MATH 161 & 161E - FIRST EXAM - SPRING 2003
THURSDAY, FEBRUARY 6, 2003, 8:30–9:30 PM

STUDENT NAME:

STUDENT ID:

RECITATION INSTRUCTOR :

INSTRUCTIONS:

1. This test booklet has 5 pages including this page.
2. Fill in your name, your student ID number, and your recitation instructor's name above.
3. Use a number 2 pencil on the mark-sense sheet (answer sheet).
4. On the mark-sense sheet, fill in the recitation instructor's name and the course number.
5. Fill in your name and student ID number, blacken the appropriate spaces, and sign the mark-sense sheet.
6. Mark the division and section number of your class and blacken the corresponding circles, including the circles for the zeros. If you do not know your division and section number ask your instructor.
7. There are 12 questions, each worth 8 points. Blacken your choice of the correct answer in the spaces provided. Turn in BOTH the answer sheet and the question sheets to your instructor when you are finished.
8. No books, notes, or calculators may be used. Good luck!!

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1) The domain of the function

$$f(x) = \frac{1}{\sqrt{4 - |3 - 2x|}}, \quad \text{is}$$

A) $(1, \frac{3}{2})$

B) $(-\frac{1}{2}, \frac{7}{2})$

C) $(4, 7)$

D) $(3, 5]$

E) $(\frac{1}{2}, \frac{7}{2})$

2) The limit

$$\lim_{x \to \frac{\pi}{3}} \ln[\ln(2e\cos(x))]$$

is equal to

A) 1

B) 2

C) 0

D) ∞

E) None of the above

3) $\cos\left(\tan^{-1}\left(\frac{1}{2}\right)\right)$ is equal to

A) $\frac{2}{3}$

B) $\frac{2}{5}$

C) $\frac{2}{\sqrt{5}}$

D) $\frac{1}{\sqrt{5}}$

E) 1

4) If $f(x) = x^2 + 3x + 1$ and $g(x) = \sqrt{x^2 + 5}$, then $(f \circ g)(-2) =$

A) 5

B) 3

C) $\sqrt{6}$

D) 19

E) None of the above

5) The solutions of the equation

$$\sqrt{2}\cos^2\theta - \cos\theta = 0$$

in the interval $[0, \frac{\pi}{2}]$ are:

A) $\theta = \frac{\pi}{2}, \frac{\pi}{4}$

B) $\theta = \frac{\pi}{4}$

C) $\theta = 0, \frac{\pi}{4}$

D) $\theta = 0, \frac{\pi}{3}$

E) None of these

6) The limit

$$\lim_{x\to 1} \frac{(x-1)^2}{|x-1|} \text{ equals}$$

A) 0

B) -2

C) 1

D) -1

E) Does not exist

7) If

$$f(x) = \begin{cases} x^2, & x \leq 2 \\ x - 1, & x > 2 \end{cases}$$

then $\lim_{x\to 2} f(x) =$

A) 4

B) 2

C) 1

D) 0

E) Does not exist

8) Find the radius r and center C of the circle

$$x^2 + y^2 - 8x + 6y + 9 = 0.$$

A) $r = 3, \quad C = (-8, 6)$

B) $r = 4, \quad C = (4, -3)$

C) $r = 5, \quad C = (-4, 3)$

D) $r = 3, \quad C = (8, -6)$

E) $r = 4, \quad (3, -4)$

9) The graph of $f(x) = 3^{x-4} + 1$ is obtained from the graph of $g(x) = 3^x$ by

A) Shifting horizontally 4 units left and vertically 1 unit down.

B) Reflecting it about the x-axis and shifting vertically 1 unit up.

C) Shifting vertically 4 units up and horizontally 1 unit left.

D) Shifting horizontally 4 units to the right and vertically 1 unit up.

E) Shifting vertically 4 units down and horizontally 1 unit right.

10) If $g(x) = x + 1$, $h(x) = x - 1$, $k(x) = x^3$, then

$$\left[(x-1)^3 + 1\right]^3 =$$

A) $(g \circ h \circ k)(x)$

B) $(h \circ k \circ g)(x)$

C) $(k \circ g \circ k \circ h)(x)$

D) $(k \circ h \circ k \circ g)(x)$

E) $(g \circ k \circ h)(x)$

11) If $f(x) = \ln[(x-9)]^3$ then $f^{-1}(6) =$

A) $e^2 + 9$

B) $e^6 - 9$

C) $e^{1/3} - 9$

D) 27

E) None of the above

12) If the function

$$f(x) = \begin{cases} cx^2, & \text{if } x < 1 \\ 4, & \text{if } x = 1 \\ -x^3 + mx, & \text{if } x > 1 \end{cases}$$

is continuous at $x = 1$, then

A) $c = 1,\ m = 5$

B) $c = 4,\ m = 5$

C) $c = 5,\ m = 3$

D) $c = -5,\ m = 2$

E) None of the above