

Exercise 20

For the following exercises, find the x - or t -intercepts of the polynomial functions.

$$f(x) = x^3 - 3x^2 - x + 3$$

Solution

To find the x -intercepts, set $f(x) = 0$ and solve the equation for x .

$$x^3 - 3x^2 - x + 3 = 0$$

$$x^2(x - 3) - (x - 3) = 0$$

$$(x^2 - 1)(x - 3) = 0$$

$$(x + 1)(x - 1)(x - 3) = 0$$

$$x + 1 = 0 \quad \text{or} \quad x - 1 = 0 \quad \text{or} \quad x - 3 = 0$$

$$x = -1 \quad \text{or} \quad x = 1 \quad \text{or} \quad x = 3$$

Therefore, the x -intercepts are $(-1, 0)$ and $(1, 0)$ and $(3, 0)$.

