

GCSE Mathematics

H

Completing the Square

Higher | Grades 7-8

Total Marks	Time	Questions
76	76 min	20

Instructions:

- Do not use a calculator when you see: 
- Answer all questions in the spaces provided.
- Show all your working - marks are awarded for method as well as final answers.
- Cross through any work you do not want to be marked.
- Check your answers if you have time at the end.

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Edexcel-style questions**Q1** 

Grade 7

Edexcel style

 $x^2 + 8x + 5$ can be written in the form $(x + a)^2 + b$, where a and b are integers.(a) Find the values of a and b .**[2 marks]**

Answer _____

(b) Hence write down the coordinates of the minimum point of the graph $y = x^2 + 8x + 5$. **[1 mark]**

Answer _____

teachably

[3 marks]**Q2** 

Grade 7

Edexcel style

 $x^2 - 6x + 1$ can be written in the form $(x + a)^2 + b$, where a and b are integers.(a) Find the values of a and b .**[2 marks]**

Answer _____

(b) Hence write down the coordinates of the minimum point of the graph $y = x^2 - 6x + 1$. **[1 mark]**

Answer _____

teachably

[3 marks]

Q3

Grade 8

Edexcel style

$2x^2 + 8x + 3$ can be written in the form $p(x + q)^2 + r$, where p , q and r are integers.

(a) Find the values of p , q and r .

[3 marks]

Answer _____

(b) Hence write down the coordinates of the minimum point of the graph $y = 2x^2 + 8x + 3$. **[1 mark]**

Answer _____

teachably

[4 marks]**Q4**

Grade 8

Edexcel style

$x^2 + 6x + 2 = 0$.

(a) Write $x^2 + 6x + 2$ in the form $(x + a)^2 + b$.

[2 marks]

Answer _____

(b) Hence solve $x^2 + 6x + 2 = 0$, giving your answers in surd form.

[3 marks]

Answer _____

teachably

[5 marks]

Q5

Grade 8

Edexcel style

The diagram shows the graph of $y = x^2 + 10x + 18$, which has a minimum turning point at A.

(a) Write $x^2 + 10x + 18$ in the form $(x + a)^2 + b$.

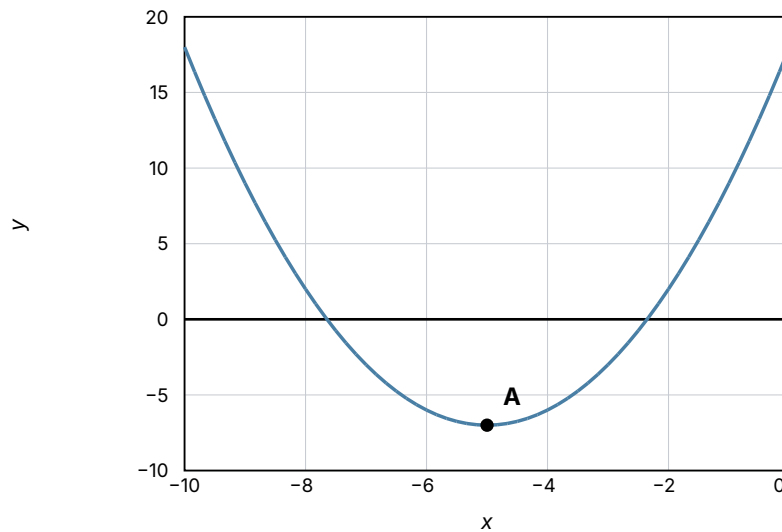
[2 marks]

Diagram NOT accurately drawn

Answer _____

(b) Hence write down the coordinates of A and the equation of the line of symmetry of the curve. **[2 marks]**

Answer _____

teachably

[4 marks]

AQA-style questions**Q6**

Grade 7

AQA style

$x^2 + 10x + 3$ can be written in the form $(x + a)^2 + b$, where a and b are integers.

(a) Find the values of a and b .

[2 marks]

Answer _____

(b) Hence write down the coordinates of the minimum point of the graph $y = x^2 + 10x + 3$. **[1 mark]**

Answer _____

teachably

[3 marks]**Q7**

Grade 7

AQA style

$x^2 - 10x + 4$ can be written in the form $(x + a)^2 + b$, where a and b are integers.

(a) Find the values of a and b .

[2 marks]

Answer _____

(b) Hence write down the coordinates of the minimum point of the graph $y = x^2 - 10x + 4$. **[1 mark]**

Answer _____

teachably

[3 marks]

Q8

Grade 8

AQA style

$3x^2 + 12x + 7$ can be written in the form $p(x + q)^2 + r$, where p , q and r are integers.

