

MA 161 Midterm, September 2003

Name _____

Student ID number _____

Lecturer _____

Recitation instructor _____

INSTRUCTIONS:

1. Fill in all the information requested above and on the scantron sheet.
 2. This booklet contains 16 problems, each worth 6 points. You get 2 points for coming and 2 if you fully comply with instruction 1. The maximum score is 100 points.
 3. For each problem circle the answer of your choice, and also mark it on the scantron sheet.
 4. Work only on the pages of this booklet.
 5. Books, notes, calculators are not to be used on this test.
 6. At the end turn in your exam and scantron sheet to your recitation instructor.
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Key:

EECB

EAEB

AEBE

DEAC

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1. The solution of $|3 - 2x| \leq 0.4$ is

- A. $[-0.2, 0.2]$
- B. $[-1.7, 1.3]$
- C. $[-0.4, 0.4]$
- D. $[-1.3, 1.7]$
- E. $[1.3, 1.7]$

2. An equation of the line through $(-2, 1)$, parallel to the line $3x - 2y = 7$ is

- A. $3x - 2y = -7$
- B. $3x - 2y = 7$
- C. $2x + 3y = -4$
- D. $2x - 3y = 8$
- E. None of these

3. For $-1 \leq x \leq 1$, $\tan(\sin^{-1} x)$ equals

A. $\sqrt{1-x^2}$

