GCSE Exam Questions

Completing the Square | Algebra

GCSE Exam Questions: Completing the Square

1) Express $x^2 + 6x + 20$ in the form $(x + a)^2 + b$, where a and b
are integers.

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(2 marks)

2) (a) Express $x^2 - 6x + 4$ in the form $(x + a)^2 + b$, where a and b
are integers.

- -

(2)

(b) Hence, or otherwise, find the coordinates of the turning point
of the graph of $y = x^2 - 6x + 4$.

- -

(1)

(3 marks)

3) By completing the square, solve $x^2 - 8x - 5 = 0$, giving your
answers in surd form.

- -

(4 marks)

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1

GCSE Exam Questions: Completing the Square

4) (a) $2x^2 + 12x - 8$ can be written in the form $a(x + b)^2 - c$

where a, b and c are positive integers. Work out

the values of a, b and c.

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(3)

(b) Hence, or otherwise, solve the equation $2x^2 + 12x - 8 = 0$.

Give your answers in surd form.

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(2)

(5 marks)

5) (a) Write $3x^2 - 6x + 5$ in the form $a(x + b) + c$, where a, b and c

are integers.

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(3)

(b) Hence, or otherwise, find the coordinates of the turning point

of the graph of $y = 3x^2 - 6x + 5$.

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(1)

(4 marks)

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2

GCSE Exam Questions: Completing the Square Answers

	Question	Answer	Marks
1)	Express $x^2 + 6x + 20$ in the form $(x + a)^2 + b$, where a and b are integers.	$(x + 3)^2$ **seen** $(x + 3)^2 + 11$	**(1)** **(1)**
2) (a)	Express $x^2 - 6x + 4$ in the form $(x + a)^2 + b$, where a and b are integers.	**(a)** $(x - 3)^2$ **seen** $(x - 3)^2 - 5$	**(1)** **(1)**
(b)	Hence, or otherwise, find the coordinates of the turning point of the graph of $y = x^2 - 6x + 4$.	**(b)** $(3, -5)$	**(1)**
3)	By completing the square, solve $x^2 - 8x - 5 = 0$, giving your answers in surd form.	$(x - 4)2$ $(x - 4)2 - 21 = 0$ **oe** $x - 4 = \pm\sqrt{21}$ $x = 4 + \sqrt{21} \ and \ x = 4 - \sqrt{21}$	**(1)** **(1)** **(1)** **(1)**
4) (a)	$2x^2 + 12x - 8$ can be written in the form $a(x + b)^2 - c$ where a, b and c are positive integers. Work out the values of a, b and c.	**(a)** $(x + 3)^2$ $2(x+3)^2 - 18 - 8$ **oe** $a = 2, b = 3, c = -26$ **or embedded as** $2(x + 3)^2 - 26$	**(1)** **(1)** **(1)**
(b)	Hence, or otherwise, solve the equation $2x^2 + 12x - 8 = 0$. Give your answers in surd form.	**(b)** $2(x + 3)^2 - 26 = 0$ $x + 3 = \pm\sqrt{13}$ $x = -3 + \sqrt{13} \ and \ x = -3 - \sqrt{13}$	**(1)** **(1)**
5) (a)	Write $3x^2 - 6x + 5$ in the form $a(x + b) + c$, where a, b and c are integers.	**(a)** $(x - 1)^2$ $3(x - 1)^2 - 3 + 5$ **oe** $3(x - 1)^2 + 2$	**(1)** **(1)** **(1)**
(b)	Hence, or otherwise, find the coordinates of the turning point of the graph of $y = 3x^2 - 6x + 5$.	**(b)** $(1, 2)$	**(1)**

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