

Each problem is worth 5 points. Clear and complete justification is required for full credit.

1. Find the derivative of $y = \frac{x^2 + 4x + 3}{\sqrt{x}} = x^{3/2} + 4x^{1/2} + 3x^{-1/2}$ *Divide through first!*

$$y' = \frac{3}{2}x^{1/2} + 2x^{-1/2} - \frac{3}{2}x^{-3/2}$$

2. Find the derivative of $f(x) = e^x \sqrt{x} = e^x \cdot x^{1/2}$

$$f'(x) = e^x \cdot \sqrt{x} + e^x \cdot \frac{1}{2}x^{-1/2}$$

used Product Rule

$$f'(x) = e^x (\sqrt{x} + \frac{1}{2}x^{-1/2})$$

Great

$$h(x)' = f' \cdot g + f \cdot g'$$

3. Find the derivative of $y = (r^2 - 2r)e^r$.

$$(fg)' = f'g + g'f$$

$$y = \underbrace{(r^2 - 2r)}_f \underbrace{e^r}_g$$

$$y' = (r^2 - 2r)'e^r + (r^2 - 2r)(e^r)'$$

$$y' = (2r - 2)e^r + (r^2 - 2r)e^r$$

$$y' = 2re^r - 2e^r + r^2e^r - 2re^r$$

Great

$$y' = e^r (r^2 - 2)$$