Exercise 34

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

$$f(x) = (2x+1)^3(9x^2 - 6x + 1)$$

Solution

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

$$(2x+1)^3(9x^2 - 6x + 1) = 0$$

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

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

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

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

The multiplicity of $x = -\frac{1}{2}$ is 3, and the multiplicity of $x = \frac{1}{3}$ is 2.