

Completing the Square

For AQA Level 2 Certificate in Further Mathematics (8365)

Name _____

Total marks: **24**

Answer **all** questions in the spaces provided. Show your working: marks are given for correct method. You may use a calculator.

- 1** Circle the coordinates of the minimum point of the curve $y = (x + 4)^2 - 7$

[1 mark]

$(4, -7)$

$(-4, -7)$

$(-7, -4)$

$(4, 7)$

- 2** Write $x^2 + 7x - 3$ in the form $(x + a)^2 + b$

[2 marks]

Answer _____

- 3** Write $3x^2 - 42x + 143$ in the form $a(x + b)^2 + c$, where a , b and c are integers.

[3 marks]

Answer _____

- 4 (a) Write $7 + 12x - 2x^2$ in the form $a + b(x + c)^2$, where a , b and c are integers. [3 marks]

Answer _____

- (b) Hence write down the coordinates of the maximum point of the curve $y = 7 + 12x - 2x^2$ [1 mark]

Answer (_____ , _____)

- 5 By completing the square, solve $x^2 - 10x + 7 = 0$
Give your answers in the form $p \pm q\sqrt{2}$, where p and q are integers. [3 marks]

Answer _____

- 6 The curve $y = 4x^2 + px + q$ has its minimum point at $\left(\frac{3}{4}, 5\right)$
Work out the value of p and the value of q . [3 marks]

$p =$ _____ $q =$ _____

7 $y = 2x^3 + 9x^2 + 15x - 4$

- (a) Work out $\frac{dy}{dx}$ and write it in the form $6(x + a)^2 + b$

[3 marks]

Answer _____

- (b) Hence explain why y is an increasing function for all values of x .

[1 mark]

8 $y = x^2 - 2kx + k + 6$, where k is a constant.

- (a) By completing the square, show that the minimum value of y is $6 + k - k^2$

[2 marks]

- (b) The curve touches the x -axis.
Work out the two possible values of k .

[2 marks]

Answer _____