Exercise 40

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

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

Solution

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

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

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

$$2x^5(x - 2)^2 = 0$$

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

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

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

The multiplicity of $x = 0$ is 5, and the multiplicity of $x = 2$ is 2.