# MATH 75

Test 1

February 23, 2004

Name:_____

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

   A. $x > 0$ **B.** $x \geq 0$ **C.** $x < 0$ **D.** $x \geq 1$ **E.** $x \neq 0$

2. If $f(x) = \sin x$ and $g(x) = 5x + 1$, find $(f \circ g)(x)$.

   A. $\sin x + 5x + 1$ **B.** $\sin x(5x + 1)$ **C.** $\sin(5x + 1)$ **D.** $5\sin x + 1$

   E. None of the above

3. Find the derivative of $\dfrac{x^2}{3x + 1}$.

   A. $\dfrac{2x}{3}$ **B.** $3x^2 + 2x$ **C.** $\dfrac{3x^2 + 2x}{(3x + 1)^2}$ **D.** $-\dfrac{3x^2 + 2x}{(3x + 1)^2}$ **E.** Does not exist

4. In which of the following intervals does the function $f(x) = x^3 + x - 5$ have a root?

   A. $[-2, -1]$ **B.** $[-1, 0]$ **C.** $[0, 1]$ **D.** $[1, 2]$ **E.** Does not have a root

5. If $f(1) = -2$, $f'(1) = 3$, $g(1) = 4$, and $g'(1) = 6$, find the derivative of the product $f(x)g(x)$ at $x = 1$.

   A. 0   **B.** 9   **C.** 10   **D.** 18   **E.** -24

6. If the curve $y = e^x$ is shifted 3 units downward then the equation of the new curve is

   A. $y = e^x + 3$ **B.** $y = e^x - 3$ **C.** $y = 3 - e^x$ **D.** $y = e^{x+3}$ **E.** $y = e^{x-3}$
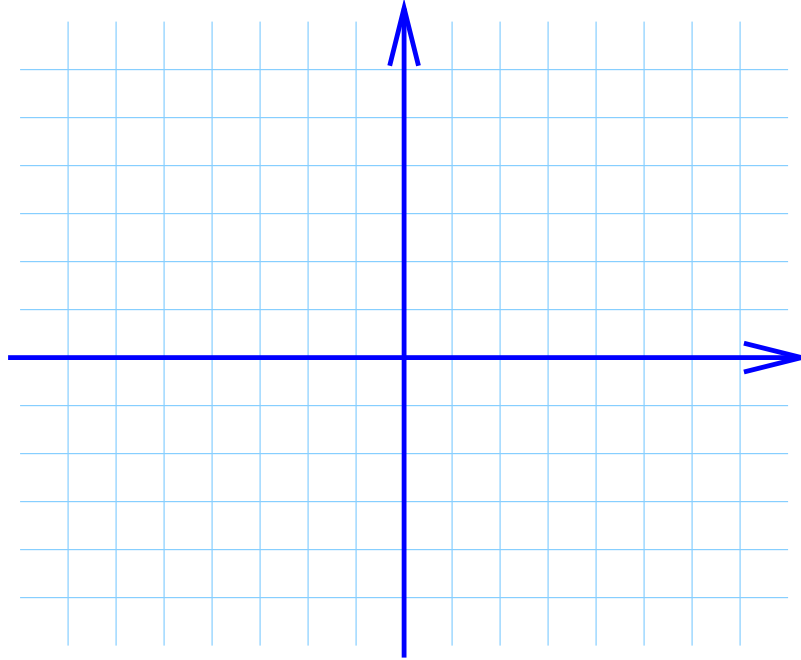
7. Sketch the graph of $f(x) = -\sqrt{x+4}$.
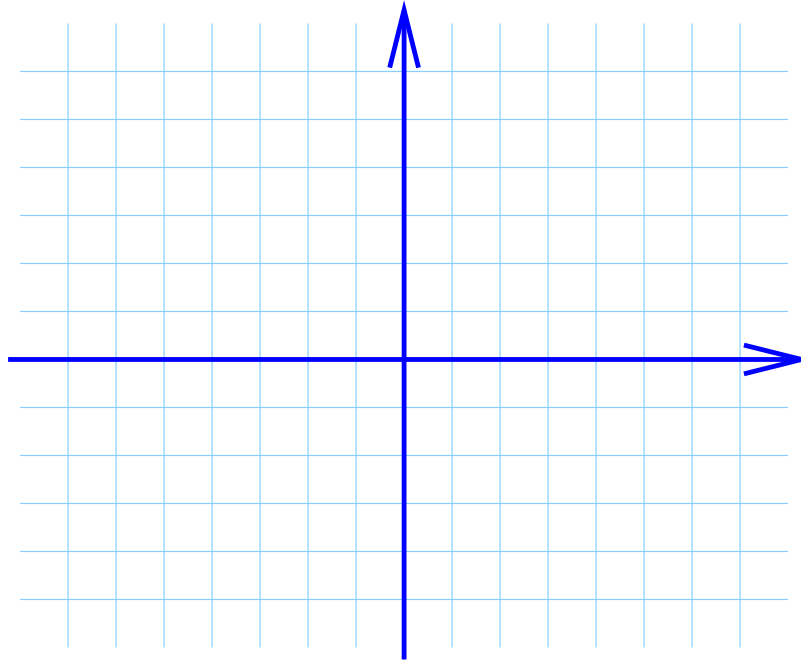
8. Find an equation of the tangent line to $y = x^4 + x + 4$ at $(1, 4)$.

9. Evaluate the limit: $\lim\limits_{t \to 1} \dfrac{t^2 - 1}{t^2 - t}$. If the limit is infinite, determine whether it is $+\infty$ or $-\infty$.

10. Evaluate the limit: $\lim\limits_{x \to 2^-} \dfrac{3 - x}{x^2 - 7x + 10}$. If the limit is infinite, determine whether it is $+\infty$ or $-\infty$.

11. Let $f(x) = \begin{cases} x + 4 & , \text{ if } \quad x \leq -2 \\ -x - 1 & , \text{ if } \quad -2 < x < 1 \\ 2x - 4 & , \text{ if } \quad x \geq 1 \end{cases}$.

Sketch the graph of $f(x)$.

Is $f(x)$ coninuous at -2?

Is $f(x)$ continuous at 1?

12. Find the derivative of the function $f(x) = \sqrt{x}\left(4x^2 - 2 + \dfrac{1}{x}\right)$.

Simplify your derivative.

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

	Your scores so far	Out of
Homework		41
Quizzes		15
Mathematica		10
Test 1		50
Total		116
Grade		

This page may be used as scratch paper