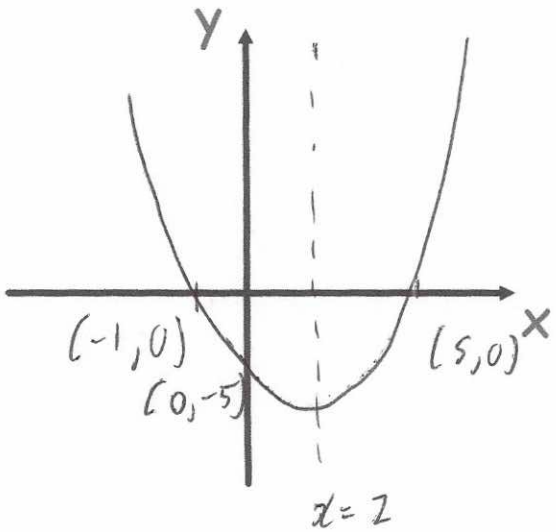
(1)

4. (a) Sketch the graph of $y = x^2 - 4x - 5$

Clearly show the coordinates of any points of intersection with the axes.

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

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



(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)

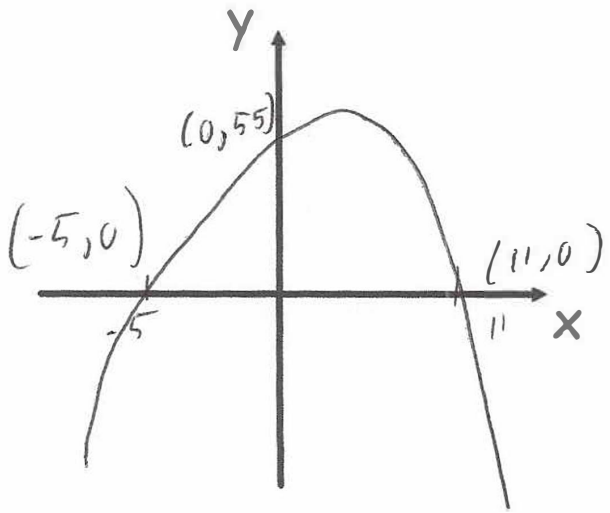
5. Sketch the graph of $y = -x^2 + 6x + 55$

Clearly show the coordinates of any points of intersection with the axes.

$x^2 - 6x - 55$

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

$x = 11 \quad x = -5$



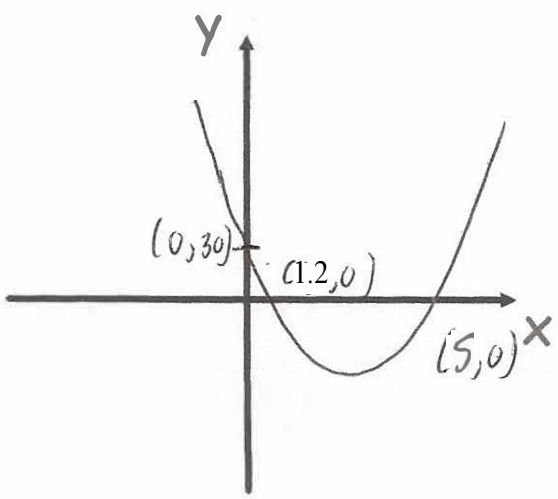
(3)

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 $y = 2x^2 + 7x - 4$

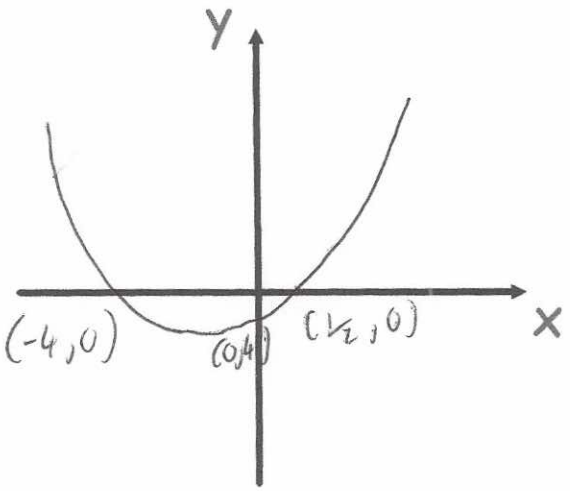
Clearly show the coordinates of any points of intersection with the axes.

