MATH 3A QUIZ 3 (THURSDAY)

NAME:_____ SECTION (CIRCLE) 1A 1B 1C 1D 1E 1F

1. Find derivative of the implicit function

$$x^{1/2} + y^{1/2} = xy$$

$$\tfrac{1}{2} x^{-1/2} + \tfrac{1}{2} y^{-1/2} \cdot y' = y + x \cdot y'$$

$$y' \cdot \left(\tfrac{1}{2} y^{-1/2} - x\right) = y - \tfrac{1}{2} x^{-1/2}$$

$$y' = \frac{y - \tfrac{1}{2} x^{-1/2}}{\tfrac{1}{2} y^{-1/2} - x}$$

2. Find the linearization of the function $y = \ln(x)$ at $a = e^2$. Using this linearization, find an approximate value of $\ln(1.1e^2) = \ln(e^2 + 0.1e^2)$.

$L(x) = f(a) + f'(a) \cdot (x-a)$

$f(a) = f(e^2) = \ln(e^2) = 2$

$f'(x) = \frac{1}{x}$

$f'(e^2) = \frac{1}{e^2}$

Linearization:

$L(x) = 2 + \frac{1}{e^2}(x-e^2) =$

$= \frac{x}{e^2} + 2 - 1 = \frac{x}{e^2} - 1$

$L(1.1e^2) = 2 + \frac{1}{e^2} \cdot 0.1e^2 = 2.1$