

Instructions Please write your name in the upper right-hand corner of the page. Write complete sentences to explain your solutions.

1. Find an approximate solution of the equation $x^5 - x^2 - 32 = 0$ by doing one iteration of Newton's method starting from the initial guess $x_0 = 2$.

2. Find an equation for the line tangent to the graph of $y = e^{\sin x}$ at the point on the graph where $x = 0$.

3. For the curve given in parametric form by $x(t) = \ln(2t)$ and $y(t) = e^{3t}$, find the slope dy/dx at the point on the curve where $t = 1$.

4. The TI-89 calculator says that

$$\frac{d}{dx} (x^{1/x}) = \left(\frac{1}{x^2} - \frac{\ln(x)}{x^2} \right) x^{1/x}.$$

Supply a calculation that confirms this result, assuming that $x > 0$.
(Use the method of logarithmic differentiation.)