$(2x - 1)(x + 4)$

$x = \frac{1}{2}$ $\quad$ $x = -4$

$(\frac{1}{2}, 0)$ $\quad$ $(-4, 0)$

$(0, 4)$



(3)

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

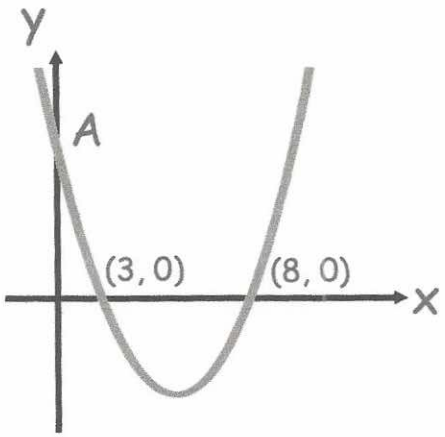
$\frac{-4 + 0.5}{2}$

$x = -1.75$

.....

(1)

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



(a) Find the values of b and c

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

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

$b = -11 \quad c = 24$

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(2)

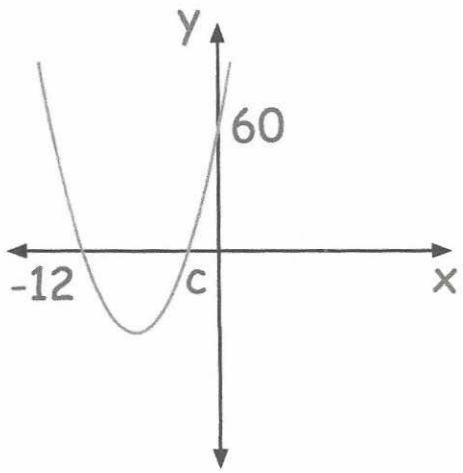
(b) Find the coordinates of point A

$(0, 24)$

.....

(2)

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



(a) Find the values of a and b

$b = 60$

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

$p = 5$

$x^2 + 17x + 60$

$a = 17$

$b = 60$

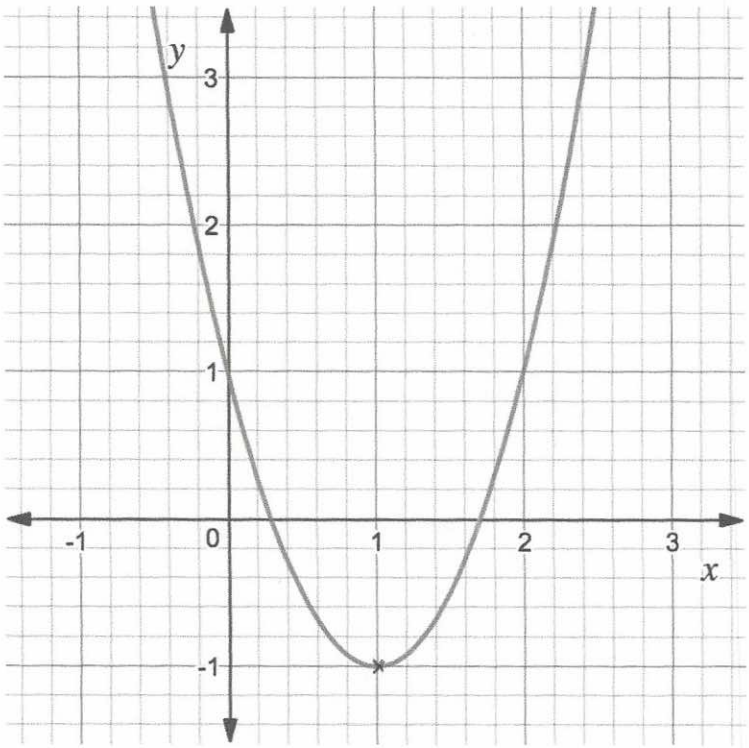
(2)

