MA 161 EXAM I **Fall 2006**

Name ______________________________

ten–digit Student ID number ______________________________

Division and Section Numbers ______________________________

Recitation Instructor ______________________________

Instructions:

1. Fill in all the information requested above and on the scantron sheet.
2. This booklet contains 15 problems, each worth $6\frac{2}{3}$ points. The maximum score is 100 points.
3. For each problem mark your answer on the scantron sheet and also circle it in this booklet.
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.

1. The graph of $x^2 - 6x + 8 - y = 0$ is obtained from the graph of $y = x^2$ by

A. Moving it 4 units to the right and 3 units down

B. Moving it 3 units to the left and 1 unit up

C. Moving it 3 units to the right and 1 unit down

D. Moving it 4 units to the left and 3 units down

E. Moving it 1 unit to the right and 3 units up

2. The solution to the inequality $x \leq 5x - 3 < 8x - 2$ is

A. $x \geq -\frac{1}{3}$

B. $x \geq \frac{3}{4}$

C. $-\frac{1}{3} \leq x < \frac{3}{4}$

D. $-\frac{1}{3} < x \leq \frac{3}{4}$

E. $x > \frac{3}{4}$

3. Given that $\sin x = \frac{2}{5}$ and $\cos x < 0$, it follows that $\tan x$ is equal to

A. $-\frac{2}{\sqrt{21}}$

B. $-\frac{\sqrt{21}}{25}$

C. $-\frac{5}{\sqrt{21}}$

D. $-\frac{4}{25}$

E. $-\frac{4}{\sqrt{21}}$

4. The center C and radius r of the circle given by $x^2 + y^2 - 10x + 3y = 5$ are

A. $C = \left(-\frac{3}{2}, 5\right), \quad r = \frac{\sqrt{129}}{2}$

B. $C = \left(5, -\frac{3}{2}\right), \quad r = \frac{\sqrt{129}}{2}$

C. $C = (5, -3), \quad r = 7$

D. $C = (-5, 3), \quad r = 7$

E. $C = \left(\frac{3}{2}, -5\right), \quad r = \frac{\sqrt{129}}{2}$

5. An equation of the line through $(-2, 2)$ and parallel to $4x + 3y - 7 = 0$ is

A. $3y + 4x + 2 = 0$

B. $2x + 3y + 8 = 0$

C. $4x + 3y - 14 = 0$

D. $4y + 3x + 2 = 0$

E. $2x + 3y - 2 = 0$

6. Given that $f(x) = \sqrt{4 - x^2}$ and $g(x) = \sqrt{x^2 + 1}$, the domain of $g \circ f$ is

A. $[-\sqrt{5}, -2] \cup [2, \sqrt{5}]$

B. $[-\sqrt{5}, \sqrt{5}]$

C. $(-\infty, -2] \cup [2, \infty)$

D. $(-\infty, -\sqrt{5}] \cup [\sqrt{5}, \infty)$

E. $[-2, 2]$

7. Which of the following statements are true?

I. $5^x \cdot 5^y = 5^{x+y}$

II. $(4 \cdot 3)^x = 4^x + 3^x$

III. $8^x + 8^y = 8^{x+y}$

A. Only I

B. Only II

C. Only I and II

D. Only III

E. I, II, and III

8. The inverse of the function $f(x) = \dfrac{3x-2}{2x+5}$ is $f^{-1}(x) =$

A. $\dfrac{5x-2}{3-2x}$

B. $\dfrac{2x-5}{3-2x}$

C. $\dfrac{2x+3}{5-2x}$

D. $\dfrac{5x+2}{3-2x}$

E. $\dfrac{3x-2}{3-5x}$

9. $\displaystyle\lim_{x\to 1} \frac{\sqrt{2x+5}-\sqrt{7}}{x-1} =$

A. $\sqrt{5}-\sqrt{7}$

B. $\dfrac{2}{\sqrt{5}}$

C. $\dfrac{2}{\sqrt{7}}$

D. $\dfrac{1}{\sqrt{5}-\sqrt{7}}$

E. $\dfrac{1}{\sqrt{7}}$

10. If f and g are continuous at $x = 2$ with $g(2) = 3$ and $\lim_{x \to 2} \dfrac{2f(x) - 3g(x)}{2g(x) - f(x)} = 7$, then f(2) is

A. undefined

B. $= \dfrac{17}{3}$

C. $= \dfrac{7}{3}$

D. $= 1$

E. impossible to determine

11. $\lim_{x \to -\infty} \sqrt{\dfrac{1 - 4x^2 + 7x^3}{28x^3 - \pi x + e}} =$

A. $\dfrac{1}{2}$

B. 2

C. $\dfrac{1}{4}$

D. $\dfrac{1}{e}$

E. $-\infty$

12. The total number of asymptotes, vertical and horizontal, for the graph of $f(x) = \dfrac{x - 2}{\sqrt{2x^2 + 7x + 3}}$ is

A. 0

B. 1

C. 2

D. 3

E. 4

13. If a ball is thrown directly up from the ground with a velocity v_0, then its height above ground at time t is given by $H(t) = v_0 t - \frac{g}{2} t^2$ until is falls back to the ground. Here g is the acceleration of gravity. Then, the velocity of the ball when it hits the ground is

A. v_0

B. $\frac{v_0}{2g}$

C. 0

D. $-\frac{2g}{v_0}$

E. $-v_0$

14. $f'(a) = \lim_{h\to 0} \frac{32(2^h - 1)}{h}$ represents the derivative of a certain function f at a number a in its domain. Determine f and a.

A. $f(x) = 32$ and $a = 0$

B. $f(x) = 32 \cdot 2^x$ and $a = 2$

C. $f(x) = 2^x$ and $a = 5$

D. $f(x) = 2^x$ and $a = 32$

E. $f(x) = 32\frac{2^x - 1}{x}$ and $a = 0$

15. If $r + 3s + 1 = 0$ is the tangent line to $r = g(s)$ at $(-1, 2)$, then

A. $g(-1) = 2$ and $g'(-1) = 3$

B. $g(2) = -1$ and $g'(2) = 3$

C. $g(-1) = 2$ and $g'(-1) = -\frac{1}{3}$

D. $g(2) = -1$ and $g'(-1) = 3$

E. $g(-1) = 2$ and $g'(-1) = -3$