$f(x) = 6x^2 - 9x + 2x - 3$

$f(x) = 3x(2x-3) + 1(2x-3)$

$f(x) = (3x+1)(2x-3)$

The zeros of $f(x)$ are given by

$f(x) = 0$

$6x^2 - 7x - 3 = 0$

$(3x+1)(2x-3) = 0$

$3x + 1 = 0$

$3x = -1$

$x = \frac{-1}{3}$

Or

$2x - 3 = 0$

$2x = 3$

$x = \frac{3}{2}$

Thus, the zeros of $f(x) = 6x^2 - 7x - 3$ are $\alpha = \frac{-1}{3}$ and $\beta = \frac{3}{2}$.

Now,

Sum of the zeros = $\alpha + \beta$

$$= \frac{-1}{3} + \frac{3}{2}$$

$$= \frac{-1 \times 2}{3 \times 2} + \frac{3 \times 3}{2 \times 3}$$

$$= \frac{-2}{6} + \frac{9}{6}$$

$$= \frac{-2+9}{6}$$

$$= \frac{7}{6}$$

and, $= \dfrac{-\text{Coefficient of } x}{\text{Coefficient of } x^2}$

$$= \frac{-(-7)}{6}$$

$$= \frac{7}{6}$$

Therefore, sum of the zeros $= \dfrac{-\text{Coefficient of } x}{\text{Coefficient of } x^2}$

Product of the zeros = $\alpha \times \beta$

$$= \frac{-1}{\cancel{3}} \times \frac{\cancel{3}}{2}$$

$$= \frac{-1}{2}$$

and, $= \dfrac{\text{Constant term}}{\text{Coefficient of } x^2}$

$$= \frac{-3}{6}$$

$$= \frac{-1}{2}$$

Product of zeros $= \dfrac{\text{Constant term}}{\text{Coefficient of } x^2}$

Hence, the relation between the zeros and its coefficient are verified.

(v) Given $p(x) = x^2 + 2\sqrt{2}x - 6$

We have,

$$p(x) = x^2 + 2\sqrt{2}x - 6$$

$$p(x) = x^2 + 3\sqrt{2}x - \sqrt{2}x - 6$$

$$p(x) = x\left(x + 3\sqrt{2}\right) - \sqrt{2}\left(x + 3\sqrt{2}\right)$$

$$p(x) = \left(x - \sqrt{2}\right)\left(x + 3\sqrt{2}\right)$$

The zeros of $p(x)$ are given by

$$p(x) = 0$$

$$p(x) = x^2 + 2\sqrt{2}x - 6$$

$$x^2 + 2\sqrt{2}x - 6 = 0$$

$$\left(x - \sqrt{2}\right)\left(x + 3\sqrt{2}\right) = 0$$

$$\left(x - \sqrt{2}\right) = 0$$

$$x = \sqrt{2}$$

Or

$$\left(x + 3\sqrt{2}\right) = 0$$

$$x = -3\sqrt{2}$$

Thus, The zeros of $p(x) = x^2 + 2\sqrt{2}x - 6$ are $\alpha = \sqrt{2}$ and $\beta = -3\sqrt{2}$

Now,

Sum of the zeros $= \alpha + \beta$

$$= \sqrt{2} - 3\sqrt{2}$$

$$= +\sqrt{2}(1-3)$$

$$= \sqrt{2}(-2)$$

$$= -2\sqrt{2}$$

and,

$$= \frac{-\text{Coefficient of } x}{\text{Coefficient of } x^2}$$

$$= \frac{-2\sqrt{2}}{1}$$
$$= -2\sqrt{2}$$

Therefore, Sum of the zeros = $\frac{-\text{Coefficient of } x}{\text{Coefficient of } x^2}$

Product of the zeros $= \alpha \times \beta$

$$= \sqrt{2} \times -3\sqrt{2}$$
$$= -3 \times 2$$
$$= -6$$

and

$$\frac{\text{Constant term}}{\text{Coefficient of } x^2}$$
$$= \frac{-6}{1}$$
$$= -6$$

Therefore, The product of the zeros = $\frac{\text{Constant term}}{\text{Coefficient of } x^2}$

Hence, the relation-ship between the zeros and coefficient are verified.

(vi) Given $q(x) = \sqrt{3}x^2 + 10x + 7\sqrt{3}$

We have, $q(x) = \sqrt{3}x^2 + 10x + 7\sqrt{3}$

$$q(x) = \sqrt{3}x^2 + 3x + 7x + 7\sqrt{3}$$
$$q(x) = \sqrt{3}x^2 + \sqrt{3} \times \sqrt{3} \times x + 7x + 7\sqrt{3}$$
$$q(x) = \sqrt{3}x\left(x + \sqrt{3}\right) + 7\left(x + \sqrt{3}\right)$$
$$q(x) = \left(x + \sqrt{3}\right)\left(\sqrt{3}x + 7\right)$$

The zeros of g(x) are given by

$$g(x) = 0$$
$$\sqrt{3}x^2 + 10x + 7\sqrt{3} = 0$$
$$\left(x + \sqrt{3}\right)\left(\sqrt{3}x + 7\right) = 0$$
$$x + \sqrt{3} = 0$$
$$x = -\sqrt{3}$$

Or

$$\sqrt{3} + 7 = 0$$
$$\sqrt{3}x = -7$$
$$x = \frac{-7}{\sqrt{3}}$$

Thus, the zeros of $q(x) = \sqrt{3}x^2 + 10x + 7\sqrt{3}$ are $\alpha = -\sqrt{3}$ and $\beta = \frac{-7}{\sqrt{3}}$.

Now,

Sum of the zeros = $\alpha + \beta$

$$= -\sqrt{3} + \frac{-7}{\sqrt{3}}$$

$$= \frac{-\sqrt{3} \times \sqrt{3}}{1 \times \sqrt{3}} + \frac{-7}{\sqrt{3}}$$

$$= \frac{-3}{\sqrt{3}} + \frac{-7}{\sqrt{3}}$$

$$= \frac{-3-7}{\sqrt{3}}$$

$$= \frac{-10}{\sqrt{3}}$$

and = $\frac{-\text{Coefficient of } x}{\text{Coefficient of } x^2}$

$$= \frac{-(+10)}{\sqrt{3}}$$

$$= \frac{-10}{\sqrt{3}}$$

Therefore, sum of the zeros = $\frac{-\text{Coefficient of } x}{\text{Coefficient of } x^2}$

Product of zeros = $\alpha \times \beta$

$$= -\sqrt{\cancel{3}} \times \frac{-7}{\sqrt{\cancel{3}}}$$

$$= +7$$

and = $\frac{-\text{Coefficient of } x}{\text{Coefficient of } x^2}$

********** END **********