(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

$k = -1$

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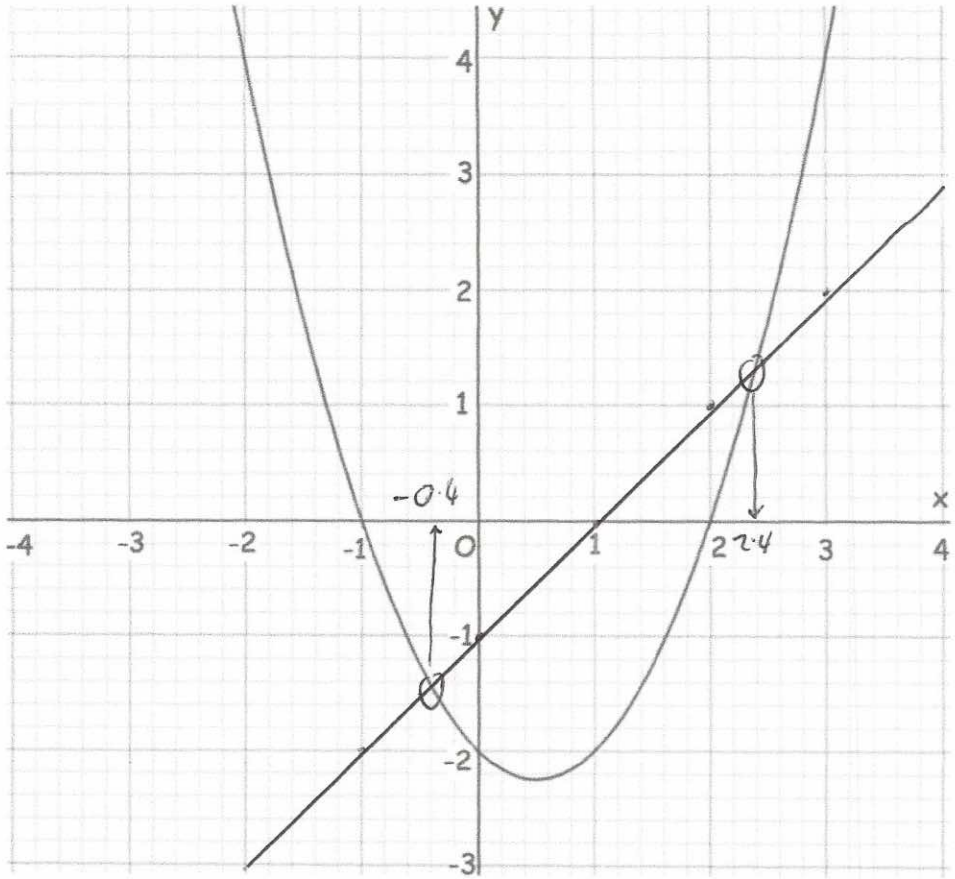
(2)

