

**WRITE YOUR NAME:**

MAC 2233 Homework 3

Due in class, Friday February 9th

You can use more paper if necessary, but please STAPLE

**Question 1.** Differentiate the given function.

$$f(x) = \frac{x^7 - 8x^5}{x^3}$$

**Question 2.** Find the **equation** of the line that is tangent to the graph of the given function at the point where  $x = 0$ .

$$y = (x^2 + 5x + 4)(x^2 + 5x + 6)$$

**Question 3.** Differentiate the function and simplify your answer.

$$f(x) = \frac{1}{\sqrt{3x^2 - 1}}$$

**Question 4.** Differentiate the function and simplify your answer.

$$f(x) = \frac{(x+1)^3}{(x-1)^8}$$

**Question 5.** Consider the function  $f(x) = 6x^2 - x^3$ .

(a) Find  $f'(x)$  and  $f''(x)$ .

(b) Evaluate  $f(x)$  and  $f'(x)$  at  $x = 0, 1, 2, 3, 4, 5,$  and  $6$ .

(c) Use the information from (b) to draw a graph of  $f(x)$  on the interval  $0 \leq x \leq 6$ .

(d) What value of  $x$  do you think makes  $f(x)$  the largest? What value of  $x$  do you think makes  $f'(x)$  the largest? What does that say about the graph at those points?