Section A   Plotting Straight Line Graphs   Grade D / C

1. (a) Complete the table of values for $y = 3x + 4$

x	0	1	2	3	4	5
y	4		10		16	19

(1)

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....

(b) On the grid draw the graph of $y = 3x + 4$ for values of x from 0 to 5.
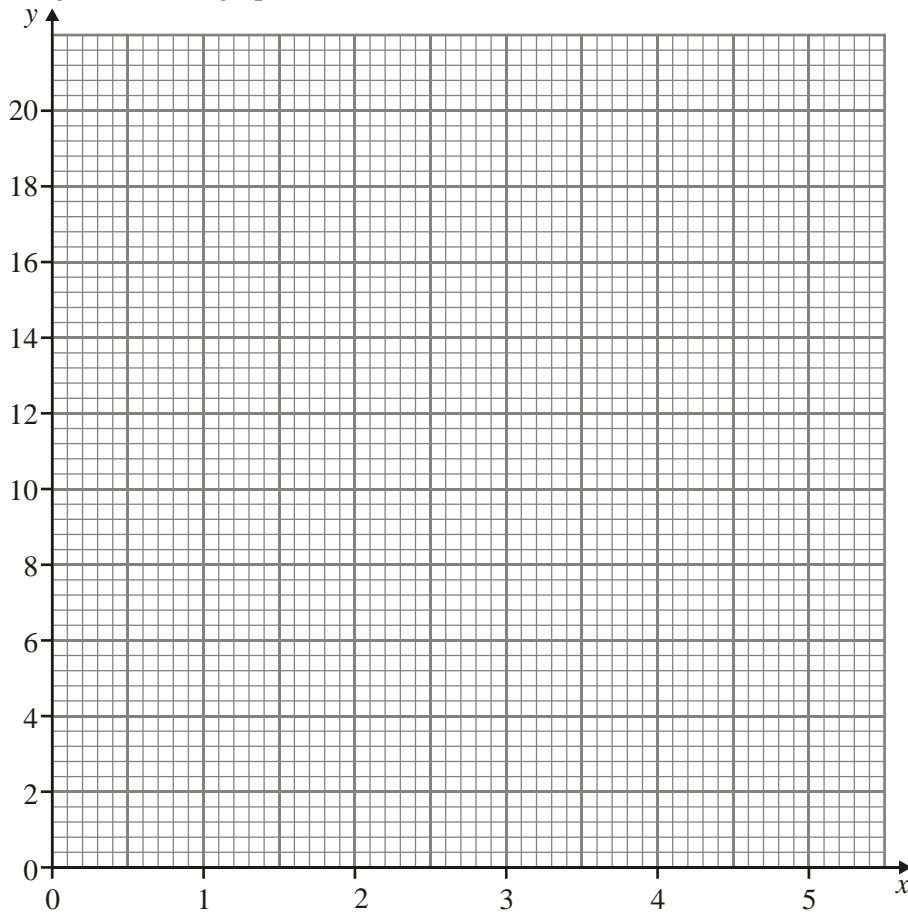
(2)

(c) On the grid draw and label the line $x = 2.5$

(1)
(Total 4 marks)

2. (a) Complete the table of values for $y = 3x + 1$

x	0	1	2	3	4
y	1		7		13

....

(1)

(b) On the grid draw the graph of $y = 3x + 1$ for values of x from 0 to 4.

(2)
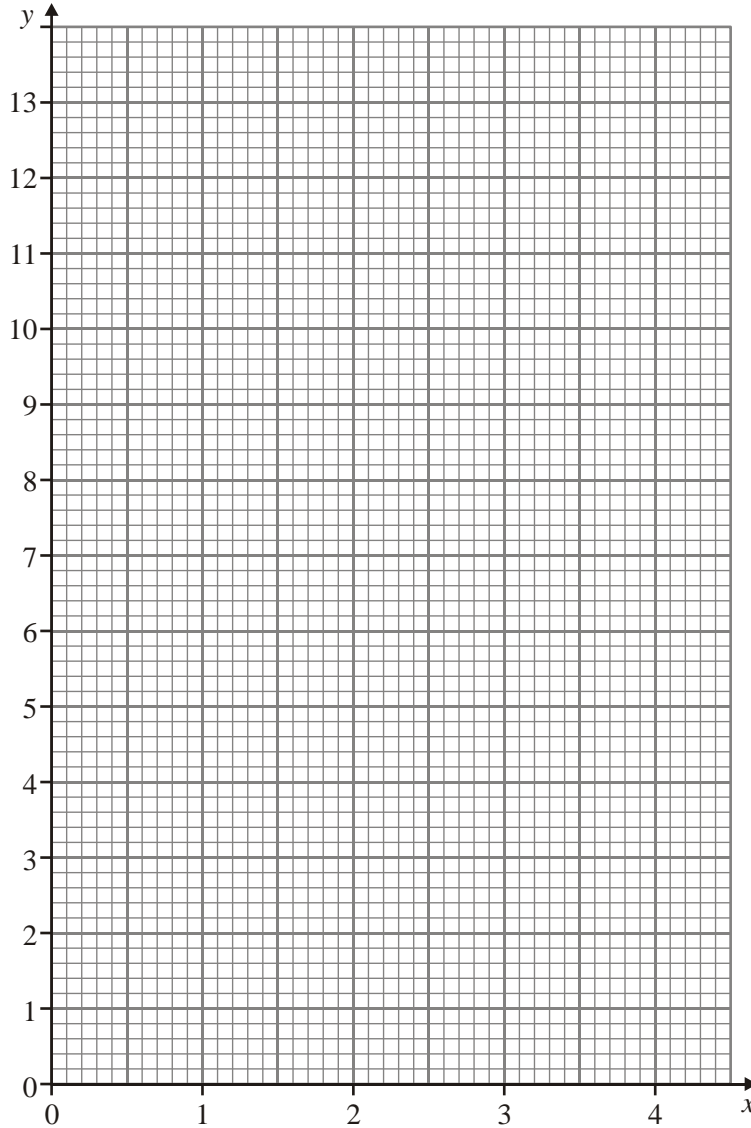
(c) Use your graph to solve $5.5 = 3x + 1$

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....

Answer $x =$…………………………………………..

(2)
(Total 5 marks)

3. (a) Complete this table of values for $y = 2x - 1$

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

....
(1)

(b) On the grid draw the graph of $y = 2x - 1$ for values of x from -1 to $+3$.
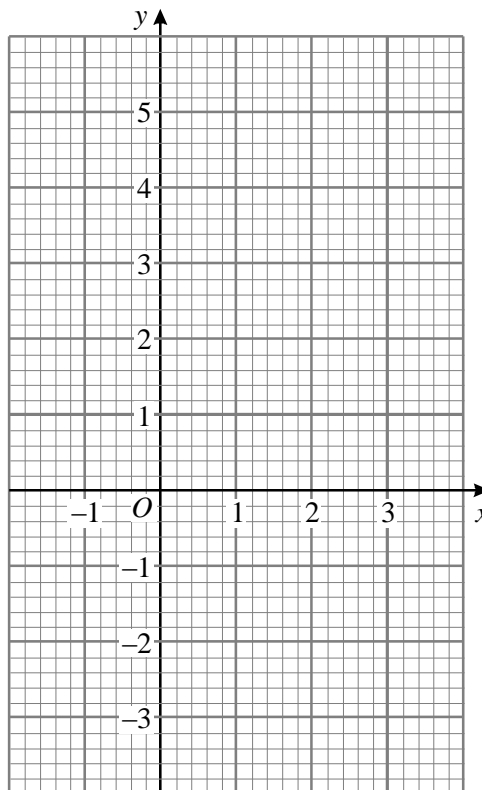
(2)

(c) Find the coordinates of the point where the line $y = 2x - 1$ crosses the line $y = -2$.

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....

Answer (........................, ...)
(2)
(Total 5 marks)

4.   (a)   (i)   Complete the table of values for $y = 4x - 3$

x	1	2	3	4	5
y	1			13	17

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(1)

(ii)   On the grid draw the graph of $y = 4x - 3$ for values of x from 1 to 5
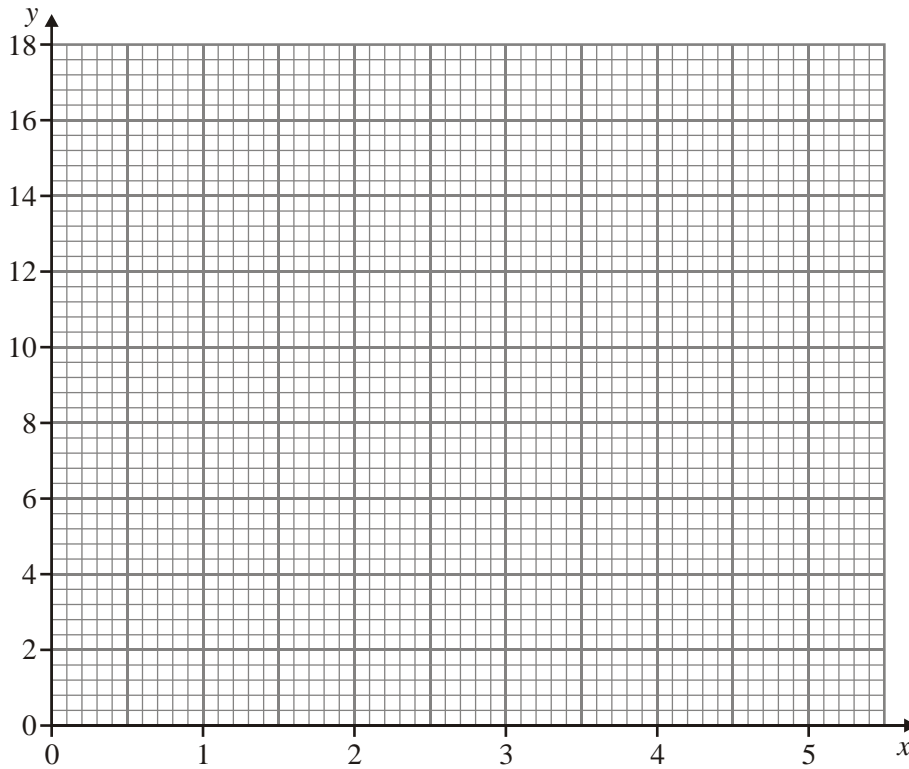
(2)

(b)   Draw and label the line $y = 7$ on the grid.

