

Show that  $x = 4$  is a solution of the equation  $x^2 - 2x - 8 = 0$ .

$$(4)^2 - 2(4) - 8 = 0$$

$$16 - 8 - 8 = 0$$

$$0 = 0$$

The equation  $x^2 + ax + b = 0$ , where  $a, b \in \mathbb{Z}$ , has solutions  $x = 5$  and  $x = -2$ . Find the value of  $a$  and the value of  $b$ .

$$(5)^2 + a(5) + b = 0$$

$$(-2)^2 + a(-2) + b = 0$$

$$25 + 5a + b = 0$$

$$4 - 2a + b = 0$$

$$b = -25 - 5a$$

$$4 - 2a + (-25 - 5a) = 0$$

$$4 - 2a - 25 - 5a = 0$$

$$-21 - 7a = 0$$

$$7a = -21$$

$$a = -21/7$$

$$a = -3$$

$$b = -25 - 5(-3)$$

$$b = -25 + 15$$

$$b = -10$$

Check:

$$(5)^2 - 3(5) - 10 = 0$$

$$(-2)^2 - 3(-2) - 10 = 0$$

$$25 - 15 - 10 = 0$$

$$4 + 6 - 10 = 0$$

$$0 = 0$$

$$0 = 0$$

Find the solutions of the equation  $5x^2 - 2x - 9 = 0$ , where  $x \in \mathbb{R}$ .  
Give each answer correct to 2 decimal places.

$$a = 5, b = -2, c = -9$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(5)(-9)}}{2(5)}$$

$$x = \frac{2 \pm \sqrt{4 + 180}}{10}$$

$$x = \frac{2 \pm \sqrt{184}}{10}$$

$$x = \frac{2 \pm \sqrt{4}\sqrt{46}}{10}$$

$$x = \frac{2 \pm 2\sqrt{46}}{10}$$

$$x = \frac{1 \pm \sqrt{46}}{5}$$

$$x = \frac{1 \pm 6.782}{5}$$

$$x = \frac{1 + 6.782}{5} \quad x = \frac{1 - 6.782}{5}$$

$$x = \frac{7.782}{5} \quad x = \frac{-5.782}{5}$$

$$x = 1.556 \quad x = -1.156$$

Solve the following equation:

$$2(2x + 3) - 3(x + 7) = 5x + 1$$

$$4x + 6 - 3x - 21 = 5x + 1$$

$$4x - 3x - 5x = 1 + 21 - 6$$

$$-4x = 16$$

$$x = 16/-4$$

$$x = -4$$

Solve the following quadratic equation correct to 2 decimal places:

$$4x^2 - 9x + 3 = 0$$

$$a = 4, b = -9, c = 3$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-9) \pm \sqrt{(-9)^2 - 4(4)(3)}}{2(4)}$$

$$x = \frac{9 \pm \sqrt{81 - 48}}{8}$$

$$x = \frac{9 \pm \sqrt{33}}{8}$$

$$x = \frac{9 \pm 5.74}{8}$$

$$x = \frac{9 + 5.74}{8} \quad x = \frac{9 - 5.74}{8}$$

$$x = 1.84 \quad x = 0.41$$

Solve the equation:

$$4(2x + 3) - 7 = 3(x - 5), \text{ where } x \in \mathbb{R}.$$

$$4(2x + 3) - 7 = 3(x - 5)$$

$$8x + 12 - 7 = 3x - 15$$

$$5x = -20$$

$$x = -20/5$$

$$x = -4$$

Solve the simultaneous equations:

$$\begin{aligned}2x - y &= 10 \\ x^2 + y^2 &= 20\end{aligned}$$

$$2x - y = 10 \quad x^2 + y^2 = 20$$

$$y = 2x - 10 \quad x^2 + y^2 = 20$$

$$x^2 + (2x - 10)^2 = 20$$

$$x^2 + (2x - 10)(2x - 10) = 20$$

$$x^2 + 4x^2 - 20x - 20x + 100 = 20$$

$$5x^2 - 40x + 100 = 20$$

$$x^2 - 8x + 20 = 4$$

$$x^2 - 8x + 16 = 0$$

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(16)}}{2(1)}$$

$$x = \frac{8 \pm \sqrt{64 - 64}}{2}$$

$$x = \frac{8 \pm 0}{2}$$

$$x = \frac{8}{2}$$

$$x = 4$$

$$y = 2(4) - 10$$

$$y = 8 - 10$$

$$y = -2$$

Solve the simultaneous equations:

$$\begin{aligned}2x - y &= 7 \\ x^2 + y^2 &= 49.\end{aligned}$$

$$2x - y = 7$$

$$y = 2x - 7$$

$$x^2 + y^2 = 49$$

$$x^2 + (2x - 7)^2 = 49$$

$$x^2 + (2x - 7)(2x - 7) = 49$$

$$x^2 + 4x^2 - 14x - 14x + 49 = 49$$

$$5x^2 - 28x = 0$$

$$x = \frac{-(-28) \pm \sqrt{(-28)^2 - 4(5)(0)}}{2(5)}$$

$$x = \frac{28 \pm \sqrt{784}}{10}$$

$$x = \frac{28 \pm 28}{2}$$

$$x = 14 \pm 14$$

$$x = 28 \quad x = 0$$

$$y = 2(0) - 7$$

$$y = 0 - 7$$

$$y = -7$$

$$y = 2(28) - 7$$

$$y = 56 - 7$$

$$y = 49$$

$$x = 0 \text{ \& } y = -7$$

$$x = 28 \text{ \& } y = 49$$