Exercise 19

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

$$f(x) = 2x^4 + 6x^2 - 8$$

Solution

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

$$2x^4 + 6x^2 - 8 = 0$$

$$2(x^4 + 3x^2 - 4) = 0$$

$$2(x^2 + 4)(x^2 - 1) = 0$$

$$2(x^2 + 4)(x + 1)(x - 1) = 0$$

$$x^2 + 4 = 0 \quad \text{or} \quad x + 1 = 0 \quad \text{or} \quad x - 1 = 0$$

$$x^2 = -4 \quad \text{or} \quad x = -1 \quad \text{or} \quad x = 1$$

$$(\text{no real soln}) \quad \text{or} \quad x = -1 \quad \text{or} \quad x = 1$$

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