

# EE3900 : Assignment-5

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Download all python codes from

[https://github.com/Rahul27n/EE3900/blob/main/Assignment\\_5/Assignment\\_5.py](https://github.com/Rahul27n/EE3900/blob/main/Assignment_5/Assignment_5.py)

and latex-tikz codes from

[https://github.com/Rahul27n/EE3900/blob/main/Assignment\\_5/Assignment\\_5.tex](https://github.com/Rahul27n/EE3900/blob/main/Assignment_5/Assignment_5.tex)

Therefore the required quadratic polynomial is given by  $y = x^2 + 3x + 2$ .

The zeroes of the polynomial are given by -1 and -2 as shown in the below figure.

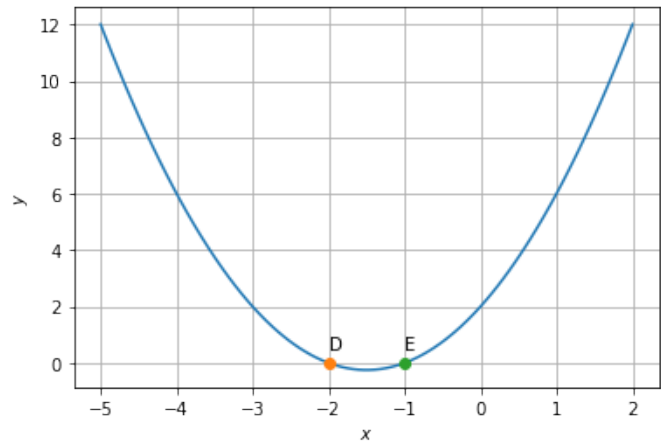


Fig. 0: Quadratic polynomial with zeroes -1 and -2

## 1 QUESTION: QUADRATIC FORMS Q2.17

Find a quadratic polynomial, the sum and product of whose zeroes are -3 and 2, respectively.

## 2 SOLUTION

A general polynomial equation  $p(x, y)$  of degree 2 is given by :

$$Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0 \quad (2.0.1)$$

The vector equation of  $p(x, y)$  is given by :

$$\mathbf{x}^T \begin{pmatrix} A & \frac{B}{2} \\ \frac{B}{2} & C \end{pmatrix} \mathbf{x} + \begin{pmatrix} D & E \end{pmatrix} \mathbf{x} + F = 0 \quad (2.0.2)$$

As the polynomial we have to find is a quadratic polynomial we have :

$$B = 0 \quad (2.0.3)$$

$$C = 0 \quad (2.0.4)$$

$$E = 0 \quad (2.0.5)$$

If we take  $A = 1$  , we have :

$$\text{Sum of zeroes} = -D = -3 \implies D = 3 \quad (2.0.6)$$

$$\text{Product of zeroes} = F = 2 \quad (2.0.7)$$

Substituting the values in (2.0.2) we have :

$$\mathbf{x}^T \begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix} \mathbf{x} + \begin{pmatrix} 3 & 0 \end{pmatrix} \mathbf{x} + 2 = 0 \quad (2.0.8)$$

which is equivalent to :

$$x^2 + 3x + 2 = 0 \quad (2.0.9)$$