Exercise 31

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

$$f(x) = x^2(2x+3)^5(x-4)^2$$

Solution

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

$$x^2(2x+3)^5(x-4)^2 = 0$$

$$x^2 = 0 \quad \text{or} \quad (2x+3)^5 = 0 \quad \text{or} \quad (x-4)^2 = 0$$

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

$$x = 0 \quad \text{or} \quad x = -\frac{3}{2} \quad \text{or} \quad x = 4$$

The multiplicity of $x = 0$ is 2, the multiplicity of $x = -\frac{3}{2}$ is 5, and the multiplicity of $x = 4$ is 2.