

Provide a clear and organized presentation. Show all of your work and provide exact values only. Completely simplify your answer.

$$y^2(8x^4 + 12x^3 + 10x^2 + 5x + 1) \frac{dy}{dx} = (y + \sqrt{2y^2 + 3})(16x^4 + 28x^3 + 40x^2 + 27x + 8)$$