

1. For all values of x,
$$x^2 + 6x - 2 = (x + p)^2 + q$$

Find the value of p and the value of q.

$$(x+3)^{2} - 3^{2} - 2$$

$$(x+3)^{2} - 9 - 2$$

$$(x+3)^{2} - 11$$

$$p = \dots 3 \qquad q = \dots$$
(Total 2 marks)

2. Write $x^2 + 10x + 3$ in the form $(x + a)^2 + b$, where a and b are constants.

$$(x+5)^2 - 25 + 3$$

 $(x+5)^2 - 22$

$$(x+5)^2 - 22$$
(Total 3 marks)



3. (a) Express $x^2 - 4x - 10$ in the form $(x + a)^2 + b$

$$(9c-2)^2 - 4 - 10$$

 $(x-2)^2 - 14$

$$(x-2)^2-14$$

(b) Hence write down the minimum value of $y = x^2 - 4x - 10$

(Total 3 marks)



- 4. The expression $x^2 8x + 21$ can be written in the form $(x a)^2 + b$ for all values of x.
 - (a) Find the value of a and the value of b.

$$(x-4)^2-16+21$$
 $(x-4)^2+5$

$$(x-4)^2 + 5$$

The equation of a curve is y = f(x) where $f(x) = x^2 - 8x + 21$.

(b) Write down the coordinates of the minimum point of this curve.

(...4...),(...5...) (Total 3 marks)



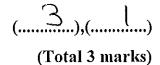
5. (a) Express $x^2 - 6x + 10$ in the form $(x + a)^2 + b$

$$(x-3)^2-9+10$$

 $(x-3)^2+1$

$$(x-3)^2+1$$

(b) Hence write down the minimum value of $y = x^2 - 6x + 10$





6. (a) Express $x^2 + 4x - 12$ in the form $(x + a)^2 + b$

$$(x+2)^2 - 4 - 12$$

 $(x+2)^2 - 16$

 $(x+2)^{2}-16$

(b) Hence, or otherwise, solve $x^2 + 4x - 12 = 0$

$$(x+2)^{2} - 16 = 0$$

$$(x+2)^{2} = 16$$

$$x+2 = \pm \sqrt{16}$$

$$x = -2 \pm 4$$

$$x = -6 \text{ or } 2$$

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(Total 4 marks)



7. By completing the square solve $x^2 + 8x + 13 = 0$

Give your answers in surd form.

$$(3c+4)^{2} - 16 + 13 = 0$$

$$(3c+4)^{2} - 3 = 0$$

$$(3c+4)^{2} = 3$$

$$(3c+4)^{2} = 3$$

$$3c+4 = \pm \sqrt{3}$$

$$3c = -4 \pm \sqrt{3}$$

 $x = -4 + \sqrt{3}$ or $x = -4 - \sqrt{3}$

(Total 5 marks)



8. By completing the square find the minimum point of the curve $y = x^2 + 10x + 3$

$$y = (3c+5)^{2} - 25 + 3$$

 $y = (3c+5)^{2} - 22$

(-5, -22)

(Total 4 marks)