

1. Find the derivative of

a) $f(x) = \frac{-e^x}{4} + x^2 - 1.$

b) $g(t) = \sqrt{1 - 3t^2}.$

c) $p(x) = 3e^{-2x^2} + x.$

2. Find the equation of the tangent line to the graph of the function $f(x) = e^{1-2x}$ at the point where $x = \frac{1}{2}.$

3. Let $f(x) = \ln(1 + 2x)$ and $g(x) = ax^2 + bx + c$, where a, b, and c are constants.

a) Find $f(0)$, $f'(0)$, and $f''(0)$.

b) Find the value of c so that $g(0) = f(0)$. (Bonus)

c) Find the value of b so that $g'(0) = f'(0)$. (Bonus)

d) Find the value of a so that $g''(0) = f''(0)$. (Bonus)