(1)
(Total 4 marks)

5. On the grid draw the line $y = 2x + 5$ for values of x from 0 to 5.

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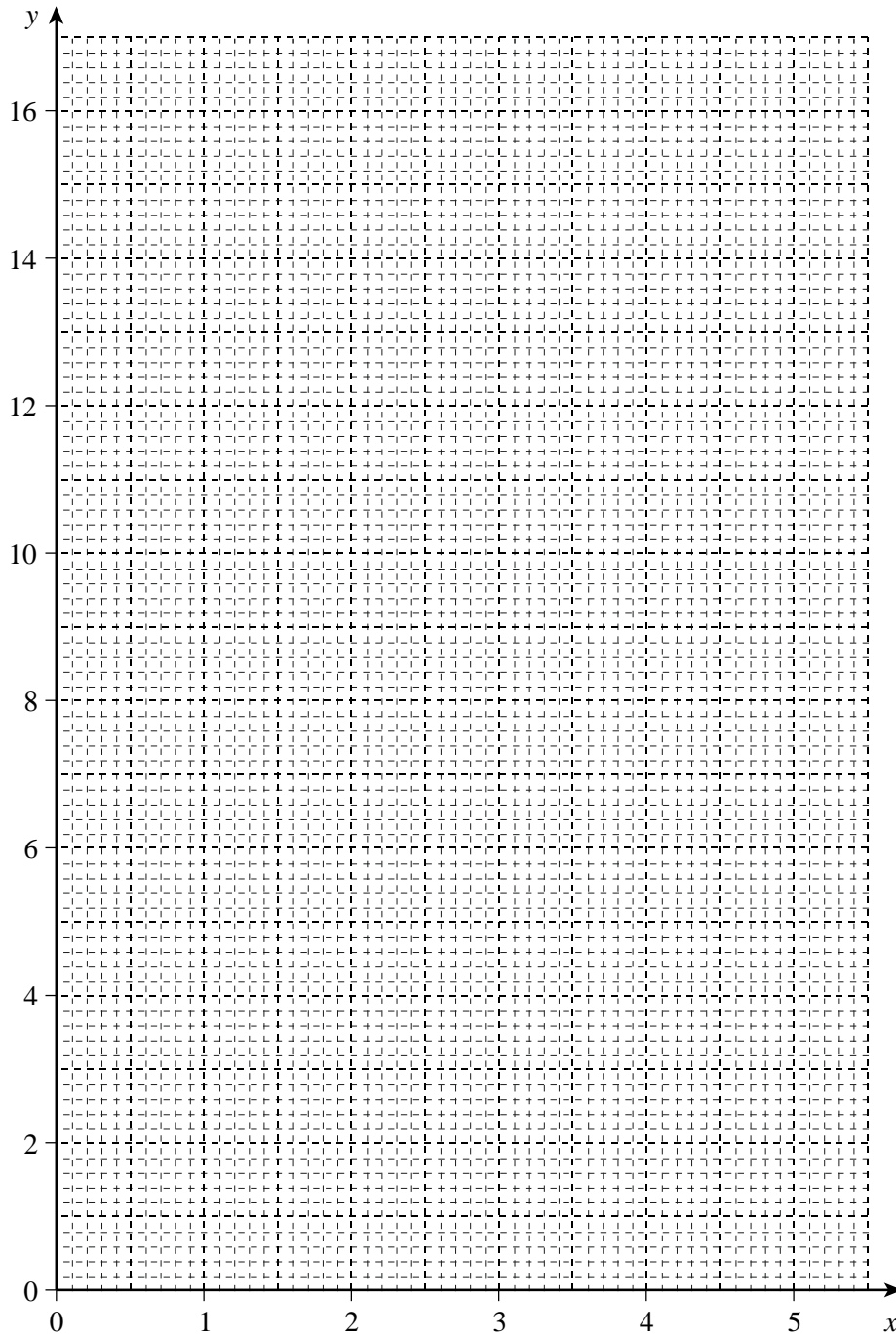
(Total 3 marks)

6. On the grid below draw the graph of $y = 3x - 1$ for values of x from 0 to 5.

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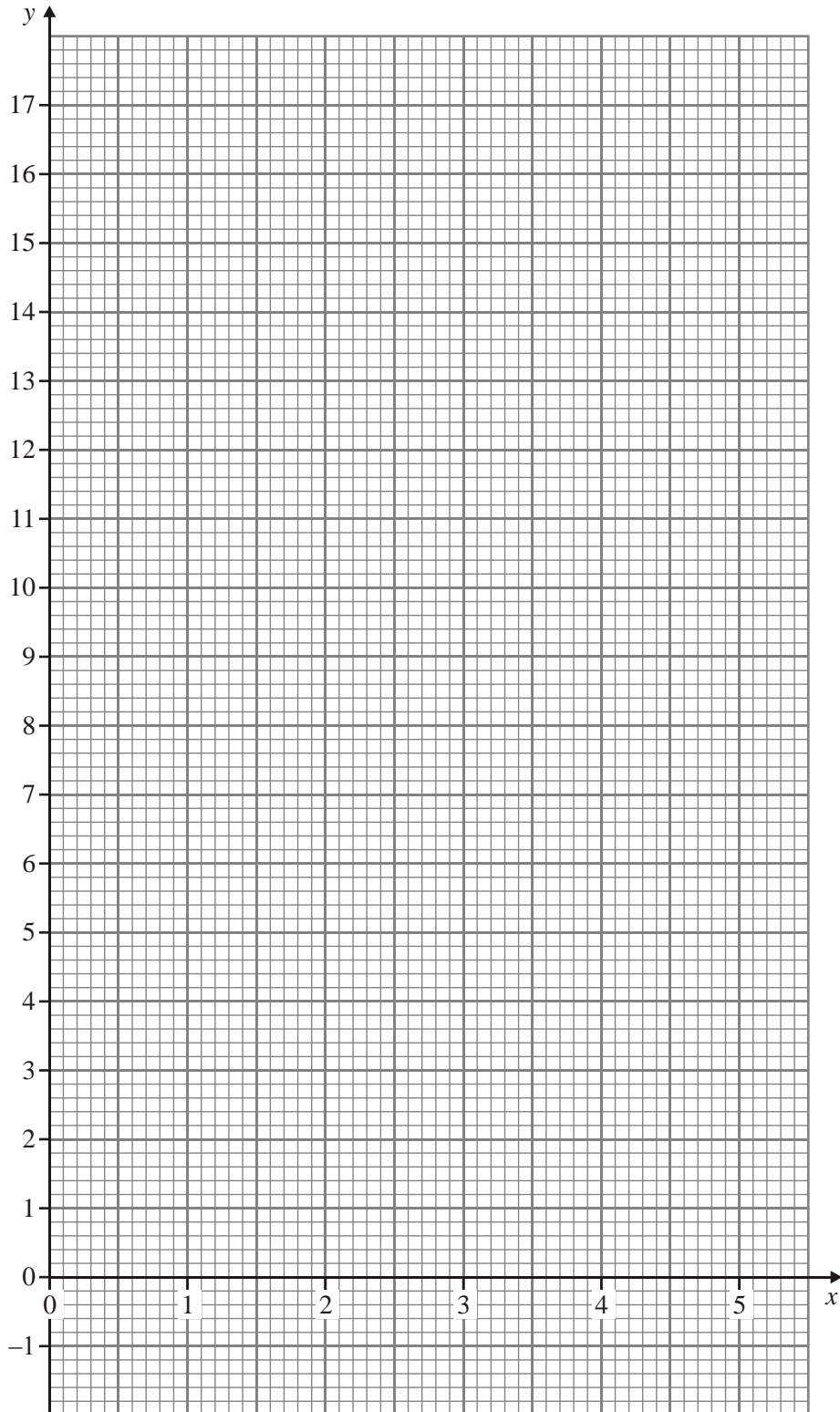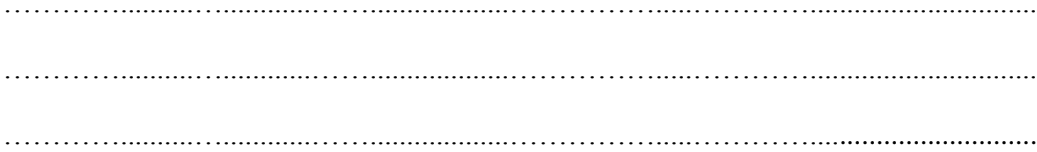
(Total 3 marks)

7. (a) On the grid draw the graph of $y = 10 - 2x$ for values of x from 0 to 5.