(a) Find the values of p , q and r .

[3 marks]

Answer _____

(b) Hence write down the coordinates of the minimum point of the graph $y = 3x^2 + 12x + 7$. **[1 mark]**

Answer _____

teachably

[4 marks]**Q9**

Grade 8

AQA style

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

(a) Write $x^2 + 4x - 3$ in the form $(x + a)^2 + b$.

[2 marks]

Answer _____

(b) Hence solve $x^2 + 4x - 3 = 0$, giving your answers in surd form.

[3 marks]

Answer _____

teachably

[5 marks]

Q10

Grade 8

AQA style

The diagram shows the graph of $y = x^2 + 6x + 4$, which has a minimum turning point at A.

(a) Write $x^2 + 6x + 4$ in the form $(x + a)^2 + b$.

[2 marks]

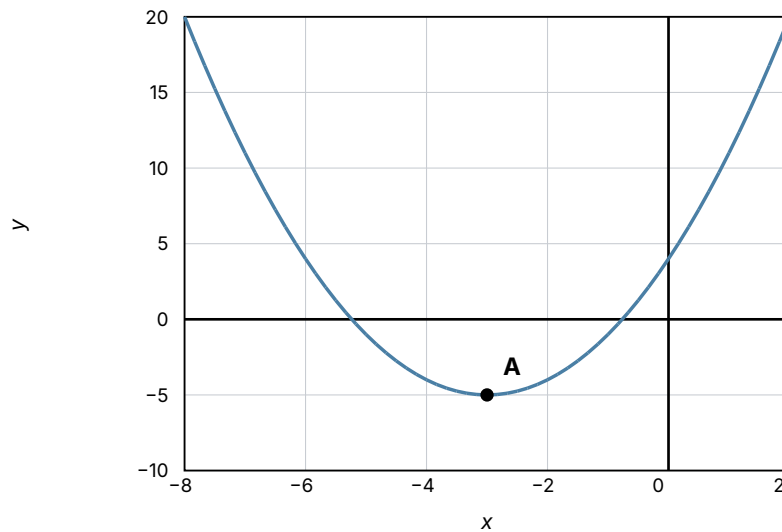


Diagram NOT accurately drawn

Answer _____

(b) Hence write down the coordinates of A and the equation of the line of symmetry [2 marks]
of the curve.

Answer _____

teachably

[4 marks]

OCR-style questions**Q11**

Grade 7

OCR style

$x^2 + 4x + 7$ can be written in the form $(x + a)^2 + b$, where a and b are integers.

(a) Find the values of a and b .

[2 marks]

Answer _____

(b) Hence write down the coordinates of the minimum point of the graph $y = x^2 + 4x + 7$. **[1 mark]**

Answer _____

teachably

[3 marks]**Q12**

Grade 7

OCR style

$x^2 - 8x + 9$ can be written in the form $(x + a)^2 + b$, where a and b are integers.

(a) Find the values of a and b .

[2 marks]

Answer _____

(b) Hence write down the coordinates of the minimum point of the graph $y = x^2 - 8x + 9$. **[1 mark]**

Answer _____

teachably

[3 marks]

Q13

Grade 8

OCR style

$2x^2 - 12x + 5$ can be written in the form $p(x + q)^2 + r$, where p , q and r are integers.

(a) Find the values of p , q and r .

[3 marks]

Answer _____

(b) Hence write down the coordinates of the minimum point of the graph $y = 2x^2 - 12x + 5$. **[1 mark]**

Answer _____

teachably

[4 marks]**Q14**

Grade 8

OCR style

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

(a) Write $x^2 - 2x - 5$ in the form $(x + a)^2 + b$.

[2 marks]

Answer _____

(b) Hence solve $x^2 - 2x - 5 = 0$, giving your answers in surd form.

[3 marks]

Answer _____

teachably

[5 marks]

Q15

Grade 8

OCR style

The diagram shows the graph of $y = x^2 - 4x + 9$, which has a minimum turning point at A.

(a) Write $x^2 - 4x + 9$ in the form $(x + a)^2 + b$.

