Name:

GCSE (1 – 9)

Completing the Square

Instructions

- Use **black** ink or ball-point pen.
- Answer all questions.
- Answer the questions in the spaces provided
- there may be more space than you need.
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out**.

Information

- The marks for each question are shown in brackets
- use this as a guide as to how much time to spend on each question.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

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_	(a) Write $x^2 - 6x + 1$ in the form $(x + a)^2 + b$ where <i>a</i> and <i>b</i> are integers.	
		(2)
		(-)
	(b) Hence, or otherwise, write down the coordinates of the turning point of the graph of $y = x^2$ -	-6x + 1
		(1)
	(Total for question 1 is 3	marks)
	(a) White $x^2 + 9x + 5$ in the form $(x + a)^2 + b$ where a and b are integers	
	(a) write $x^2 + \delta x + 5$ in the form $(x + a)^2 + b$ where a and b are integers.	
		(2)
		(2)
	(b) Hence, or otherwise, write down the coordinates of the turning point of the graph of $y = x^2 + y^2$	(2) $+ 8x + 5$
	(b) Hence, or otherwise, write down the coordinates of the turning point of the graph of $y = x^2 - x^2$	(2) + $8x + 5$
	(b) Hence, or otherwise, write down the coordinates of the turning point of the graph of $y = x^2$	(2) $+ 8x + 5$
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	(b) Hence, or otherwise, write down the coordinates of the turning point of the graph of $y = x^2$.	(2) + $8x + 5$ (1)
	(b) Hence, or otherwise, write down the coordinates of the turning point of the graph of $y = x^2 - \frac{1}{2}$	(2) + $8x + 5$ (1) marks)

3	(a) Write $x^2 + 10x + 2$ in the form $(x + a)^2 + b$ where a and b are integers.
	(2)
	(b) Hence, or otherwise, write down the coordinates of the turning point of the graph of $y = x^2 + 10x + 2$
	(1)
_	(Total for question 3 is 3 marks)
4	(a) Write $x^2 - 2x - 1$ in the form $(x + a)^2 + b$ where a and b are integers.
	(2)
	(b) Hence or otherwise write down the coordinates of the turning point of the graph of $y = x^2 - 2x - 1$
	(b) Hence, of otherwise, write down the coordinates of the tarining point of the graph of $y = x^2 - 2x^2 + 1$
	(1)
_	(Total for question 4 is 3 marks)

5	By completing the square, find the coordinates of the turning point of the curve with the
	equation $y = x^2 + 8x + 3$
	You must show all your working.

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(Total for question 5 is 3 marks)

6 By completing the square, find the coordinates of the turning point of the curve with the equation $y = x^2 + 10x - 8$ You must show all your working.

(Total for question 6 is 3 marks)

7	By completing the square, find the coordinates of the turning point of the curve with the
	equation $y = x^2 + 3x - 7$
	You must show all your working.

(Total for question 7 is 3 marks)

8 By completing the square, find the coordinates of the turning point of the curve with the equation $y = x^2 - x + 8$ You must show all your working.

(Total for question 8 is 3 marks)

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9 (a) Write $2x^2 - 12x + 23$ in the form $a(x + b)^2 + c$ where a, b, and c a	are integers.
	(3)
(b) Hence, or otherwise, write down the coordinates of the turning po	bint of the graph of $y = 2x^2 - 12x + 23$
	(1)
	(Total for question 9 is 4 marks)
10 (a) Write $2x^2 + 16x + 26$ in the form $a(x + b)^2 + c$ where <i>a</i> , <i>b</i> , and <i>c</i>	are integers.
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10 (a) Write $2x^2 + 16x + 26$ in the form $a(x + b)^2 + c$ where <i>a</i> , <i>b</i> , and <i>c</i>	are integers.
 (a) Write 2x² + 16x + 26 in the form a(x + b)² + c where a, b, and c (b) Hence, or otherwise, write down the coordinates of the turning point. 	are integers. (3) Solution of the graph of $y = 2x^2 + 16x + 26$
 (a) Write 2x² + 16x + 26 in the form a(x + b)² + c where a, b, and c (b) Hence, or otherwise, write down the coordinates of the turning po 	are integers. (3) int of the graph of $y = 2x^2 + 16x + 26$
 (a) Write 2x² + 16x + 26 in the form a(x + b)² + c where a, b, and c (b) Hence, or otherwise, write down the coordinates of the turning po 	are integers. (3) int of the graph of $y = 2x^2 + 16x + 26$
 (a) Write 2x² + 16x + 26 in the form a(x + b)² + c where a, b, and c (b) Hence, or otherwise, write down the coordinates of the turning po 	are integers. (3) int of the graph of $y = 2x^2 + 16x + 26$
 (a) Write 2x² + 16x + 26 in the form a(x + b)² + c where a, b, and c (b) Hence, or otherwise, write down the coordinates of the turning po 	are integers. (3) (3) (3) (5) (1) (1) (Total for question 10 is 4 marks)

