

# MATH 75

## Test 1

June 6, 2005

**Name:** \_\_\_\_\_

**Email:** \_\_\_\_\_

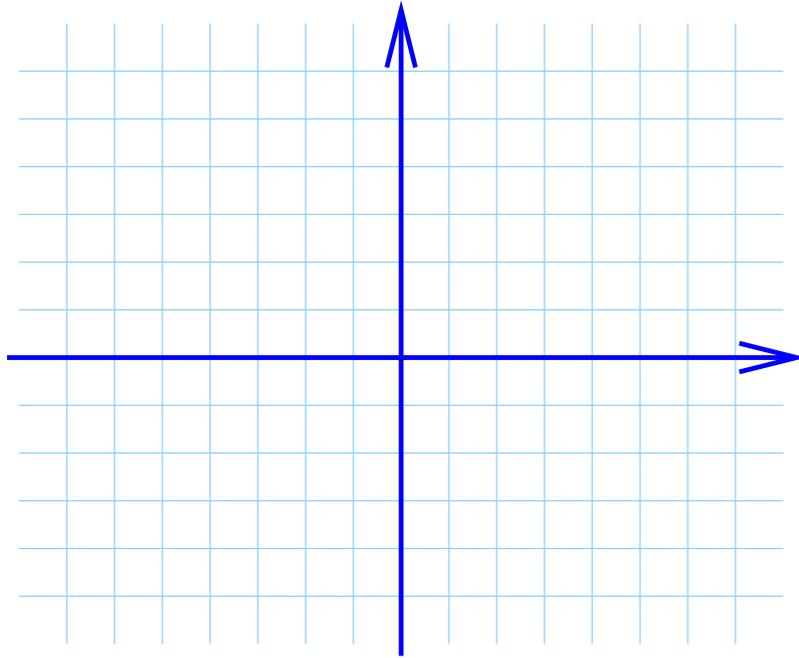
- No books, notes, or calculators are allowed.
- Please show all your work.
- Please simplify your answers.

Multiple choice questions: circle the correct answer

1. Find the domain of the function  $f(x) = \frac{5}{\sqrt{x}}$ .
- A.  $x < 0$       B.  $x \leq 0$       C.  $x \neq 0$       D.  $x \geq 0$       E.  $x > 0$
2. If  $f(x) = \sin x$  and  $g(x) = x^3$ , find  $(f \circ g)(x)$ .
- A.  $x^3 \sin x$       B.  $3x^2 \cos x$       C.  $\sin^3 x$       D.  $\sin x^3$
- E. None of the above
3. Find the derivative of  $\frac{x^3 + 1}{x^2}$ .
- A.  $\frac{3x^2}{2x}$       B.  $\frac{3}{2}x$       C.  $1 - \frac{2}{x^3}$       D.  $\frac{5x^4 + 2x}{x^4}$       E.  $\frac{2-x^3}{x^3}$
4. Evaluate the limit:  $\lim_{x \rightarrow 4} \frac{x-2}{x+4}$
- A. 0      B.  $\infty$       C. 1      D.  $\frac{1}{4}$       E. Does not exist
5. If  $f(0) = 1$ ,  $f'(0) = 2$ ,  $g(0) = 3$ , and  $g'(0) = 5$ , find the derivative of the product  $f(x)g(x)$  at  $x = 0$ .
- A. -1      B. 0      C. 1      D. 10      E. 11
6. If the curve  $y = \sin x$  is stretched horizontally by a factor of 2 then the equation of the new curve is
- A.  $y = \sin x + 2$       B.  $y = \sin(x + 2)$       C.  $y = \sin\left(\frac{1}{2}x\right)$       D.  $y = \sin(2x)$       E.  $y = 2 \sin x$

**Regular problems: show all your work**

7. Sketch the graph of  $f(x) = (x + 1)^2 - 3$ .

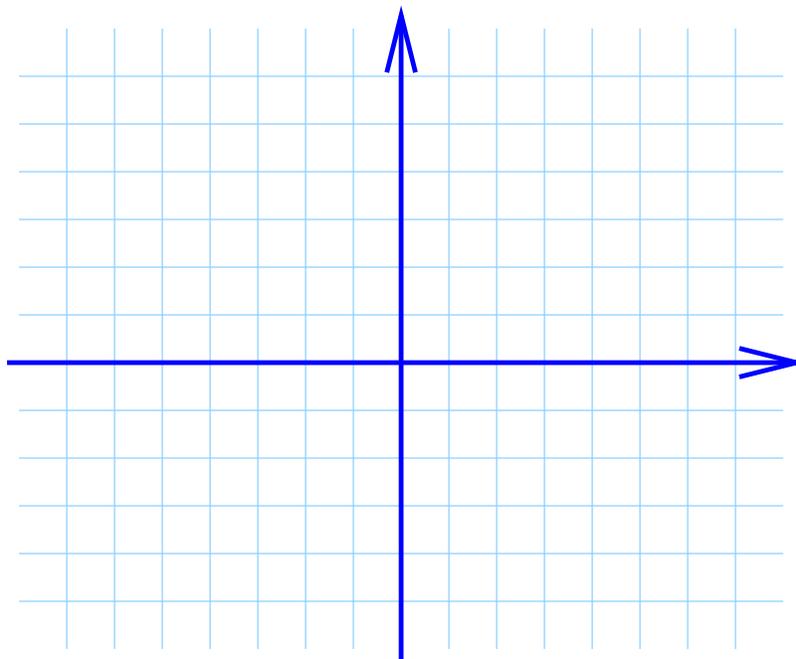


8. Find an equation of the tangent line to  $y = (x + 1)^2 - 3$  at  $(-3, 1)$ . Draw this tangent line on the above graph.

9. Show that the equation  $13x^5 + 5x + 13 = 0$  has a real root.

10. Evaluate the limit:  $\lim_{x \rightarrow 9} \frac{9 - \sqrt{x}}{x - 9}$ . If the limit is infinite, determine whether it is  $+\infty$  or  $-\infty$ .

11. Let  $f(x) = \begin{cases} 3 - x & , \text{ if } x < -1 \\ 5 & , \text{ if } x = -1 \\ -2x + 2 & , \text{ if } -1 < x < 2 \\ x & , \text{ if } x \geq 2 \end{cases}$ .
- Sketch the graph of  $f(x)$ .



Is  $f(x)$  continuous at  $-1$ ?

Is  $f(x)$  continuous at  $2$ ?

12. Find the derivative of the function  $f(x) = \frac{x^2}{\sqrt{x}} \left( 5 + \frac{1}{x} \right)$ .
- Simplify your answer.

Please do not write anything on this page

Problem	Value	Score
1	3	
2	3	
3	3	
4	3	
5	3	
6	3	
7	5	
8	5	
9	5	
10	5	
11	7	
12	5	
Total	50	

	Your scores so far	Out of
Homework		59
Quizzes		20
Test 1		50
Total		129
Grade		

This page may be used as scratch paper