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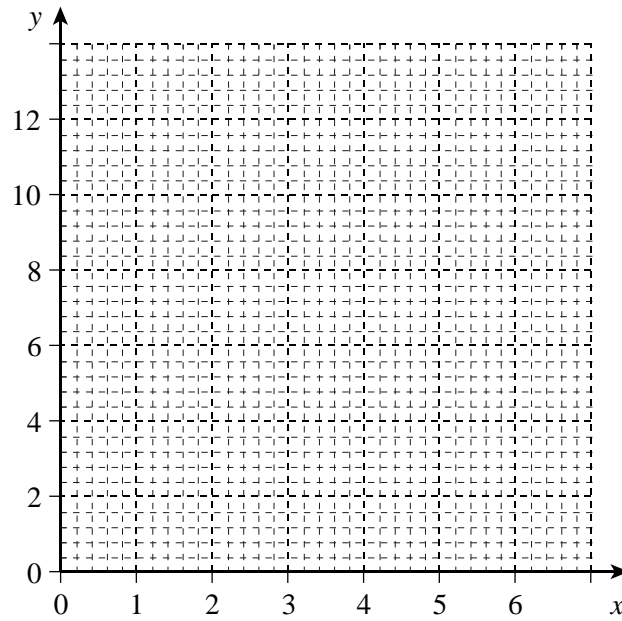
(3)

(b) On the grid draw the line $y = 7$

(1)(Total 4 marks)

8. On the grid below, draw the graph of $y = 7 - x$ for values of x from 0 to 7.

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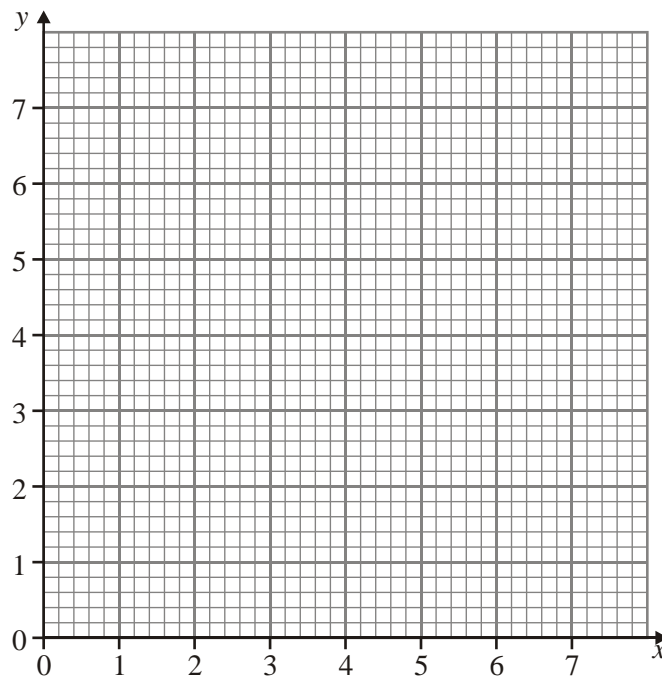
(Total 3 marks)

9. (a) Complete the table of values for the graph of $x + y = 4$

x	0	1	2	3	4
y	4			1	

(2)

(b) On the grid, draw the graph of $x + y = 4$
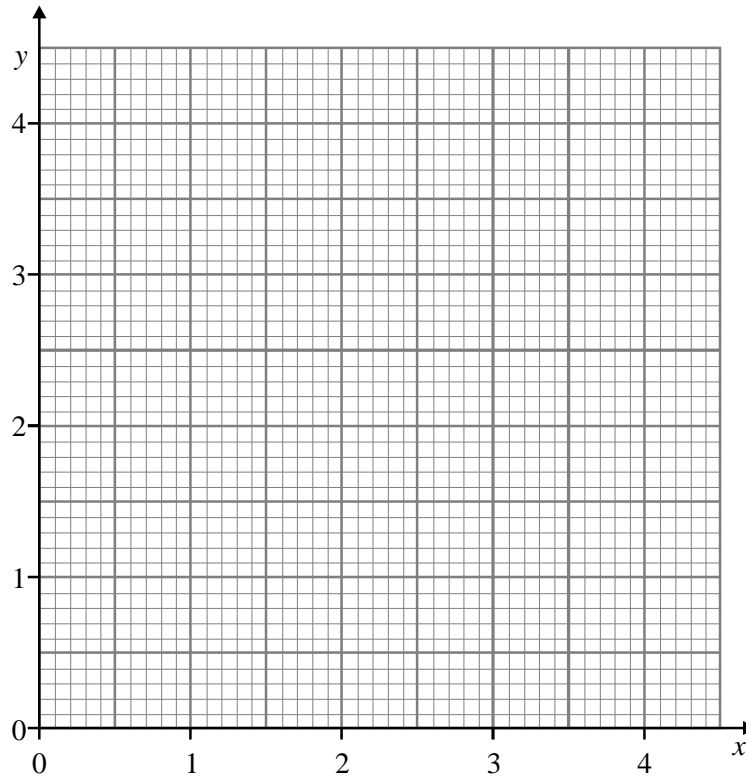
(1)

(c) P is a point on the line $x + y = 4$
David says, "the x coordinate of P is one greater than the y coordinate of P".

Write down the coordinates of P.

Answer (..................., ...)

(1)
(Total 4 marks)

10. (a) On the grid below draw and label the lines $y = -4$ and $y = 2x + 1$

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(4)

(b) Write down the coordinates of the point where the lines $y = -4$ and $y = 2x + 1$ cross.

Answer (...................., ...)

(1)(Total 5 marks)

Success:

Target:
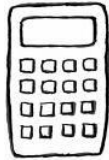
Section B   Quadratic Graphs   Grade C

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

x	–3	–2	–1	0	1	2	3
y	6	1		–3	–2	1	6

....

(1)

(b) On the grid below, draw the graph of $y = x^2 - 3$ for values of x from –3 to +3.
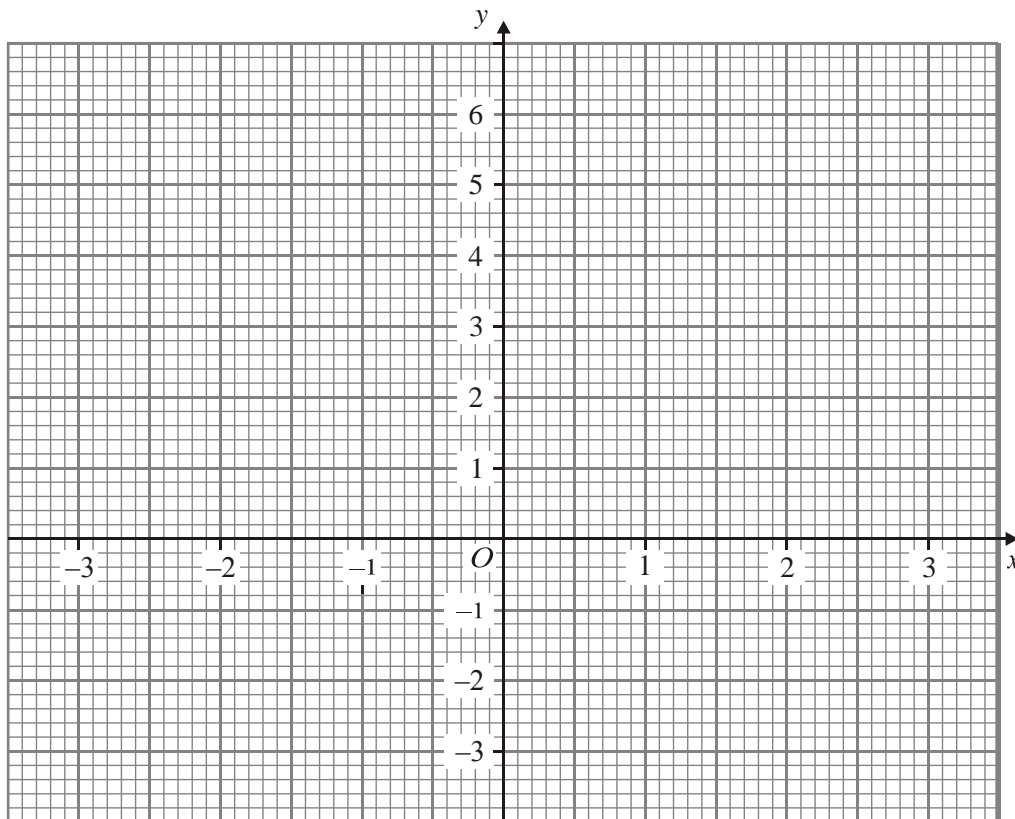
(2)

(c) Write down the values of x at the points where the line $y = 2$ crosses your graph.

....

Answer .... and ....

(2)
(Total 5 marks)

2. (a) Complete the table for the graph of $y = x^2 - 3x + 1$.

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

....

....

(2)

(b) On the grid below, draw the graph of $y = x^2 - 3x + 1$ for values of x from -1 to $+4$.

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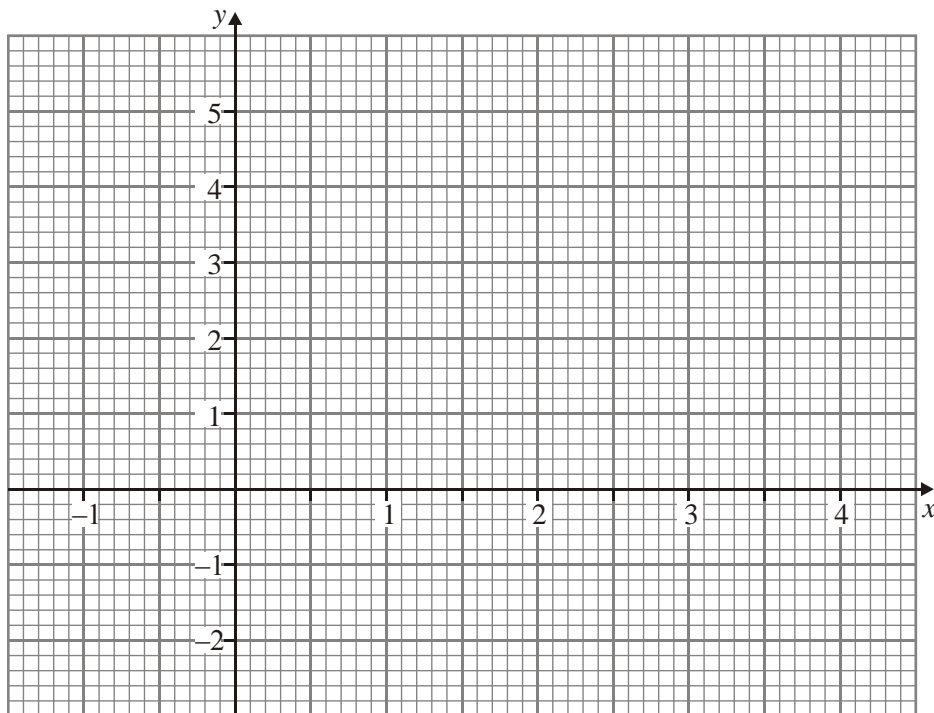
(c) Use your graph to solve the equation $x^2 - 3x + 1 = 0$.

