

MA161

EXAM 1

September 16, 1998

Name: _____

ID #: _____

Section # _____

TA's Name: _____

Instructions:

1. Fill in your name, student ID number and division and section number on the mark-sense sheet. Also fill out the information requested above.
2. This booklet consists of 8 pages. There are 14 questions, each worth 7 points.
3. Mark your answers on the mark-sense sheet with a #2 pencil. Please show your work in this booklet.
4. No books, notes or calculator may be used.
5. When you are finished with the exam, please hand this booklet and the mark-sense sheet, in person, to your instructor.

1. If $|2x - 1| \leq 2$ then

- A. $-\frac{1}{2} \leq x \leq \frac{1}{2}$
- B. $-\frac{1}{2} \leq x \leq \frac{3}{2}$
- C. $-1 \leq x \leq 3$
- D. $-2 \leq x \leq 6$
- E. $-\frac{3}{2} \leq x \leq \frac{1}{2}$

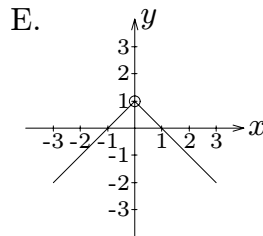
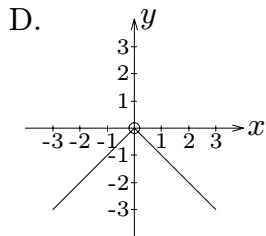
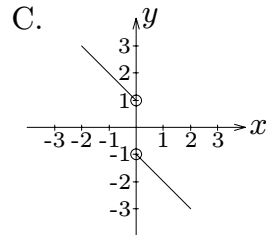
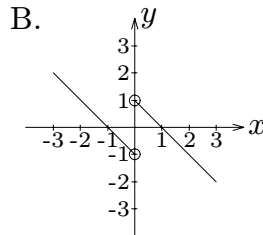
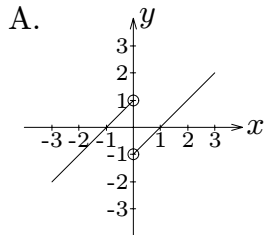
2. Find an equation for the line through $(4, 2)$ and perpendicular to the line with equation $y = 4$.

- A. $x = 4$
- B. $y = 2$
- C. $y - 4x + 14 = 0$
- D. $4y - x - 4 = 0$
- E. None of the above

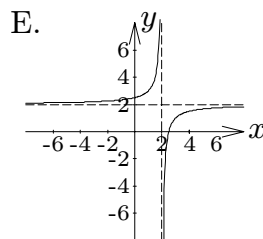
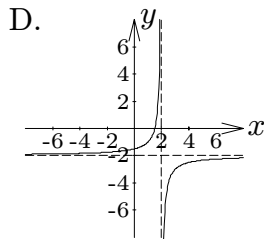
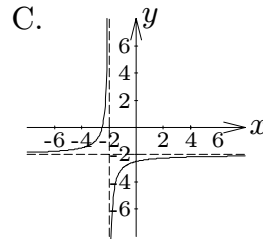
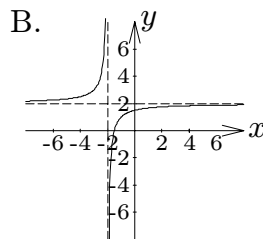
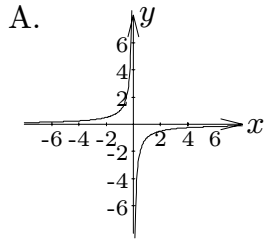
3. A ball is thrown straight up from the top of a 120 foot tall building. It hits the ground 3 seconds later. What was its initial velocity? ($h(t) = -16t^2 + v_0t + h_0$).