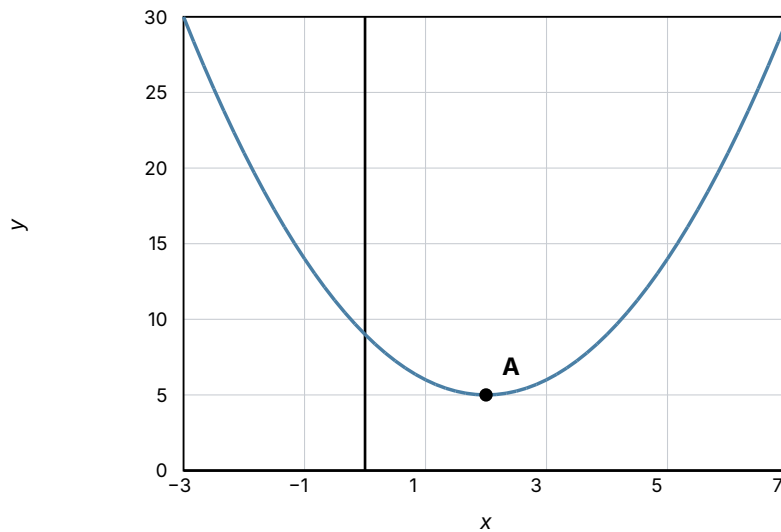
[2 marks]

Diagram NOT accurately drawn

Answer _____

(b) Hence write down the coordinates of A and the equation of the line of symmetry of the curve. **[2 marks]**

Answer _____

teachably

[4 marks]

Teachably-style questions**Q16**

Grade 7

Teachably style

$x^2 + 12x + 1$ can be written in the form $(x + a)^2 + b$, where a and b are integers.

(a) Find the values of a and b .

[2 marks]

Answer _____

(b) Hence write down the coordinates of the minimum point of the graph $y = x^2 + 12x + 1$. **[1 mark]**

Answer _____

teachably

[3 marks]**Q17**

Grade 7

Teachably style

$x^2 - 14x + 2$ can be written in the form $(x + a)^2 + b$, where a and b are integers.

(a) Find the values of a and b .

[2 marks]

Answer _____

(b) Hence write down the coordinates of the minimum point of the graph $y = x^2 - 14x + 2$. **[1 mark]**

Answer _____

teachably

[3 marks]

Q18

Grade 8

Teachably style

$5x^2 + 20x + 3$ can be written in the form $p(x + q)^2 + r$, where p , q and r are integers.

(a) Find the values of p , q and r .

[3 marks]

Answer _____

(b) Hence write down the coordinates of the minimum point of the graph $y = 5x^2 + 20x + 3$. **[1 mark]**

Answer _____

teachably

[4 marks]**Q19**

Grade 8

Teachably style

$$x^2 + 8x + 3 = 0.$$

(a) Write $x^2 + 8x + 3$ in the form $(x + a)^2 + b$.

[2 marks]

Answer _____

(b) Hence solve $x^2 + 8x + 3 = 0$, giving your answers in surd form.

[3 marks]

Answer _____

teachably

[5 marks]

Q20

Grade 8

Teachably style

The diagram shows the graph of $y = x^2 + 2x + 6$, which has a minimum turning point at A.

(a) Write $x^2 + 2x + 6$ in the form $(x + a)^2 + b$.

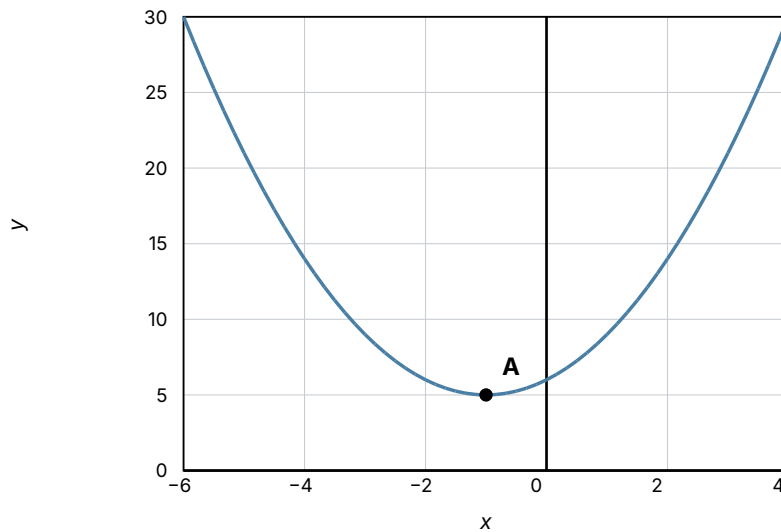
[2 marks]

Diagram NOT accurately drawn

Answer _____

(b) Hence write down the coordinates of A and the equation of the line of symmetry of the curve. **[2 marks]**

Answer _____

teachably

[4 marks]**END OF PAPER****Want help from an expert maths tutor?**

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