....

Answer .... and ....

(2)
(Total 6 marks)

3. (a) Complete this table of values for $y = (2 + x)(3 - x)$

x	−2	−1	0	1	2	3	4
y		4	6	6	4	0	

……………...........……………………………...…………………………………………….

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(2)

(b) On the grid, draw the graph of $y = (2 + x)(3 - x)$ for values of x from −2 to + 4.
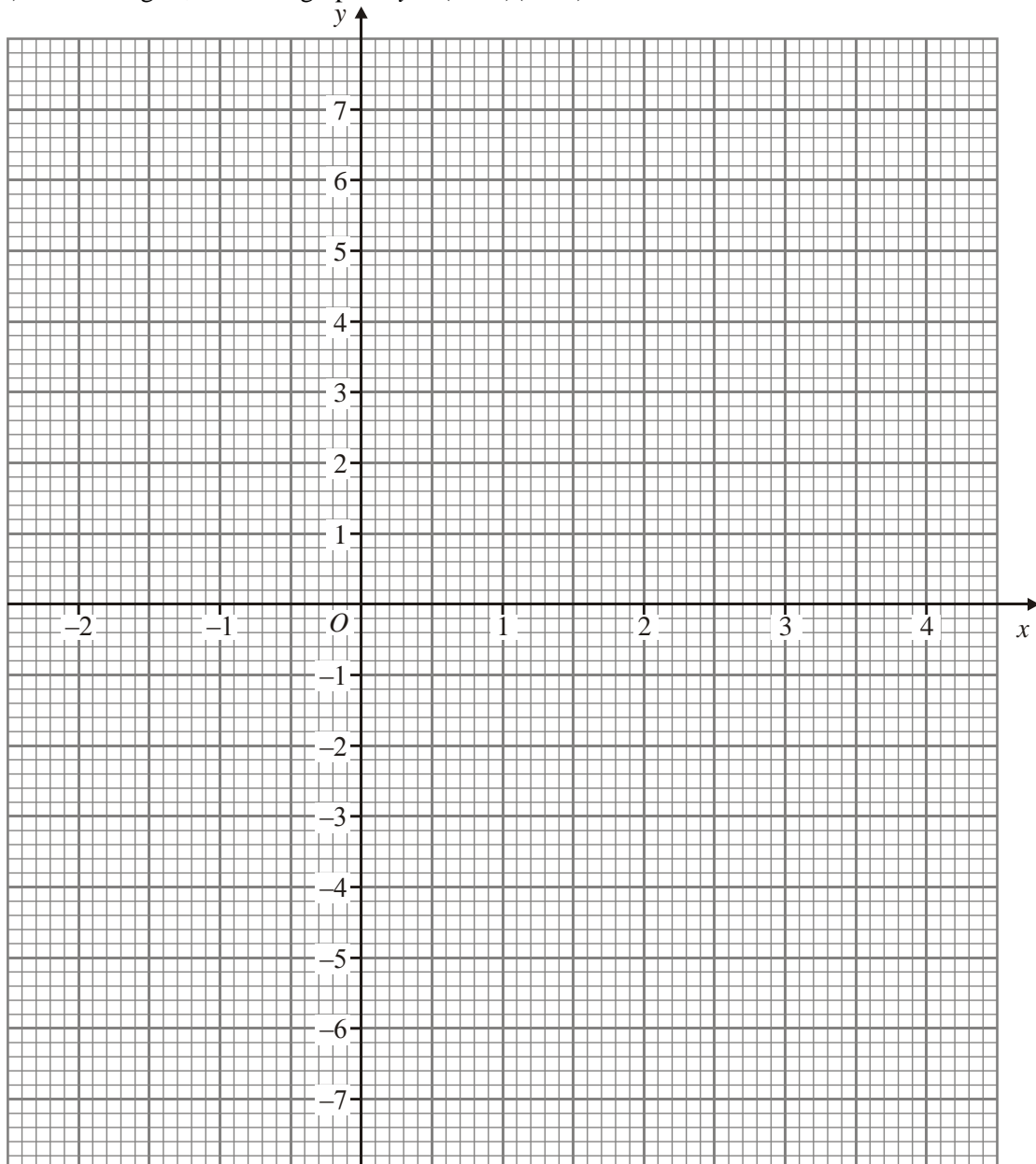
(2)
(Total 4 marks)

4. (a) Complete the table of values for $y = 2x^2 - 4x - 1$

x	-2	-1	0	1	2	3
y	15		-1		-1	5

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(2)

(b) On the grid, draw the graph of $y = 2x^2 - 4x - 1$ for values of x from -2 to $+3$.
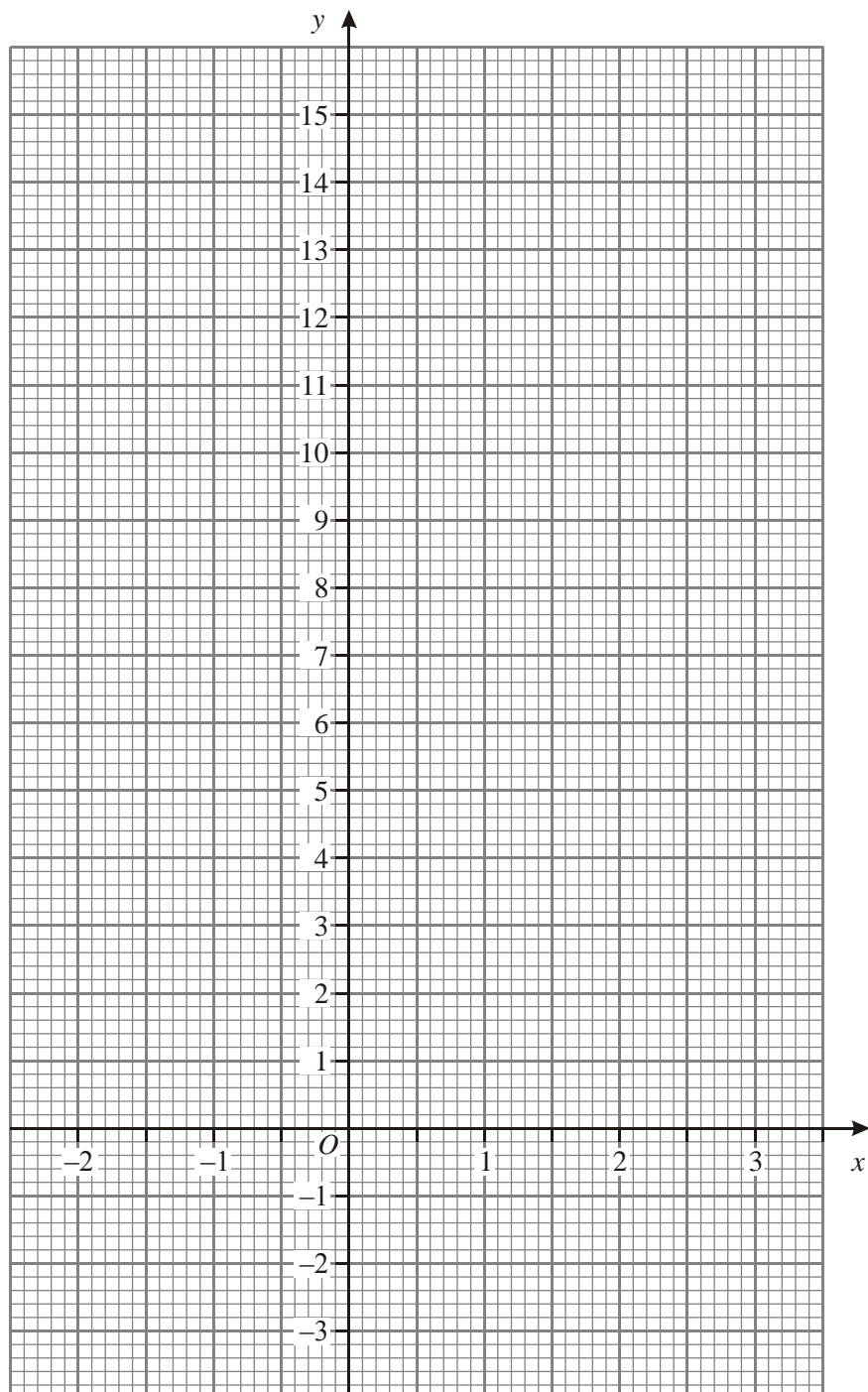
(2)

(c)   An approximate solution of the equation $2x^2 - 4x - 1 = 0$ is $x = 2.2$

   (i)   Explain how you can find this from the graph.

   ....

   ....

   (1)

   (ii)   Use your graph to write down another solution of this equation.

   Answer $x = $ ....

   (1)
   (Total 6 marks)

5. (a) Complete the table of values for $y = x^2 - 4x - 1$.

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

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(2)

(b) On the grid, draw the graph of $y = x^2 - 4x - 1$ for values of x from -1 to $+5$.

