2003

Question 3

Q3. (a) Given that $p = \frac{x + 2y}{3}$, express y in terms of x and p.

(b) (i) Multiply out: $(3x - 1)(2x^2 + x - 4)$.

(ii) Evaluate your answer to part (i) when $x = -2$.

(c) (i) Solve $x^2 - 13x + 36 = 0$.

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

$$\left(\frac{1}{t} + 2\right)^2 - 13\left(\frac{1}{t} + 2\right) + 36 = 0.$$

Solution

Q3. (a) Given that $p = \frac{x+2y}{3}$, express y in terms of x and p.

$$p = \frac{x+2y}{3}$$

$$3p = x+2y$$

$$x+2y = 3p$$

$$2y = 3p - x$$

$$y = \frac{3p-x}{2}$$

(b) (i) Multiply out: $(3x-1)(2x^2+x-4)$.

$$(3x-1)(2x^2+x-4)$$

$$3x(2x^2+x-4)-1(2x^2+x-4)$$

$$6x^3+3x^2-12x-2x^2-x+4$$

$$6x^3+x^2-13x+4$$

(ii) Evaluate your answer to part (i) when $x = -2$.

$$6x^3+x^2-13x+4$$

$$6(-2)^3+(-2)^2-13(-2)+4$$

$$6(-8)+4+26+4$$

$$-48+34$$

$$-14$$

(c) (i) Solve $x^2 - 13x + 36 = 0$.

$x^2 - 13x + 36 = 0$ GN of 36

$x^2 - 4x - 9x + 36 = 0$

$x(x-4) - 9(x-4) = 0$

$(x-9)(x-4) = 0$

$x - 9 = 0$ $\qquad$ $x - 4 = 0$

$x = 9$ $\qquad$ $x = 4$

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

$$\left(\frac{1}{t} + 2\right)^2 - 13\left(\frac{1}{t} + 2\right) + 36 = 0.$$

$$\frac{1}{t} + 2 = x$$

$\frac{1}{t} + 2 = 9$ $\qquad$ $\frac{1}{t} + 2 = 4$

$\frac{1}{t} = 7$ $\qquad$ $\frac{1}{t} = 2$

$t = \frac{1}{7}$ $\qquad$ $t = \frac{1}{2}$