

Exercise 33

For the following exercises, find the zeros and give the multiplicity of each.

$$f(x) = x^2(x^2 + 4x + 4)$$

Solution

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

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

$$x^2(x + 2)^2 = 0$$

$$x^2 = 0 \quad \text{or} \quad (x + 2)^2 = 0$$

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

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

The multiplicity of $x = 0$ is 2, and the multiplicity of $x = -2$ is 2.