

2004

Question 3

Q3 (a) Solve $3(x - 4) - 2(5x - 3) = 8$

(b) (i) Evaluate $\frac{2x+1}{4} - \frac{3x-4}{3}$, when $x = \frac{1}{2}$.

Express your answer in form $\frac{a}{b}$, where $a, b \in N$.

(ii) Given that $2(2q - 7p) = q(3p - q)$, express p in terms of q .

(c) (i) Solve the equation $x^2 - 8x + 11 = 0$ and give your answer correct to two decimal places.

(ii) Hence, find the two values of $t \in R$ for which

$$\left(\frac{1}{t}\right)^2 - 8\left(\frac{1}{t}\right) + 11 = 0.$$

Give your answers correct to two decimal places.

Solution

Q3 (a) Solve $3(x-4) - 2(5x-3) = 8$

$$3(x-4) - 2(5x-3) = 8$$

$$3x - 12 - 10x + 6 = 8$$

$$-7x - 6 = 8$$

$$-7x = 14$$

$$7x = -14$$

$$x = -2$$

(b) (i) Evaluate $\frac{2x+1}{4} - \frac{3x-4}{3}$, when $x = \frac{1}{2}$.

$$\frac{2x+1}{4} - \frac{3x-4}{3}$$

$$\frac{2\left(\frac{1}{2}\right)+1}{4} - \frac{3\left(\frac{1}{2}\right)-4}{3}$$

$$\frac{1+1}{4} - \frac{1.5-4}{3}$$

$$\frac{2}{4} - \frac{-2.5}{3}$$

$$\frac{1}{2} + \frac{5}{6}$$

$$\frac{4}{3}$$

(ii) Given that $2(2q - 7p) = q(3p - q)$, express p in terms of q .

$$2(2q - 7p) = q(3p - q)$$

$$4q - 14p = 3pq - q^2$$

$$-14p - 3pq = -q^2 - 4q$$

$$14p + 3pq = q^2 + 4q$$

$$p(14 + 3q) = q^2 + 4q$$

$$p = \frac{q^2 + 4q}{14 + 3q}$$

- (c) (i) Solve the equation $x^2 - 8x + 11 = 0$ and give your answer correct to two decimal places.

$$a = 1, b = -8 \text{ and } c = 11$$

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

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(11)}}{2(1)} \quad \text{sub the numbers in for letters}$$

$$= \frac{8 \pm \sqrt{64 - 44}}{2}$$

$$= \frac{8 \pm \sqrt{20}}{2}$$

$$= \frac{8 \pm 4.4721}{2}$$

$$= \frac{8 + 4.4721}{2}$$

$$= \frac{8 - 4.4721}{2}$$

$$= \frac{12.4721}{2}$$

$$= \frac{3.5279}{2}$$

$$= 6.236$$

$$= 1.763$$

$$= 6.24$$

$$= 1.76$$

- (ii) Hence, find the two values of $t \in R$ for which

$$\left(\frac{1}{t}\right)^2 - 8\left(\frac{1}{t}\right) + 11 = 0.$$

Give your answers correct to two decimal places.

$$x = \frac{1}{t}$$

$$\frac{1}{t} = 6.24$$

$$1 = 6.24t$$

$$\frac{1}{6.24} = t$$

$$t = 0.160$$

$$t = 0.16$$

$$\frac{1}{t} = 1.76$$

$$1 = 1.76t$$

$$\frac{1}{1.76} = t$$

$$t = 0.568$$

$$t = 0.57$$