

MATH 133 – Calculus with Fundamentals 1  
Quiz 8 – December 3, 2015

Your Name: \_\_\_\_\_

*Directions*

Do all work in the space provided below or on the back of the second sheet. There are 30 total points possible. You may use a calculator but not any graphing features.

*Questions*

1) Both parts of this question refer to the function  $f(x) = -x^3 + 3x + 1$

(a) (5) Compute  $f'(x)$  and find all of the critical points of  $f$ .

(b) (5) Find the maximum and minimum values of  $f$  on the closed interval  $[-2, 0]$ .

2) Let  $f(x) = xe^{-3x}$

(a) (5) Compute  $f'(x)$  and  $f''(x)$ .

(b) (5) Determine the interval(s) where  $y = f(x)$  is *concave up* and the interval(s) and where  $y = f(x)$  is *concave down*.

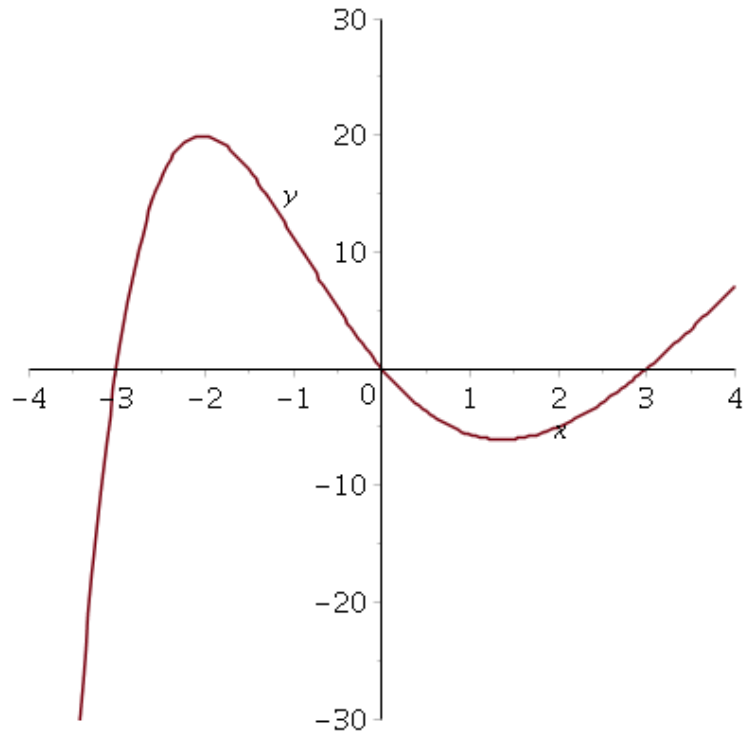


Figure 1: Plot of  $y = f'(x)$  for Problem 3

3) The graph above shows  $y = f'(x)$  for some function  $f$  (NOTE: this is the graph of the derivative  $y = f'(x)$ , NOT  $y = f(x)$ ).

(a) (3) What are the critical points of  $f$  in the interval  $[-4, 4]$ ?

Answer:  $x =$  \_\_\_\_\_

(b) (2) At which  $x$  value(s) in this interval does  $f$  have a local maximum?

Answer:  $x =$  \_\_\_\_\_

(c) (1) Explain briefly how you know your answer in (b) is correct.

(d) (2) On the interval  $(-1, 1)$ , is the graph  $y = f(x)$  concave up or concave down?

Answer: \_\_\_\_\_

(e) (2) How many points of inflection does  $y = f(x)$  have in the interval  $[-4, 4]$ , and what are the approximate  $x$ -values where they are located?

Answer: \_\_\_\_\_