

(1) [5] Determine dy/dx by implicit differentiation:

$$\ln(xy) = e^{xy}$$

(2) [5] Determine y' if $y = x^{\sqrt{x}}$. (Logarithmic differentiation may be helpful here.)

(3) [5] Suppose you are using Newton's method to find a root of $x^4 = 3x - 1$ that is between $x = 0$ and $x = 1$. Using a starting value of $x_1 = 0.5$, determine x_2 , the next approximation given by Newton's method.