$$f(x) = 6x^2 - 9x + 2x - 3$$
$$f(x) = 3x(2x - 3) + 1(2x - 3)$$
$$f(x) = (3x + 1)(2x - 3)$$

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

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

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

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

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

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

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

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

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

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

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

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 **********