Quiz #5b Math 101 Semester 042

Name:	I.D.		

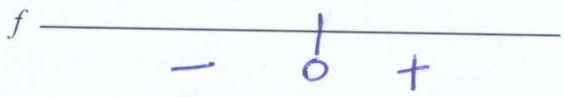
Q27/5.3 Consider the function $f(x) = x\ e^{-3x}$ Follow the steps to sketch the Graph of the function.

1) Find symmetry if any

No

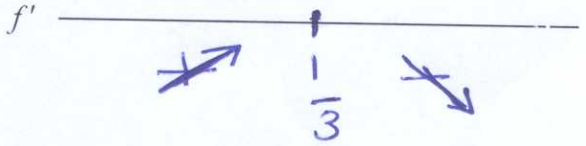
2) Find y-int. then x-int. then check if the graph above the x-axis or below.

$(0,0)$



3) Find critical points then check if the graph increasing or decreasing , then find relative extreme

$$f'(x) = e^{-3x} - 3x\,e^{-3x}$$
$$= e^{-3x}(1-3x)$$

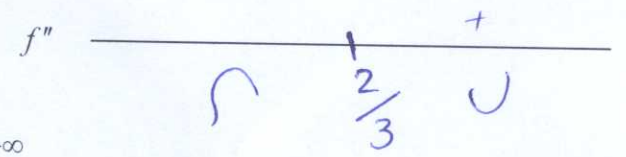


4) Find asymptotes if any

$\lim_{x\to\infty} f(x) = 0$ $\quad y=0$ $\quad$ H. A.

5) Check if the graph concave up or down then find inflection points if any

$$f''(x) = e^{-3x}(-3) + (-3)\,e^{-3x}(1-3x)$$
$$= 3e^{-3x}(3x-2)$$



6) Check the behavior of the graph as $x \to \infty$ and $x \to -\infty$

7) Is there a cusp or a vertical tangent

8) Find the absolute extremum in the [0,2]

9) Sketch the graph

(6) $\lim_{x\to-\infty} f(x) = -\infty$

(7) No

(8)

x	$f(x)$	
0	0	Abs. min $x=0$
$\frac{1}{3}$	$\frac{1}{3e}$	Abs max $x=\frac{1}{3}$
2	$\frac{2}{e^6}$