ASSIGNMENT 5

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1 QUESTION No 2.18(QUAD FORMS)

Find the zeroes of the quadratic polynomial $x^2 + 7x + 10$ and verify the relationship between the zeros and coefficients.

2 SOLUTION

1) The vector form of equation is

$$y = x^2 + 7x + 10 \qquad (2.0.1)$$

$$\mathbf{x}^T \begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix} \mathbf{x} + \begin{pmatrix} 7 & 0 \end{pmatrix} \mathbf{x} + 10 = 0 \qquad (2.0.2)$$

Thus

$$y = 0 \implies x^2 + 7x + 10 = 0 \qquad (2.0.3)$$
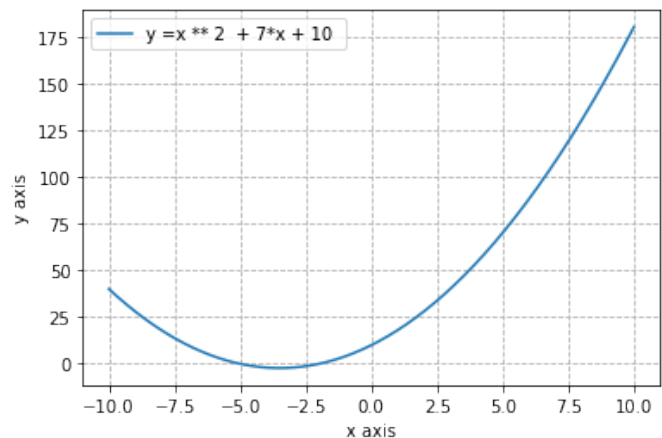$$x^2 + 5x + 2x + 10 = 0 \qquad (2.0.4)$$
$$(x + 2)(x + 5) = 0 \qquad (2.0.5)$$
$$x = -2, -5 \qquad (2.0.6)$$
$$\qquad (2.0.7)$$

Fig. 2.1: $x^2 + 7x + 10$.

The roots are $\alpha = -2$ and $\beta = -5$.
Compare given quadratic equation $x^2 + 7x + 10 = 0$ with $ax^2 + bx + c = 0$,we get
a=1 , b=7 , c= 10.
Sum of the roots

$$\alpha + \beta = \frac{-b}{a} = -7 \qquad (2.0.8)$$

product of the roots

$$\alpha\beta = \frac{c}{a} = 10 \qquad (2.0.9)$$