(2)
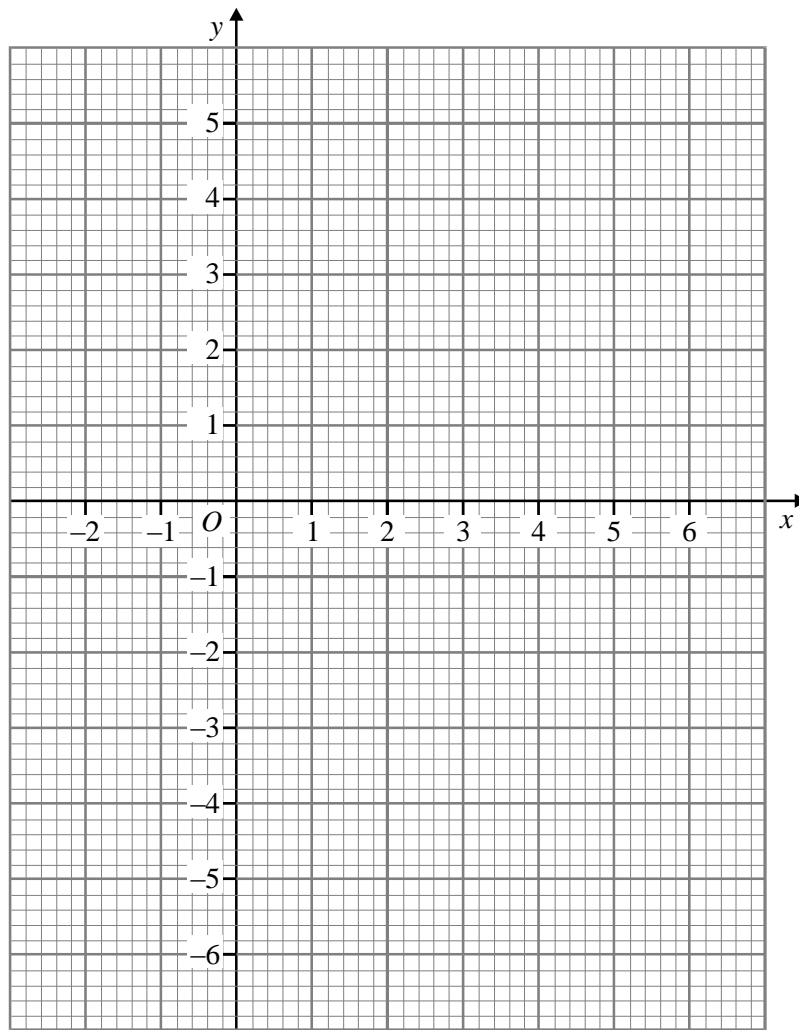
(c) Use your graph to solve the equation $x^2 - 4x - 1 = 0$.

Answer .... and ....

(2)(Total 6 marks)

Success:

Target:

Teacher
Assessment
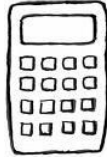
Section C   Using an Appropriate Linear Graph   Grade A / A*

1. The grid shows the graph of $y = x^2 + 2x - 5$
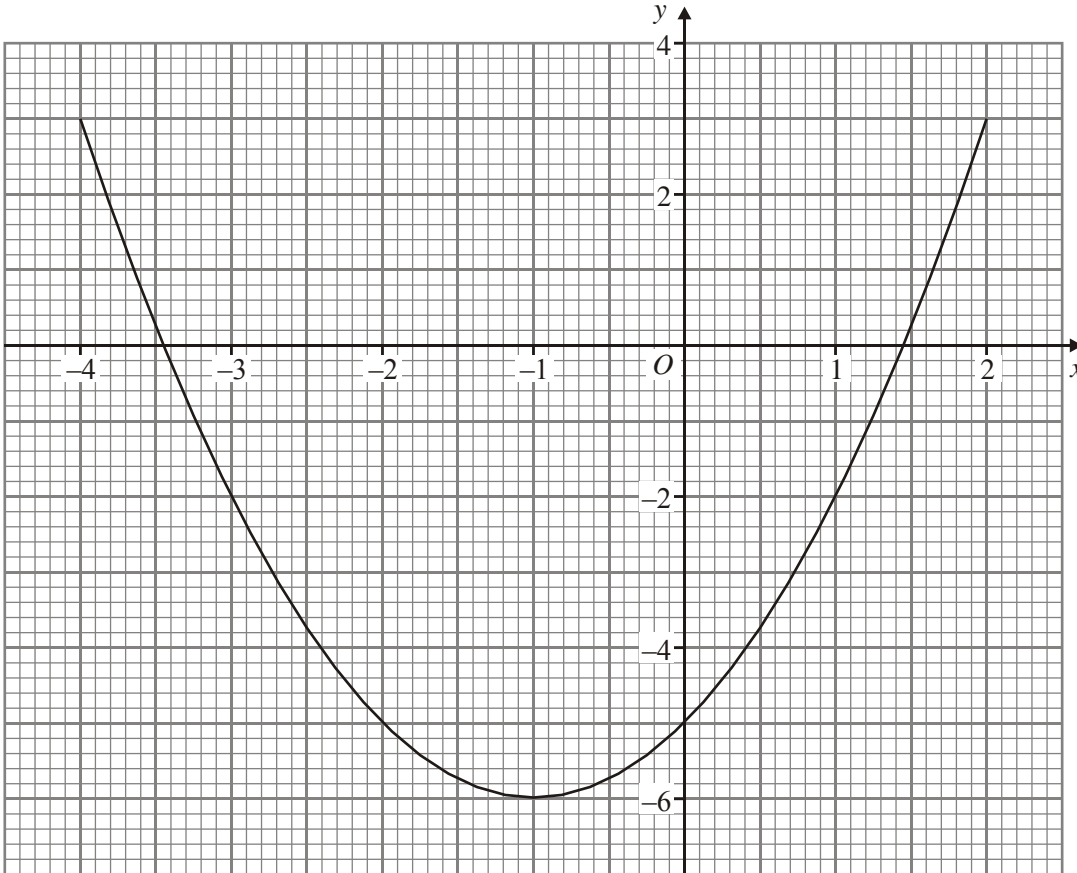
By drawing an appropriate straight line, solve the equation $x^2 + 2x - 5 = x - 1$

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Answer ....

(Total 3 marks)

2. The graph of $y = 2x^2 - x - 2$ is drawn below.
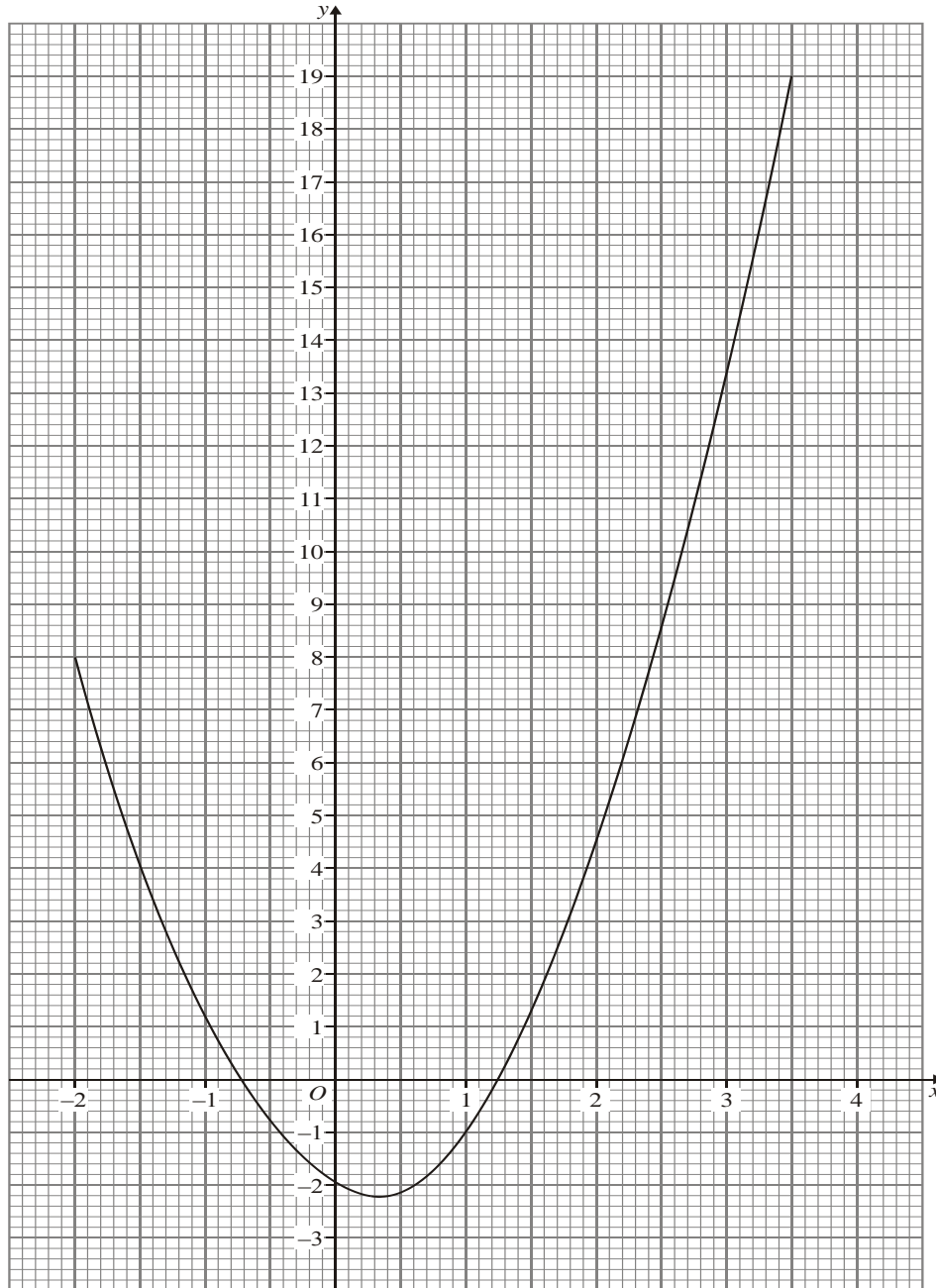
(a) Write down the solutions of $2x^2 - x - 2 = 0$.

Answer ....

(2)

(b) By drawing an appropriate linear graph, write down the solutions of

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

....

....

....

Answer ....

