

Part II: Free Response – Show all work.

1a. $\frac{d}{dx}(\cot^{-1}(e^{2x}))$

b. $\frac{d}{dx}(3\cos(x^2 + 2x))$

c. $\frac{d}{dx}\left[-4x^5 + 8^x - \frac{7}{5}\sqrt[4]{x^5} - \frac{3}{\sqrt[7]{x^6}} - \frac{1}{2x}\right]$

d. $\frac{d}{dx}\left(\frac{3x}{15+x^2}\right)$

2. $\frac{d}{dx}(e^{-2x} \cos x)$

3. If $g(x) = \ln(9 - x^2)$, find $g''(x)$

4. Find $\frac{dy}{dx}$ in factored form if $y = 3\sin^{-1}\left(\frac{x}{3}\right) + \sqrt{9-x^2}$.

5. Find the equations of the lines tangent and normal $y = \frac{-3x}{x^2+1}$ at $x = -1$.