

MAT 136 (Calculus I), Quiz 6, Prof. Jim Swift

Name: _____

key

You may work on this in groups, but turn in your own quiz. (Being here gets 1 free point.)

1. (1 point) Find the derivative of

$$f(x) = \ln|x^2 - 3x + 1|$$

$$f'(x) = \frac{1}{x^2 - 3x + 1} \cdot \frac{d}{dx}(x^2 - 3x + 1) = \frac{2x - 3}{x^2 - 3x + 1}$$

2. (3 points) (a) Find the local linearization of $f(x) = \frac{1}{x}$ at 10. ($a=10$)

$$L_{10}(x) = f(10) + f'(10)(x - 10)$$

$$L_{10}(x) = \frac{1}{10} - \frac{1}{100}(x - 10)$$

$$f(10) = \frac{1}{10}$$

$$f'(x) = -x^{-2}$$

$$f'(10) = -10^{-2} = -\frac{1}{100}$$

(b) Use the answer to part (a) to get a decimal approximation to $\frac{1}{11}$, without a calculator and without doing long division.

$$\frac{1}{11} = f(11) \approx L_{10}(11) = \frac{1}{10} - \frac{1}{100} = \frac{10}{100} - \frac{1}{100} = \frac{9}{100} = 0.09 \therefore \boxed{\frac{1}{11} \approx 0.09}$$