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

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.

(vii) Given $f(x) = x^2 - \left(\sqrt{3}+1\right)x + \sqrt{3}$

$$f(x) = x^2 - \sqrt{3}x - 1x + \sqrt{3}$$
$$f(x) = x\left(x-\sqrt{3}\right) - 1\left(x-\sqrt{3}\right)$$
$$f(x) = (x-1)\left(x-\sqrt{3}\right)$$

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

$$f(x) = 0$$
$$x^2 - \left(\sqrt{3}+1\right)x + \sqrt{3} = 0$$
$$(x-1)\left(x-\sqrt{3}\right) = 0$$
$$(x-1) = 0$$
$$x = 0+1$$
$$x = 1$$

Or

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

$x = \sqrt{3}$

Thus, the zeros of $x^2 - \left(\sqrt{3}+1\right)x + \sqrt{3}$ are $\alpha = 1$ and $\beta = \sqrt{3}$

Now,

Sum of zeros = $\alpha + \beta$

$$= 1 + \sqrt{3}$$

$$= 1 + \sqrt{3}$$

And,

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

$$= -\frac{-\left(\sqrt{3}+1\right)}{1}$$

$$= \frac{+\left(\sqrt{3}+1\right)}{1}$$

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

Product of the zeros = $\alpha\beta$

$$= 1 \times \sqrt{3}$$

$$= \sqrt{3}$$

And

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

$$= \frac{\sqrt{3}}{1}$$

$$= \sqrt{3}$$

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

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

(viii) Given $g(x) = a\left(x^2+1\right) - x\left(a^2+1\right)$

$$g(x) = ax^2 - xa^2 + a - x$$

$$g(x) = xa(x-a) - 1(x-a)$$

$$g(x) = (xa-1)(x-a)$$

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

$$g(x) = 0$$

$$ax^2 - \left(a^2+1\right)x + a = 0$$

$$xa - 1 = 0$$

$$xa = 1$$

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

or

$$x - a = 0$$

$$x = a$$

Thus, the zeros of $g(x) = ax^2 - (a^2+1)x + a$ are

$\alpha = \frac{1}{a}$ and $\beta = a$

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

$$= \frac{1}{a} + a$$

$$= \frac{1}{a} + \frac{a \times a}{1 \times a}$$

$$= \frac{1+a^2}{a}$$

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

$$= \frac{-(a^2+1)}{a}$$

$$= \frac{a^2+1}{a}$$

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

$$= \frac{1}{a} \times a$$

$$= \frac{1}{\cancel{a}} \times \cancel{a}$$

$$= 1$$

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

$$= \frac{a}{a}$$

$$= \frac{\cancel{a}}{\cancel{a}}$$

$$= 1$$

Therefore,

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

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

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