(3)(Total 5 marks)

3. (a) Complete the table of values for $y = x^2 - 4x + 3$

(1)

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

(b) On the grid below, draw the graph of $y = x^2 - 4x + 3$ for values of x between -1 and $+5$.
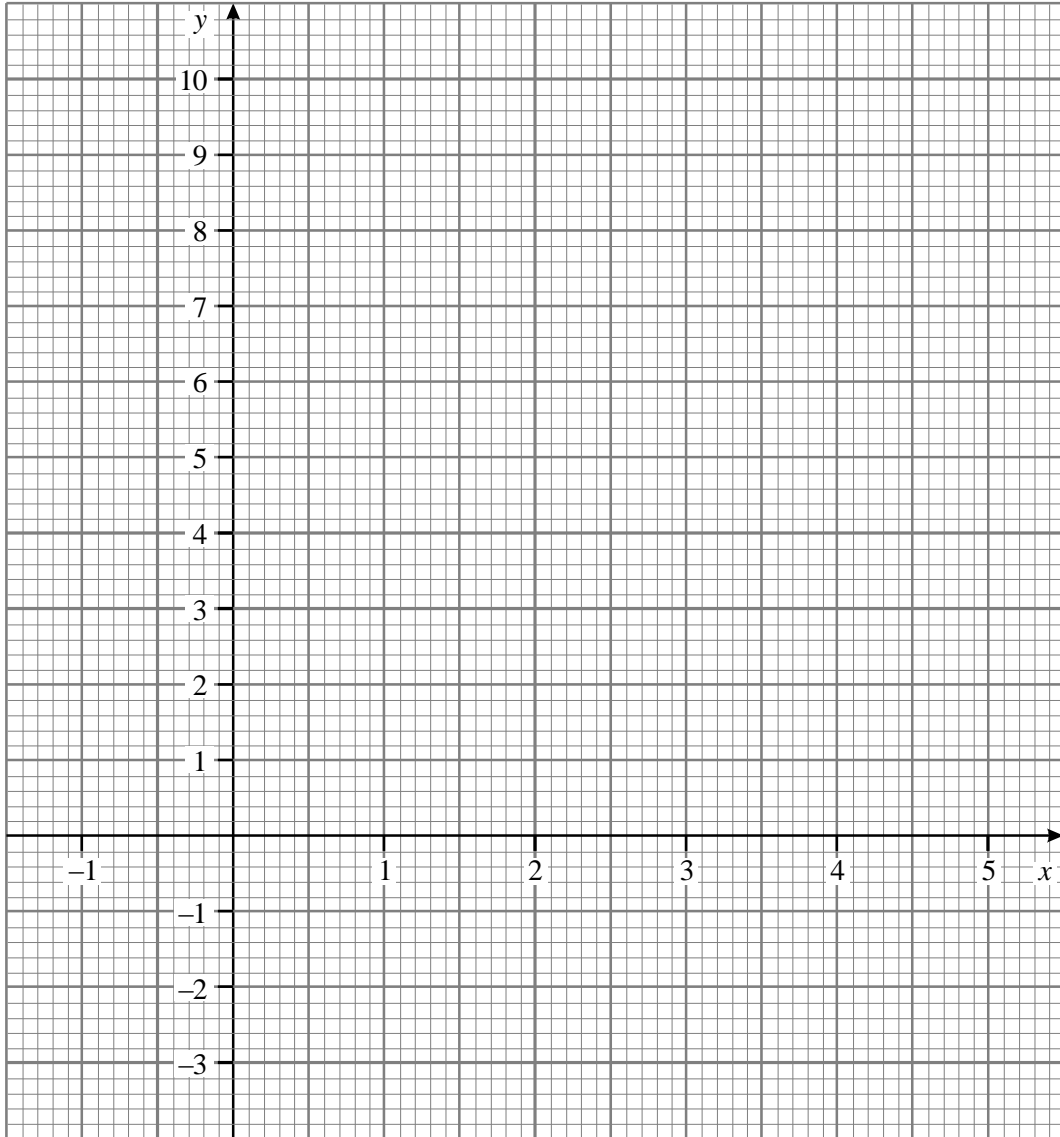
(2)

(c) Write down the solutions of $x^2 - 4x + 3 = 0$

Answer ....

(1)

(d) By drawing an appropriate linear graph, write down the solutions of $x^2 - 5x + 5 = 0$

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Answer ....

(3)(Total 7 marks)

4. The grid below shows the graph of $y = x^2 + 3x - 2$

$y = x^2 + 3x - 2$
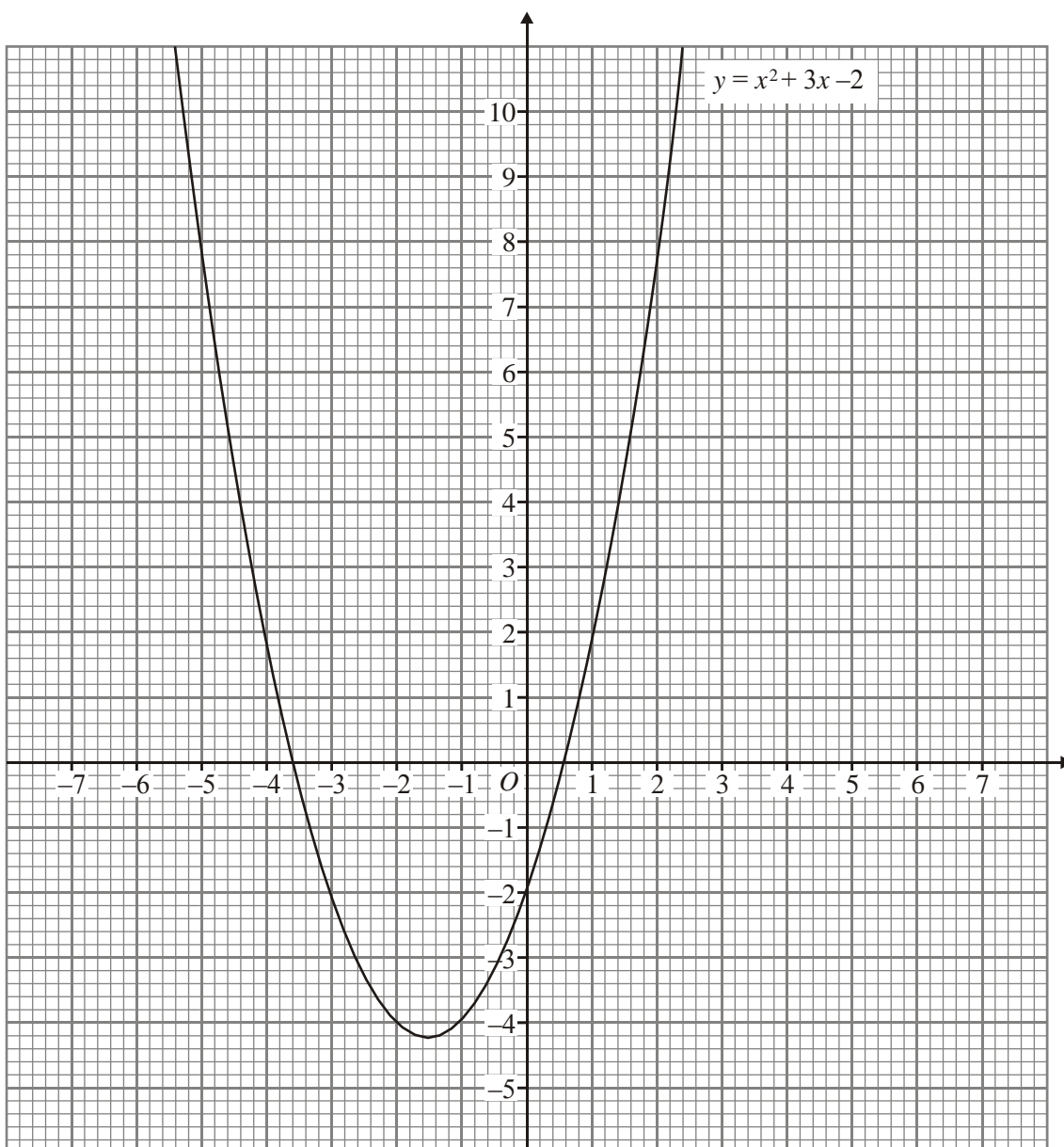
(a) By drawing an appropriate straight line on the graph solve the equation $x^2 + 3x - 3 = 0$

…………..…………….........……………......................

Answer ………………………………..

(2)

(b) By drawing an appropriate straight line on the graph solve the equation $x^2 + 2x - 1 = 0$

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Answer ………………………………..

(3)(Total 5 marks)

