Nicely show all your work on this page. No books, notes, calculators!

1. Use the definition of the derivative to differentiate \( f(x) = 2x^2 - 3x \) and \( g(x) = \frac{1}{\sqrt{x}} \).

2. Given are two differentiable functions \( f \) and \( g \) with \( f(2) = 1, \ g(3) = 2, \ f'(2) = 3, \ g'(3) = 4, \ f(3) = 5, \) and \( f'(3) = 6 \). Find \((2f)'(2), (f + g)'(3), (f \cdot g)'(3), (f/g)'(3), f'(g(3)), \) and \((f \circ g)'(3)\).

3. Find the tangent line to the graph of \( y^4 + 3y - 4x^3 = 5x + 1 \) at the point \((1, -2)\).

4. Gravel is being dumped from a conveyor belt at a rate of 30 ft\(^3\)/min and its coarseness is such that it forms a pile in the shape of a cone whose base diameter and height are always equal. How fast is the height of the pile increasing when the pile is 10 ft high?