

Math 157 - Quiz 8x

November 5, 2014

Name key

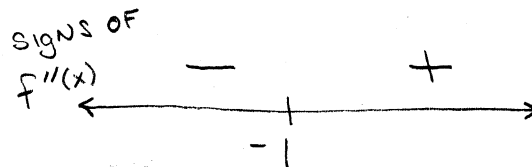
Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (5 points) Find the inflection point(s) of the graph of
- $f(x) = xe^{2x}$
- .

$$f'(x) = e^{2x} + 2xe^{2x} = e^{2x}(1+2x)$$

$$\begin{aligned} f''(x) &= 2e^{2x} + 2e^{2x} + 4xe^{2x} \\ &= e^{2x}(4+4x) \end{aligned}$$



$$\begin{aligned} f''(x) = 0 &\Rightarrow 4+4x=0 \\ &\Rightarrow x=-1 \end{aligned}$$

CONCAVITY CHANGES AT $x=-1$

$(-1, -e^{-2})$ IS THE ONLY
INFLECTION PT.

2. (5 points) Use the 2nd derivative to determine whether the graph of
- $f(x) = x^2e^{-x}$
- is concave up or concave down at
- $x=3$
- .

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

$$\begin{aligned} f''(x) &= 2e^{-x} - 2xe^{-x} - 2xe^{-x} + x^2e^{-x} \\ &= e^{-x}(2-4x+x^2) \end{aligned}$$

$$f''(3) = e^{-3}(2-12+9)$$

$$= -e^{-3} < 0 \Rightarrow \text{Graph is CD AT } x=3$$