- A. 40
- B. -40
- C. 10
- D. -8
- E. 8

4. The graph of the function $f(x) = \frac{|x|}{x} - x$ looks most like



5. The graph of $y + 2 = \frac{1}{2 - x}$ looks most like



6. Let $f(x) = \frac{1}{x-1}$ and $g(x) = \frac{1}{1-x}$. Find the rule for and the domain of $f \circ g$.

A. $f \circ g(x) = \frac{x-1}{x}$, $x \neq 0, 1$

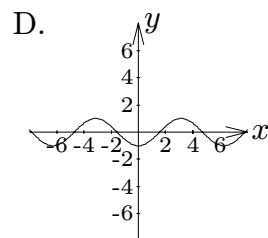
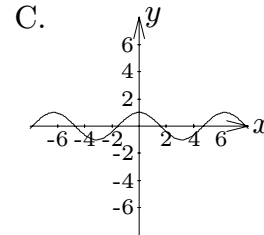
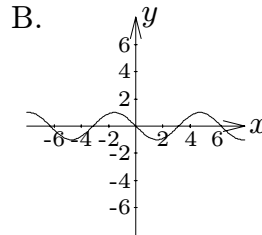
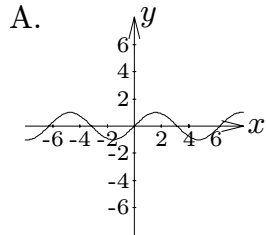
B. $f \circ g(x) = \frac{1-x}{x}$, $x \neq 0, 1$

C. $f \circ g(x) = \frac{x-1}{x}$, $x = 0$

D. $f \circ g(x) = \frac{x}{x+1}$, $x \neq -1$

E. $f \circ g(x) = -1$, $x \neq 1$

7. A sketch of the graph of $y = \sin(\pi/2 - x)$ looks like



E. None of A, B, C or D.

8. Solve: $\ln(x) + \ln(x + 5) - \ln(x^2) = \ln 13$.

- A. $x = 0, 5/12$
- B. $x = \sqrt{13}, 1$
- C. $x = 0$
- D. $x = 0, -5/12$
- E. $x = 5/12$

9. Simplify $\frac{4^{\sqrt{2}}8^{(\sqrt{2}-1)}}{2^{5\sqrt{2}}}$.

A. 1

B. $1/2$

C. $\frac{1}{\sqrt{2}}$

D. $\frac{1}{4}$

E. $\frac{1}{8}$

10. Solve the inequality $\tan x \leq -1$ for x in $[0, \pi]$.

A. $\frac{\pi}{4} \leq x < \frac{\pi}{2}$

B. $\frac{\pi}{2} < x \leq \pi$

C. $\frac{\pi}{2} < x \leq \frac{3\pi}{4}$

D. $\frac{3\pi}{4} \leq x \leq \pi$

E. there are no solutions

11. Evaluate $\lim_{x \rightarrow -1} \frac{x^2 + 3x + 2}{x^2 - 1}$.

- A. 2
- B. $\frac{3}{2}$
- C. $\frac{1}{2}$
- D. $-\frac{1}{2}$
- E. the limit does not exist

12. What value of b makes the following function continuous at $x = 0$?

$$f(x) = \begin{cases} \frac{\sin^2 x - x}{x \cos^2 x} & \text{for } x \neq 0 \\ b & \text{for } x = 0 \end{cases}$$

- A. 1
- B. -1
- C. 0
- D. 2
- E. No value of b makes f continuous at $x = 0$.

13. Let $f(x) = \frac{x-1}{x+1}$ and $g(x) = \frac{x^3-1}{x^2-2x+1}$. Which one of the following statements is true?

- A. Neither f nor g is continuous at $x = -1$
- B. Both f and g are continuous at $x = -1$
- C. Only f is continuous at $x = -1$
- D. Only g is continuous at $x = -1$
- E. The above statements are all false.

14. Evaluate $\lim_{x \rightarrow 0} x \left[1 + \sin \frac{1}{x} \right]$.

- A. -1
- B. 0
- C. 1
- D. 2
- E. the limit does not exist.