5. The diagram shows the graphs $y = x^2 - x - 6$ and $y = x + 3$
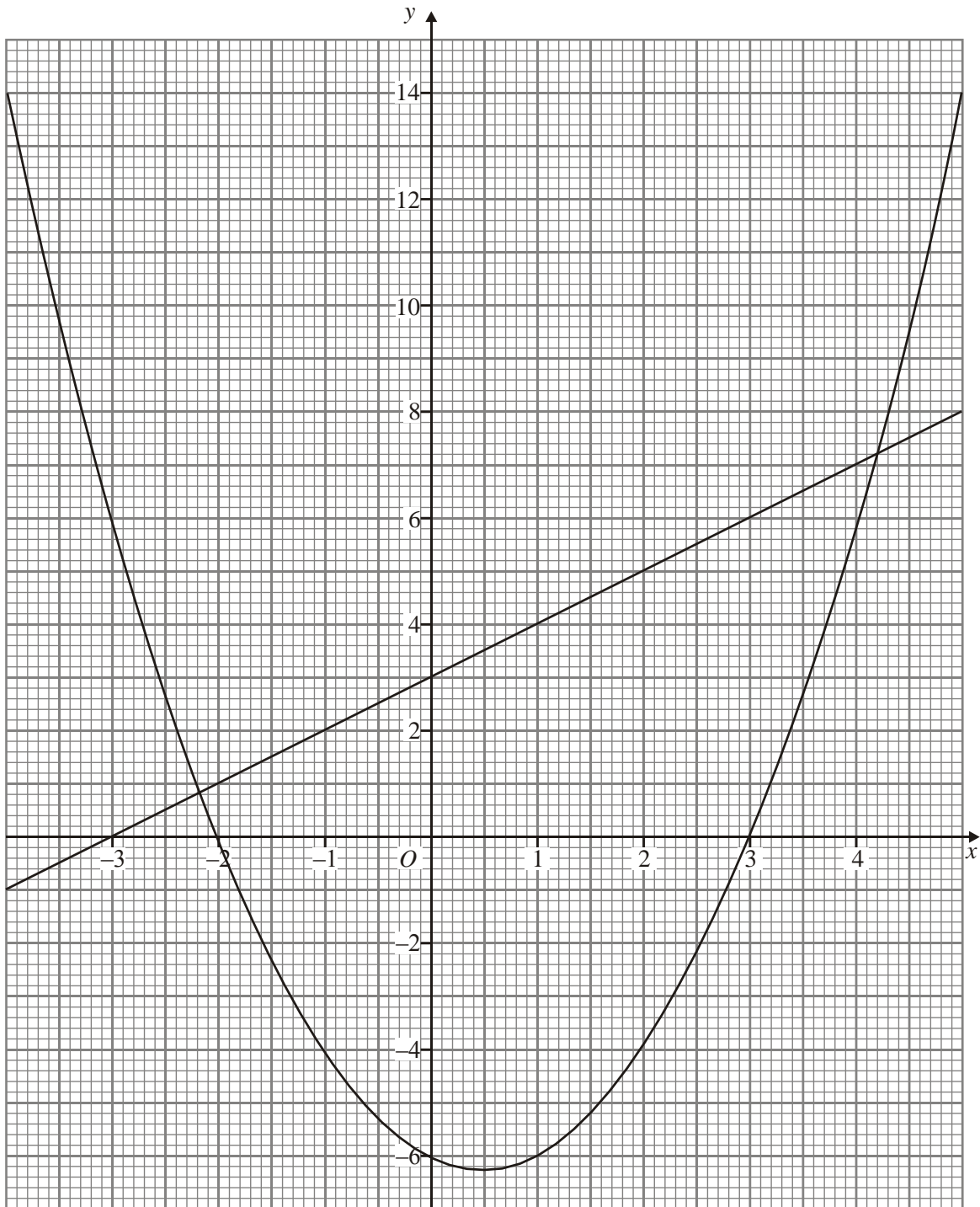
(a) Use the graph of $y = x^2 - x - 6$ to write down the solutions of the equations

(i) $x^2 - x - 6 = 0$

....

Answer ....

(1)

(ii) $x^2 - x - 6 = -2$

....

....

Answer ....

(2)

(b) Find the quadratic equation whose solutions are the x-coordinates of the points of intersection of

$$y = x^2 - x - 6 \text{ and } y = x + 3$$

Give your answer in the form $x^2 + bx + c = 0$

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Answer ....

(2)

(c) Find the equation of the straight line that should be drawn on the diagram to solve the equation

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

....

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Answer ....

(2)
(Total 7 marks)

6. The graph $y = x^2 - 2x - 4$ is drawn below for values of x between -3 and $+4$.
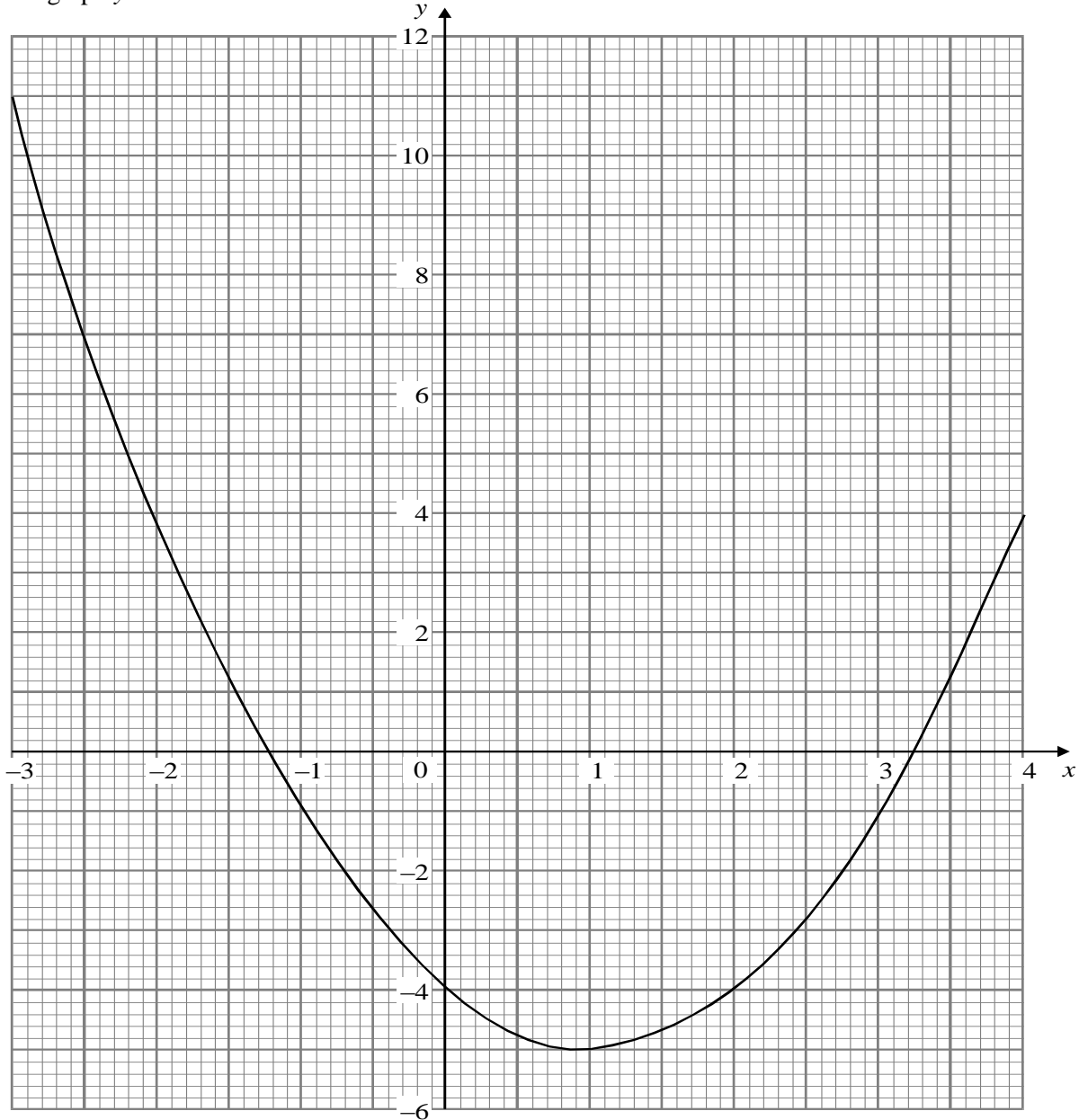
(a) Using the graph, find the solutions of $x^2 - 2x - 4 = 0$, giving your answers to 1 decimal place.

...............................…………………………………………………………………………………

Answer ....

(1)

(b) By drawing an appropriate linear graph, write down the solutions of $x^2 - 3x - 2 = 0$

...............................…………………………………………………………………………………

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Answer ....

(3)(Total 4 marks)

7. A student draws the graph of $y = x^2 - x - 1$ for $-2 \le x \le 4$.

(a) (i) Use the graph to solve the equation $x^2 - x - 1 = 2x + 1$.

....

....

Answer ....

(3)

(ii) Re-write the equation $x^2 - x - 1 = 2x + 1$ in the form of $ax^2 + bx + c = 0$.

....

Answer ....

(1)

(b) Use the graph, or otherwise, to write down the two solutions to the equation

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

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Answer ....

(2)(Total 6 marks)

Success:

Target:

Section D   Factorising and Solving Quadratics   Grade B / A

1.   (a)   Factorise $p^2 + 7p + 12$

....

....

Answer …………………………………........

(2)

(b)   Solve the equation $p^2 + 7p + 12 = 0$

....

....

Answer …………………………………........

(1)
(Total 3 marks)

2.   (a)   Factorise $y^2 - 8y + 15$

....

....

Answer ....

(2)

(b)   Hence solve the equation $y^2 - 8y + 15 = 0$

....

....

Answer ....

(1)(Total 3 marks)

3.   (i) Factorise $y^2 - 5y + 6$

....

....

Answer ....

(2)

(ii)   Hence solve the equation $y^2 - 5y + 6 = 0$

....

....

Answer ....

(1)

4.   (i) Factorise $x^2 - 13x + 36$

....

....

Answer...

(2)

(ii)   Hence, or otherwise, solve the equation $x^2 - 13x + 36 = 0$

....

....

Answer...

(1)
(Total 3 marks)

5.   (a)   Factorise $x^2 + 5x - 14$

....

....

Answer ....

(2)

(b)   Hence solve the equation $x^2 + 5x - 14 = 0$

....

....

Answer ....

(1)
(Total 3 marks)

6.   (a)   Factorise $x^2 + 3x - 40$

....

....

Answer...

(2)

(b)   Hence, solve the equation $x^2 + 3x - 40 = 0$

....

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Answer $x = $ ....

(1)
(Total 3 marks)

7. Solve the equation $y^2 - 4y - 45 = 0$

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Answer ....

(Total 3 marks)

8. Solve the equation $\qquad y^2 + 5y = 0$

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Answer ....

(Total 3 marks)

9. The diagram shows the graph of an equation of the form $y = x^2 + bx + c$. (Not drawn accurately)

Find the values of b and c.
You **must** show your method.

