Exercise 30

For the following exercises, find the intercepts of the functions.

$$f(x) = (x+3)(4x^2 - 1)$$

Solution

In order to find the y-intercept, set $x = 0$.

$$f(0) = (3)(-1) = -3$$

Therefore, the y-intercept is $(0, -3)$. To find the x-intercept(s), set $y = 0$ and solve the equation for x.

$$(x+3)(4x^2 - 1) = 0$$

$$x + 3 = 0 \quad \text{or} \quad 4x^2 - 1 = 0$$

$$x = -3 \quad \text{or} \quad (2x+1)(2x-1) = 0$$

$$x = -3 \quad \text{or} \quad 2x + 1 = 0 \quad \text{or} \quad 2x - 1 = 0$$

$$x = -3 \quad \text{or} \quad 2x = -1 \quad \text{or} \quad 2x = 1$$

$$x = -3 \quad \text{or} \quad x = -\frac{1}{2} \quad \text{or} \quad x = \frac{1}{2}$$

Therefore, the x-intercepts are $(-3, 0)$ and $\left(-\frac{1}{2}, 0\right)$ and $\left(\frac{1}{2}, 0\right)$.