B. $\frac{\sqrt{1-x^2}}{x}$

C. $\frac{x}{\sqrt{1-x^2}}$

D. $x\sqrt{1-x^2}$

E. $\frac{1}{\cos x}$

4. The domain of the function $\frac{\sqrt[4]{6+5x}}{x^2-9}$ is

A. $x \neq \pm 3$

B. $\left[-\frac{6}{5}, 3\right) \cup (3, \infty)$

C. $\left(-\infty, \frac{6}{5}\right]$

D. $(-\infty, -3) \cup \left(-3, \frac{6}{5}\right)$

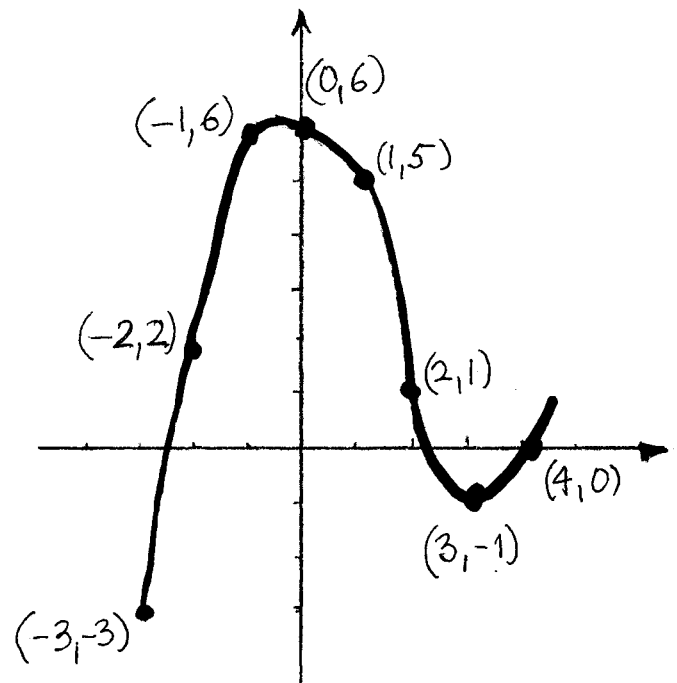
E. $(3, \infty)$

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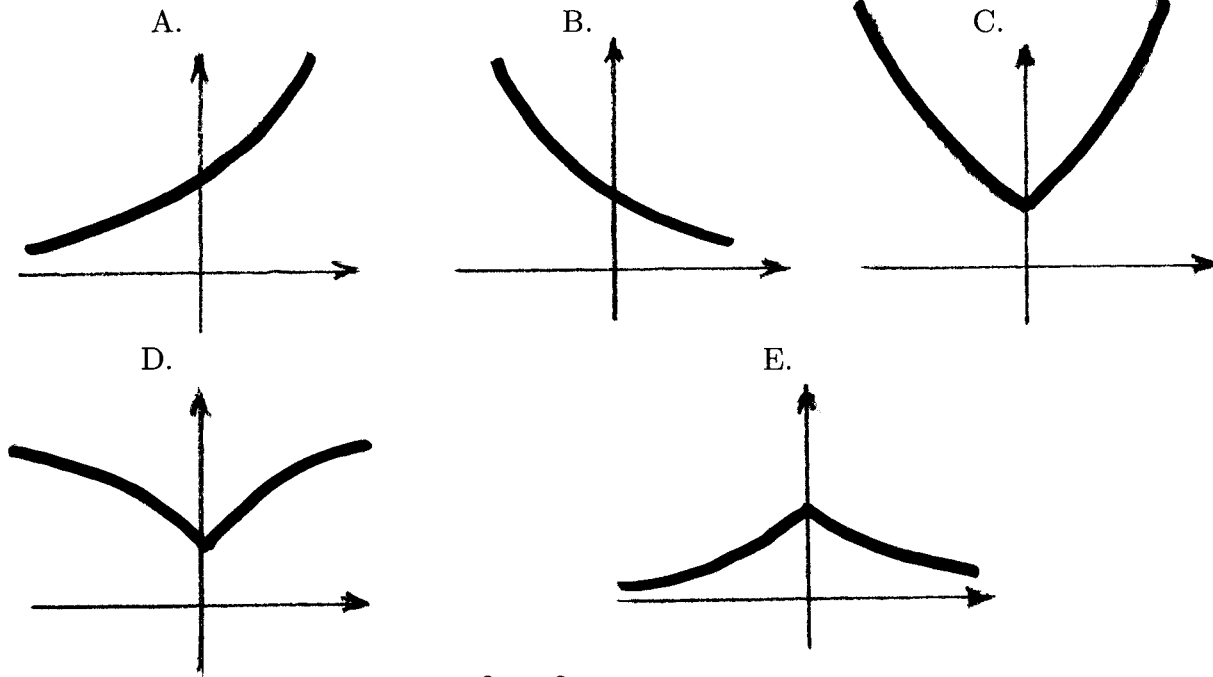
5. At the surface of the ocean water pressure is the same as air pressure above the water, 15 lb/in^2 . Below the surface the water pressure increases by 4 lb/in^2 for every 10 ft of descent. At what depth is the pressure 21.4 lb/in^2 ?
- A. 66.6 ft
 - B. 51.6 ft
 - C. 47.6 ft
 - D. 22 ft
 - E. 16 ft

6. Given the graph of f below, $(f \circ f)(-2)$ equals

- A. 1
- B. 2
- C. 4
- D. -2
- E. 5



7. The graph of $y = \left(\frac{1}{2}\right)^{|x|}$ looks most like



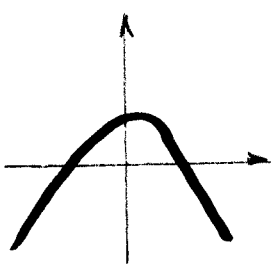
8. The inverse of $f(x) = -\frac{2x+3}{x+2}$ is $g(x) =$

- A. $\frac{3x+2}{2x+1}$
- B. $-\frac{2x+3}{x+2}$
- C. $\frac{2x-1}{3x+2}$
- D. $-\frac{x+2}{5x-2}$
- E. $\frac{3x+5}{x+2}$