11 (a) Write $2x^2$ $6x \pm 6$ in the form $a(x \pm b)^2 \pm a$ wh	are a h and a are integers
11 (a) write $5x^2 - 6x + 6$ in the form $a(x + b)^2 + c$ wr	ere <i>a</i> , <i>b</i> , and <i>c</i> are integers.
	(3)
(b) Hence, or otherwise, write down the coordinates	of the turning point of the graph of $y = 3x^2 - 6x + 6$
	(1)
	(1)
	(Total for question 11 is 4 marks)
	()
12 (a) Write $3x^2 - 30x + 63$ in the form $a(x + b)^2 + c = 0$	where <i>a</i> , <i>b</i> , and <i>c</i> are integers.
12 (a) Write $3x^2 - 30x + 63$ in the form $a(x+b)^2 + c$	where <i>a</i> , <i>b</i> , and <i>c</i> are integers.
12 (a) Write $3x^2 - 30x + 63$ in the form $a(x+b)^2 + c$	where a , b , and c are integers.
12 (a) Write $3x^2 - 30x + 63$ in the form $a(x+b)^2 + c$	where <i>a</i> , <i>b</i> , and <i>c</i> are integers.
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12 (a) Write $3x^2 - 30x + 63$ in the form $a(x + b)^2 + c$	where <i>a</i> , <i>b</i> , and <i>c</i> are integers.
12 (a) Write $3x^2 - 30x + 63$ in the form $a(x + b)^2 + c$ with the second instance of th	where <i>a</i> , <i>b</i> , and <i>c</i> are integers.
 (a) Write 3x² - 30x + 63 in the form a(x + b)² + c v (b) Hence, or otherwise, write down the coordinates 	where <i>a</i> , <i>b</i> , and <i>c</i> are integers. (3) of the turning point of the graph of $y = 3x^2 - 30x + 63$
 (a) Write 3x² - 30x + 63 in the form a(x + b)² + c v (b) Hence, or otherwise, write down the coordinates 	where <i>a</i> , <i>b</i> , and <i>c</i> are integers. (3) of the turning point of the graph of $y = 3x^2 - 30x + 63$
 (a) Write 3x² - 30x + 63 in the form a(x + b)² + c v (b) Hence, or otherwise, write down the coordinates 	where <i>a</i> , <i>b</i> , and <i>c</i> are integers.
 12 (a) Write 3x² - 30x + 63 in the form a(x + b)² + c with a form a(x + b)² + c with a form a formation of the second se	where <i>a</i> , <i>b</i> , and <i>c</i> are integers.
 12 (a) Write 3x² - 30x + 63 in the form a(x + b)² + c with a form a(x + b)² + c with a formation of the second se	where <i>a</i> , <i>b</i> , and <i>c</i> are integers.
 12 (a) Write 3x² - 30x + 63 in the form a(x + b)² + c with a state of the state of	where <i>a</i> , <i>b</i> , and <i>c</i> are integers.
 12 (a) Write 3x² - 30x + 63 in the form a(x + b)² + c with the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state of the conditional state of the conditional states are also been as a state o	where <i>a</i> , <i>b</i> , and <i>c</i> are integers.
 (a) Write 3x² - 30x + 63 in the form a(x + b)² + c was a start of the start of the	where <i>a</i> , <i>b</i> , and <i>c</i> are integers.
 (a) Write 3x² - 30x + 63 in the form a(x + b)² + c was a start of the start of the	where <i>a</i> , <i>b</i> , and <i>c</i> are integers.
 (a) Write 3x² - 30x + 63 in the form a(x + b)² + c x (b) Hence, or otherwise, write down the coordinates 	where <i>a</i> , <i>b</i> , and <i>c</i> are integers.
 (a) Write 3x² - 30x + 63 in the form a(x + b)² + c x (b) Hence, or otherwise, write down the coordinates 	where <i>a</i> , <i>b</i> , and <i>c</i> are integers.

12	By completing the square, solve $r^2 + 10r$, $3 = 0$	
15	Give your answers in surd form	
	Give your answers in surd form.	
		(Total for question 13 is 5 marks)
14	Dry completing the equare column $x^2 \pm 5x \pm 4.25 = 0$	
17	By completing the square solve $x^2 + 5x + 4.25 = 0$	
17	Give your answers in surd form.	
	Give your answers in surd form. $x^2 + 3x + 4.25 = 0$	
14	Give your answers in surd form. $4.23 - 0$	
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	Give your answers in surd form.	
	Give your answers in surd form.	
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14	Give your answers in surd form.	
14	Give your answers in surd form.	
14	Give your answers in surd form.	
14	By completing the square solve $x^2 + 3x + 4.23 = 0$ Give your answers in surd form.	
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