

MATH 211

TEST I

NAME \_\_\_\_\_

Prof. J. Beachy

2/7/97

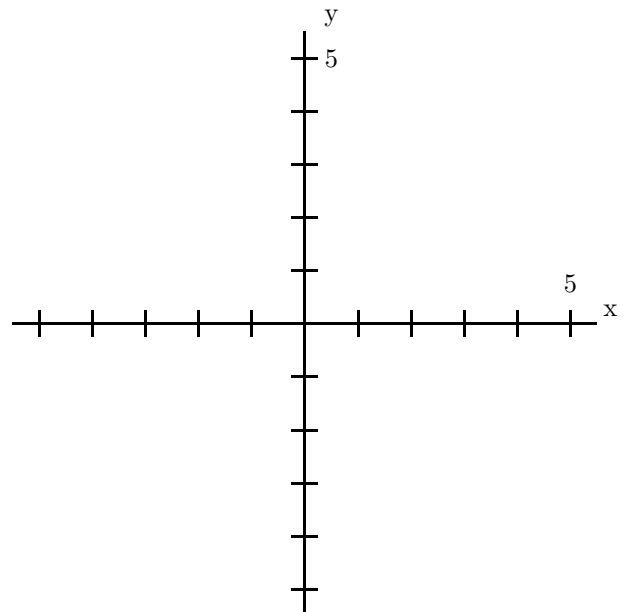
Circle recitation time: T 11:00 Th 10:00 Th 11:00

NO CALCULATORS! Be sure to show all necessary work. In your answers, only do the obvious arithmetic simplifications.

1. (8 points) Find the composite function  $h(g(x))$ , where  $h(x) = \frac{x+1}{3x-1}$  and  $g(x) = \frac{1}{x^2}$ . *Simplify your answer.*

2. (7 points) A company estimates that its cost per week for  $x$  customers will be  $C(x) = 550x + 6500$  dollars, and its revenue will be  $R(x) = 1200x$  dollars. How much profit will the company earn in a week when it has 12 customers?

3. (10 points) On the axes given below, sketch the graphs of the two functions  $y = x^2$  and  $y = x + 2$ .



4. (25 points) Find the derivative  $f'(x)$  of each of the following functions. Use the formulas you have learned—do *not* use the limit definition of the derivative.

(a)  $f(x) = 2x^7 - x^5 + x + 8$

(b)  $f(x) = \frac{x^2}{2} + \frac{2}{x^2}$

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

(d)  $f(x) = \frac{6}{x^2 + 2x + 5}$

(e)  $f(x) = \left(x^4 - \frac{1}{x} + 7\right)^{6/5}$

5. (5 pts) Find the equation of the line tangent to the curve  $y = x^3 + 3x - 8$  at  $x = 2$ .

6. (10 pts) (a)  $\frac{d}{dx}(x^3 + t^3) =$

(b) Find  $f''(3)$ , if  $f(x) = \sqrt{10 - 2x}$ .

7. (10 pts) Find the following limits.

$$\lim_{x \rightarrow 8} \frac{\sqrt{5x - 6} - 1}{3x^2 + 2} =$$

$$\lim_{x \rightarrow 5} \frac{x^2 - 6x}{x^2 - 5x - 6} =$$

8. (25 points)

(a) Complete the limit definition of the derivative of a function  $f(x)$ :

$$f'(x) = \lim_{h \rightarrow 0}$$

(b) Use the limit definition of the derivative of a function to find  $f'(x)$ , for the function

$$f(x) = \frac{1}{x}.$$

(c) Use the limit definition of the derivative of a function to find  $f'(4)$ , for the function

$$f(x) = \sqrt{2x - 1}.$$

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Total	/100
Grade	