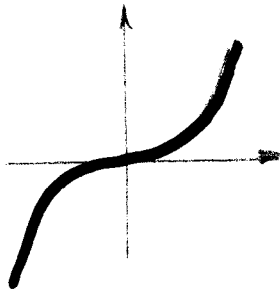
9. If $P = \log_2 6 + \log_2 8$ and $Q = 1 + 2 \ln x$ then

- A. $P = \log_2 48, Q = \ln(ex^2)$
- B. $P = \log_2 14, Q = \ln(ex^2)$
- C. $P = \log_2 14, Q = \ln(1 + e^2 x)$
- D. $P = \log_2 48, Q = \ln(1 + e^2 x)$
- E. $P = \log_2 14, Q = \ln(e + 2x)$

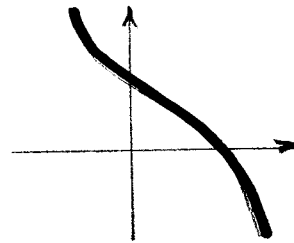
10. The graph of three functions is given below. Which is one-to-one?



I.



II.



III.

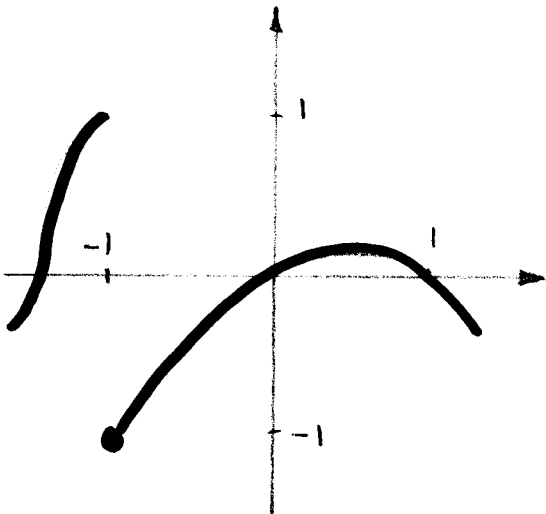
- A. Only I
- B. Only II
- C. Only III
- D. Only I and II
- E. Only II and III

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11. If distance traveled in t seconds is $t^3/3$ meters, the average velocity between $t = 0$ and $t = 3$ is

- A. 1 m/s
- B. 3 m/s
- C. 6 m/s
- D. 8 m/s
- E. 15 m/s

12. Given the graph of f below, which statement is true?



I. $\lim_{x \rightarrow -1^-} f(x)$ exists

II. $\lim_{x \rightarrow -1^+} f(x) = -1$

III. $\lim_{x \rightarrow 1} f(x)$ exists

- A. Only I.
- B. Only II.
- C. Only I and II.
- D. Only II and III.
- E. All three.

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13. Find such a number c that the finite limit $\lim_{x \rightarrow 3} \frac{cx^2 + 18}{x - 3}$ exists.

- A. 3
- B. 1
- C. -1
- D. -2
- E. An arbitrary c will do.

14. Find a real number a so that the function

$$h(x) = \begin{cases} \frac{x^2 - 2x - 3}{x + 1} & \text{if } x \neq -1 \\ a & \text{if } x = -1 \end{cases}$$

is continuous.

- A. 3
- B. $3/2$
- C. 0
- D. $-3/2$
- E. -4

15. $\lim_{x \rightarrow \infty} \frac{x^{3/2} + x}{x^2 - 2x^{1/2}} =$

A. 0

B. $\frac{1}{2}$ C. $\frac{3}{4}$ D. $\frac{3}{2}$ E. ∞

16. The graph of a function g is obtained from the graph of f by first compressing vertically by a factor of 3, then shifting to the right by 2 units and up by one unit. Then $g(x) =$

A. $f\left(\frac{x}{3} + 1\right) + 2$ B. $f\left(\frac{x+2}{3} + 1\right)$ C. $\frac{1}{3}f(x - 2) + 1$ D. $3f(x + 2) - 1$ E. $f(3(x - 2)) - 1$