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 $x^2 - 2x - 1 = 0$

$y = x^2 - x - 2$

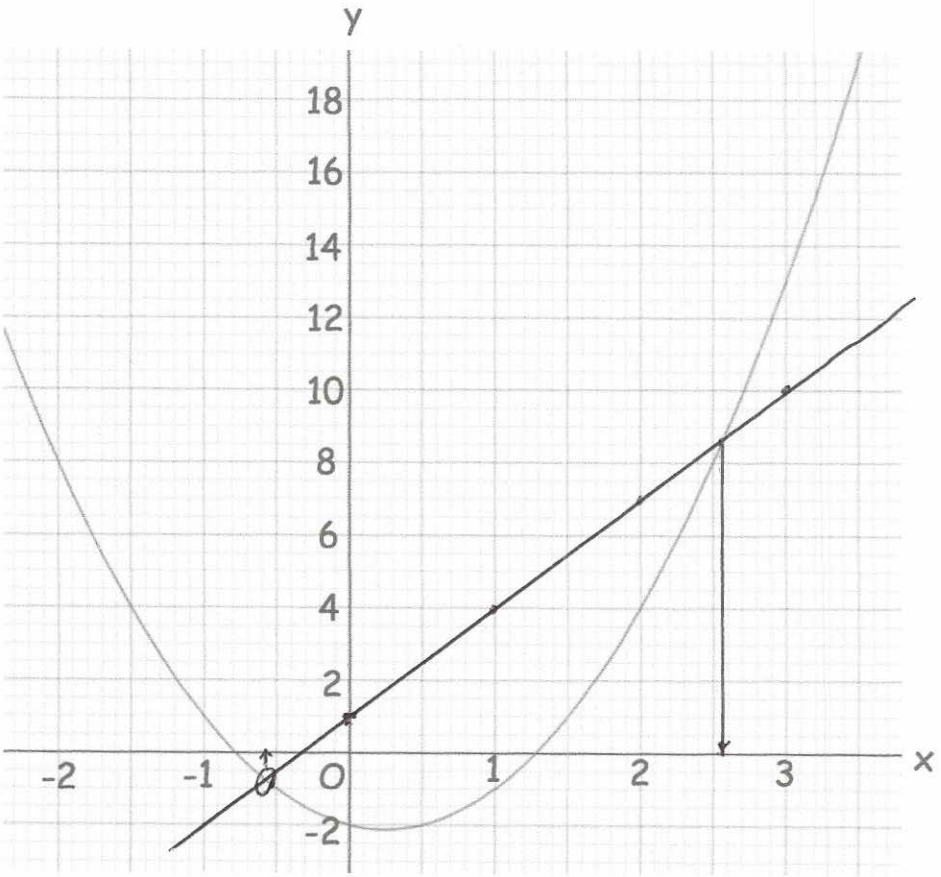
$0 = x^2 - 2x - 1$

$y = x - 1$

$x = -0.4$ 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 $2x^2 - 4x - 3 = 0$

$y = 2x^2 - x - 2$

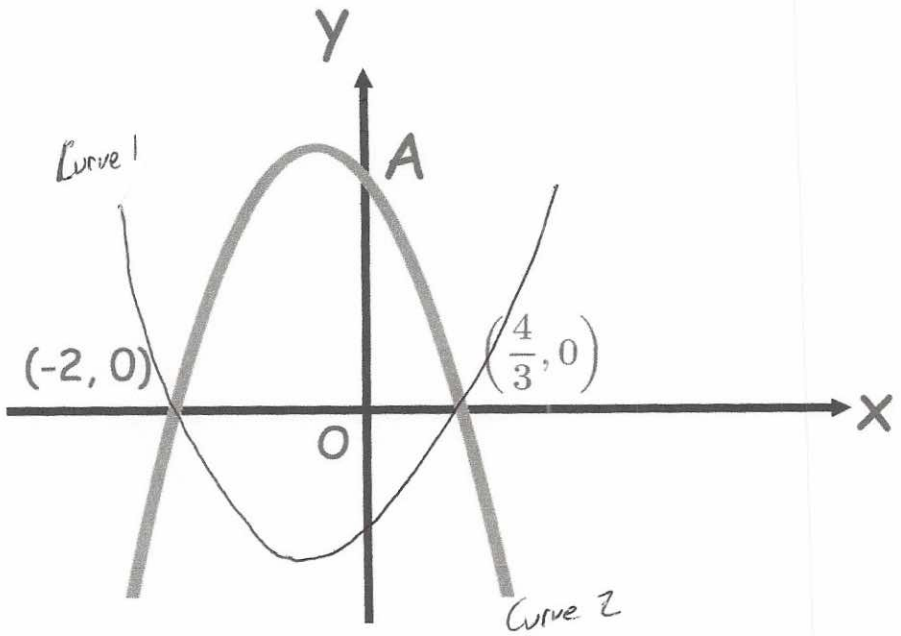
$0 = 2x^2 - 4x - 3$

$y = 3x + 1$

$x = -0.6$ 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)