CHAPTER 2: QUADRATIC EXPRESSIONS AND EQUATIONS

Paper 2

Solution to Question 28

Given $x(x - 12) + 36 = 0$

$x^2 - 12x + 36 = 0$

$(x - 6)(x - 6) = 0$

$x = 6$

Given that this is also a solution of the quadratic equation $ax^2 - 13x = 66$.

Hence, substitute $x = 6$ into the equation:

$a(6^2) - 13(6) = 66$

$36a - 78 = 66$

$36a = 144$

$a = 4$

Solution to Question 29

Given $4x^2 - 3kx = k^2$ has a solution $x = 5$.

Hence, substitute $x = 5$ into the equation:

$4(5^2) - 3k(5) = k^2$

$100 - 15k = k^2$

$k^2 + 15k - 100 = 0$

$(k - 5)(k + 20) = 0$

Thus, $k - 5 = 0$ $\quad$ $k + 20 = 0$

$k = 5$ $\quad$ $k = -20$

Solution to Question 30

Let the rate of filling tank P be x m^3/min.
The rate of filling tank Q is 2 m^3/min less than the rate of filling tank P.
Therefore, tank Q is filled at a rate of $(x - 2)$ m^3/mm.

Volume of each tank = 2 000 m^3

Time taken to fill tank $P = \frac{200}{x}$ min

Time taken to fill tank $Q = \frac{200}{x-2}$ min [longer time needed]

The difference in time taken to fill the tanks = 5 min

Hence,
$$\frac{200}{x-2} - \frac{200}{x} = 5$$
$$\frac{200x - 200(x-2)}{(x-2)(x)} = 5$$
$$200x - 200x + 400 = 5x(x-2)$$
$$400 = 5x^2 - 10x$$
$$0 = 5x^2 - 10x - 400$$
÷ 5:
$$0 = x^2 - 2x - 80$$
$$0 = (x+8)(x-10)$$
$$x = -8,\ 10$$

But $x > 0$
Thus, x = 10 m^3/min

Paper 2

1. Solve the quadratic equation $\frac{5m(m+3)}{4} = m+9$.

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2. Solve the quadratic equation $\frac{15}{2x+7} = x$.

3. Find the roots of the equation $2m-5 = \frac{9m}{m+4}$.

4. Solve $\frac{7x+4}{2x-1} = 2x-1$.