1. For the function \( f(x) = (2x + 1)^{-1} \), the tangent line at \( x = 2 \) has equation \( y = (-2/25)(x - 2) + 1/5 \). Graph \( f(x) \) and the tangent line.

2. State
   - the definition of “Continuous” and
   - the definition of “Differentiable”.

Give an example of a function that is one but not the other.
3. Compute the following derivatives:

/10  (a)  \( f(x) = \sqrt{x^2 + \frac{3}{x} + x^{3/4} + \cot(x) - \sin(7)} \)
\( \Rightarrow f'(x) = \)

/10  (b)  \( D_x \left[ \cos(x) \sin(8 + x^5 + 3x) \right] = \)

/10  (c)  \( y = \tan^5(6x^3 - 7x) \Rightarrow \frac{dy}{dx} = \)
4. Use implicit differentiation to find an equation for the tangent line to the curve defined by \( y^3 + x^2 y^4 = 1 + 2x \) at the point \((0, 1)\).

5. State the Intermediate Value Theorem. Identify what are its assumptions (hypotheses) and what are its conclusions.
6. A trough is 10m long and its ends have the shape of isosceles triangles that are 3m across at the top and have a height of 1m. The trough is being filled with water at a rate of 12m³/min. Draw and label a diagram illustrating this scenario. How fast is the water level rising when it is 0.5m deep?

7. Use a linear approximation (or differentials) to estimate \((8.03)^{2/3}\).
Total