Polynomial

Quadratic Polynomial

$p(x) = ax^{2} + bx + c$ → Max power = 2

Zeroes of quad = 2 = α, β

Rel^{n} (i) Sum of Zeroes $\alpha + \beta = -b/a$

(ii) Product of Zeroes $\alpha\beta = c/a$

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Polynomial

Ex → 2.2

① $x^2 - 2x - 8$ (a, b, c)

$= x^2 - (4-2)x - 8$

$= x^2 - 4x + 2x - 8$

$= x(x-4) + 2(x-4)$

$= (x-4)(x+2)$

$x - 4 = 0$ | $x + 2 = 0$

$x = 4$ (α) | $x = -2$ (β)

Product

$\alpha\beta = \frac{c}{a}$

$4 \times (-2) = \frac{-8}{1}$

$-8 = -8$

Verification Sum

(i) $\alpha + \beta = -\frac{b}{a}$

$4 - 2 = -\left(\frac{-2}{1}\right)$

$2 = 2$

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Polynomial

(v) $t^2 - 15$ (a = 1, b = 0, c = -15)

$= t^2 - (\sqrt{15})^2$

$= (t + \sqrt{15})(t - \sqrt{15})$

$t + \sqrt{15} = 0$ / $t - \sqrt{15} = 0$

$t = -\sqrt{15}$ (α) / $t = \sqrt{15}$ (β)

Ver

Sum $\alpha + \beta = -\frac{b}{a}$

$-\sqrt{15} + \sqrt{15} = \frac{-0}{1}$

$0 = 0$

Product $\alpha\beta = \frac{c}{a}$

$-\sqrt{15} \times \sqrt{15} = -\frac{15}{1}$

$-15 = -15$

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formation of polynomial

$$P(x) = k\left(x^2 - (\underbrace{\alpha+\beta}_{\text{Sum}})x + \underbrace{\alpha\beta}_{\text{Product}}\right)$$

no. of zeroes = 4

$= \frac{1}{4}(4x^2 - x - 1)$

$P(x) = 4x^2 - x - 1$

(1) $\alpha + \beta = 2$

$\alpha\beta = 3$

$P(x) = x^2 - 2x + 3$ Ans

(2) $\alpha + \beta = \frac{1}{4}$

$\alpha\beta = -\frac{1}{4}$

$P(x) = x^2 - \frac{1}{4}x - \frac{1}{4}$

$\therefore \frac{4x^2 - x - 1}{4}$

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