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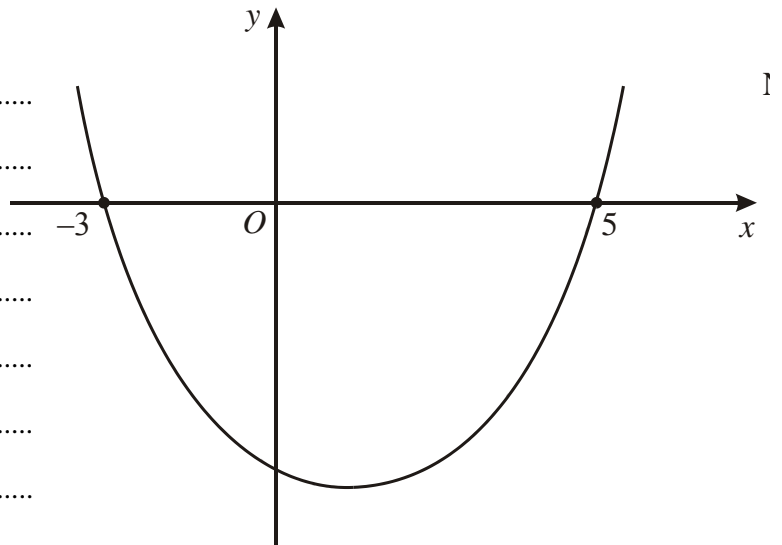
Answer $b = $ .... , $c = $ ....

(Total 3 marks)

10. (a) Factorise $2x^2 - 7x - 15$

....

....

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Answer ....

(2)

(b) The graph of $y = 2x^2 - 7x - 15$ is sketched below. (Not to scale)

Find the equation of the line of symmetry of this graph.

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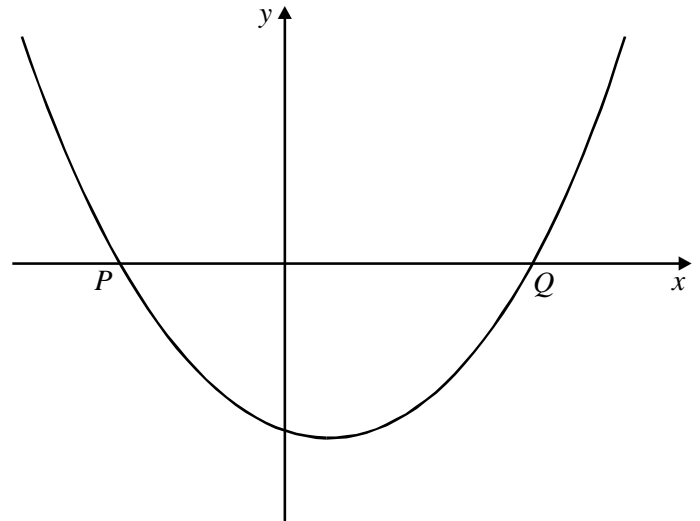
Answer ....

(3)
(Total 5 marks)

11. Mandy is x years old. Her brother is 5 years older than Mandy.
The product of their ages is 84.

(a) Show that $x^2 + 5x - 84 = 0$

....

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....

(1)

(b) Solve $x^2 + 5x - 84 = 0$

Do **not** use a trial and improvement method.

....

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....

Answer $x =$ ....

(3)(Total 4 marks)

12.   (i)   Factorise $x^2 - 10x + 25$

....

Answer ....

(2)

(ii)   Hence, or otherwise, solve the equation

$$(y - 3)^2 - 10(y - 3) + 25 = 0$$

....

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Answer $y = $ ....

(2) (Total 4marks)

13.   Solve the equation $\dfrac{2}{y+1} + \dfrac{3}{2y-3} = 1$

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Answer ....

(Total 5 marks)

14.   Solve the equation $\dfrac{4}{2x+1} - \dfrac{1}{3x-1} = 5$

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Answer ....

St Paul's Catholic School

(Total 6 marks)   28

15. Solve the equation $\dfrac{1}{x+1} + \dfrac{5x}{x-2} = 3$

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(Total 5 marks)

16. Solve this equation $\dfrac{3}{x+5} - \dfrac{1}{x+4} = \dfrac{1}{2}$

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(Total 7 marks)

Success:	Target:

Teacher Assessment
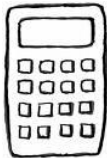
Section E   **Quadratic Formula**   **Grade A → A***

1.   Solve the equation $x^2 + 4x - 10 = 0$.
   Give your answers to 2 decimal places.
   You **must** show your working.

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Answer ....

(3)

2.   Solve the equation

$$x^2 - 2x - 5 = 0$$

giving your answers to 3 significant figures.

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Answer …...

(Total 3 marks)

3. Solve the equation $2x^2 - 6x - 1 = 0$

Give your answers to two decimal places.
You **must** show your working.

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Answer …………………………………………………………

(Total 3 marks)

4. Solve the equation $x^2 - 6x - 3 = 0$

Give your answers in the form $p \pm q\sqrt{3}$ where p and q are integers.

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Answer …………………………………………………………

(Total 4 marks)

Success:	Target:

Teacher Assessment
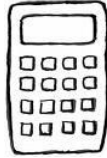
Section F   Completing the Square   Grade A → A*

1. Find the values of a and b such that

$$x^2 - 10x + 18 = (x - a)^2 + b$$

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Answer $a = $ ...., $b = $ ....

(Total 2 marks)

2. $$x^2 - 8x + 10 = (x - a)^2 + b$$

(a) Find the values of a and b.

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Answer $a = $..$b = $ ....

(3)

(b) Hence find the minimum value of $x^2 - 8x + 10$

....

Answer..

(1)

(Total 4 marks)

3. (a) Find the values of a and b such that

$$x^2 + 10x + 40 = (x + a)^2 + b$$

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Answer $a =$ .... , $b =$ ....

(2)

(b) Hence, or otherwise, write down the minimum value of $x^2 + 10x + 40$

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Answer ....

(1)
(Total 3 marks)

4. $$x^2 - 6x + 13 = (x - a)^2 + b$$

(a) Find the values of a and b.

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....

....

Answer $a =$ .... $b =$ ....

(3)

(b) Hence find the minimum value of $x^2 - 6x + 13$.

....

Answer ....

(1)
(Total 4 marks)

5. (a) Find the values of a and b such that

$$x^2 + 6x - 3 = (x + a)^2 + b$$

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Answer a = ..., b = ...

(2)

(b) Hence, or otherwise, solve the equation

$$x^2 + 6x - 3 = 0$$

giving your answers in surd form.

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Answer ....

(3)
(Total 5 marks)

6. (a) Find the values of a and b such that

$$x^2 + 6x - 11 \equiv (x+a)^2 + b$$

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Answer $a =$ ……………………, $b =$ ……………………

(3)

(b) Hence, or otherwise, solve the equation $x^2 + 6x - 11 = 0$
Give your answers in surd form.

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………………………………………………………………………………………

Answer …………………………………………………………

(2)(Total 5 marks)

7. (a) Find the values of a and b such that

$$x^2 + 8x - 5 \equiv (x+a)^2 + b$$

....

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....

....

Answer $a =$ .... $b =$ ....

(2)

(b) Hence, or otherwise, solve the equation $x^2 + 8x - 5 = 0$

Give your answers in surd form.

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....

....

Answer ....

(2)
(Total 4 marks)

8. (a) Find the values of a and b such that

$$x^2 + 6x - 3 = (x + a)^2 + b$$

…….................…………...

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…….................…………...

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Answer a = ... , b = ...

(2)

(b) Hence, or otherwise, solve the equation

$$x^2 + 6x - 3 = 0$$

giving your answers in surd form.

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Answer ....

(3)
(Total 5 marks)

Success:

Target:

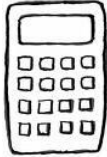Teacher Assessment

Section F   Quadratics Problem Solving   Grade A → A*

1.   Mandy is x years old.
      Her brother is 5 years older than Mandy.
      The product of their ages is 84.

      (a)   Show that $x^2 + 5x - 84 = 0$

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             (1)

      (b)   Solve $x^2 + 5x - 84 = 0$

             Do **not** use a trial and improvement method.

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             Answer x = ...
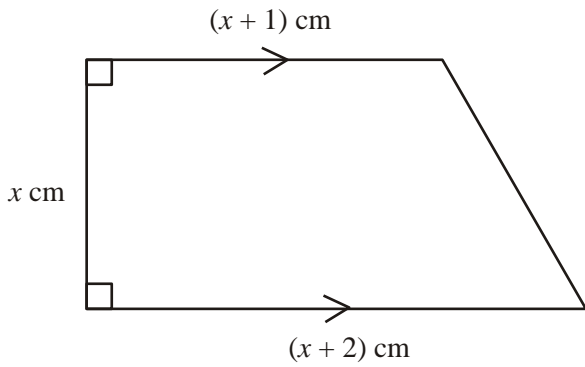   **(3)**
             (Total 4 marks)

2. A trapezium has parallel sides of length $(x + 1)$ cm and $(x + 2)$ cm.
The perpendicular distance between the parallel sides is x cm.
The area of the trapezium is 10 cm^2.

Not drawn accurately

$(x + 1)$ cm

x cm

$(x + 2)$ cm

Find the value of x.

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Answer x = ... cm
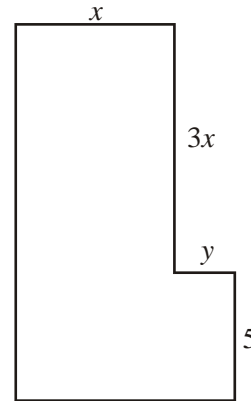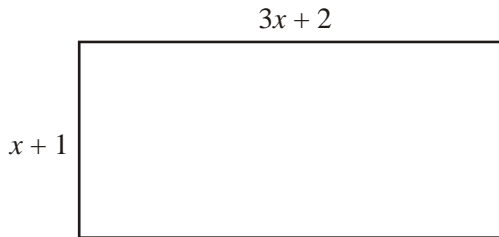
(Total 5 marks)

3. The diagrams show a rectangle and an L shape
All the angles are right angles.
All lengths are in centimetres.
The shapes are equal in area.

Diagrams not to scale

$3x + 2$

$x + 1$

x

$3x$

y

5

Calculate the value of y.

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Answer .... cm

(Total 6 marks)

4. Solve the equation $\dfrac{x}{x+1} - \dfrac{2}{x-1} = 1$

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Answer ....

(Total 5 marks)

5. Solve the equation $\dfrac{1}{x+1} + \dfrac{5x}{x-2} = 3$

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(Total 5 marks)

Success:	Target: