SOLVING QUADRATIC EQUATIONS BY COMPLETING THE SQUARE

Complete the square to solve the quadratic equations in this exercise.

1 $x^2 - 6x + 5 = 0$ **2** $x^2 - 2x - 8 = 0$ **3** $x^2 + 4x - 5 = 0$

① $x^2 - 6x + 5 = 0 \iff (x-3)^2 - 9 + 5 = 0$

$\iff (x-3)^2 = 4$

so $x - 3 = \pm 2 \iff x = \pm 2 + 3$

either $x = 5$ or $x = 1$

② $x^2 - 2x - 8 = 0 \iff (x-1)^2 - 1 - 8 = 0$

$\iff (x-1)^2 = 9$

so $x - 1 = \pm 3 \iff x = \pm 3 + 1$

either $x = -2$ or $x = 4$

③ $x^2 + 4x - 5 = 0 \iff (x+2)^2 - 4 - 5 = 0$

$\iff (x+2)^2 = 9$

so $x + 2 = \pm 3 \iff x = \pm 3 - 2$

either $x = 1$ or $x = -5$

SOLVING QUADRATIC EQUATIONS BY COMPLETING THE SQUARE

6 $x^2 - 4x = 21$ **7** $x^2 - 26x + 25 = 0$ **8** $x^2 - 3x + 2 = 0$

⑥ $(x-2)^2 - 4 = 21$

$\Leftrightarrow (x-2)^2 = 25$

so $x - 2 = \pm 5 \quad \Leftrightarrow \quad x = \pm 5 + 2$

$x = 7$ or $x = -3$

⑦ $x^2 - 26x + 25 = 0$

$\Leftrightarrow (x-13)^2 - 169 + 25 = 0$

$\Leftrightarrow (x-13)^2 = 144$

so $x - 13 = \pm 12 \quad \Leftrightarrow \quad x = \pm 12 + 13$

either $x = 25$ or $x = 1$

⑧ $x^2 - 3x + 2 = 0$

$\Leftrightarrow \left(x - \frac{3}{2}\right)^2 - \frac{9}{4} + 2 = 0$

$\Leftrightarrow \left(x - \frac{3}{2}\right)^2 = \frac{1}{4}$

so $x - \frac{3}{2} = \frac{\pm 1}{2} \qquad x = \pm \frac{1}{2} + \frac{3}{2}$

either $x = 1$ or $x = 2$