MA 161 Exam 1, Spring 2004

Name _____

(nine-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 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 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 domain of the function $f(x) = \sqrt{|x+2|-3}$ is

   A. $(-\infty, -1] \cup [5, \infty)$

   B. $[-1, 5]$

   C. $[-5, 1]$

   D. $[5, \infty)$

   E. $(-\infty, -5] \cup [1, \infty)$

2. Let l_1 and l_2 be two parallel lines. If l_1 contains the points $(1, 2)$ and $(3, 6)$ and if l_2 contains $(-1, 1)$ find the equation for l_2.

   A. $y = 2x + 3$

   B. $y = 2x - 1$

   C. $y = 2x + 1$

   D. $y = 2x + 2$

   E. None of the above.

3. If $sin\ \theta = \frac{1}{2}$ and $\frac{\pi}{2} \leq \theta \leq \pi$ then $sec\ \theta =$

   A. 2

   B. -2

   C. $\frac{\sqrt{3}}{2}$

   D. $\frac{-2}{\sqrt{3}}$

   E. $\frac{2}{\sqrt{3}}$

4. If $f(x) = \begin{cases} 2x+1 & \text{if } x < 1 \\ 3-x & \text{if } x \geq 1 \end{cases}$ and $g(x) = x^2$ then $(f \circ g)(2)$ equals

   A. 9

   B. -1

   C. 1

   D. -9

   E. 25

5. If $\frac{e^{x^2}e^6}{e^{5x}} = 1$ then $x =$

   A. -3 or -2

   B. -2 or 3

   C. 2 or 3

   D. 2 or -3

   E. None of the above.

6. The limit $\lim_{x \to 4} \dfrac{x^2 - 3x - 4}{x - 4}$ equals

   A. 1

   B. -1

   C. 5

   D. -5

   E. does not exist

7. If $f(x) = ln(e^{3x} + 1)$ then $f^{-1}(x)$ equals

   A. $\frac{1}{3}ln(e^x + 1)$

   B. $ln(\frac{(e^x-1)}{3})$

   C. $3ln(e^x - 1)$

   D. $ln(3(e^x + 1))$

   E. $\frac{1}{3}\ ln(e^x - 1)$

8. The limit $\lim_{x\to 0}(\frac{1}{x(1+x)} - \frac{1}{x})$ equals

   A. 2

   B. 1

   C. 0

   D. -1

   E. does not exist

Problems 9 - 11 refer to the graphs below:

9. $\lim_{x \to 1} f(x) \cdot g(x)$ equals

   A. 0

   B. -1

   C. 1

   D. $\frac{1}{2}$

   E. does not exist

10. $\lim_{x \to 1^-} (x + 2f(x))$ equals

   A. 3

   B. 2

   C. 1

   D. 4

   E. does not exist

11. $\lim_{x \to 1^+} \frac{f(x)}{g(x)}$ equals

   A. ∞

   B. 0

   C. $-\infty$

   D. -1

   E. does not exist

12. The graph of $h(x) = x^2$ is first compressed vertically by a factor of 2, then shifted to the right by 3 units, and then reflected about the y-axis. The final equation is

    A. $2(x+3)^2$

    B. $\frac{1}{2}(x-3)^2$

    C. $2(x-3)^2$

    D. $\frac{1}{2}(x+3)^2$

    E. None of the above.

13. A bacteria population triples each $\frac{1}{2}$ hour. If the initial population is 200, then the population $P(t)$ after t hours is

    A. $P(t) = 200 \cdot 3^t$

    B. $P(t) = 200 \cdot 3^{2t}$

    C. $P(t) = 200 \cdot 3^{\frac{t}{2}}$

    D. $P(t) = 200 \cdot (\frac{3}{2})^t$

    E. $P(t) = 200 \cdot 6^t$.

14. Let $f(x) = x^2$, $g(x) = \frac{1}{x}$, $h(x) = \frac{1}{x^2}$, $k(x) = x^3$. Then

A. f and g are one to one.

B. g and h are one to one.

C. f and h are one to one.

D. h and k are one to one.

E. g and k are one to one.

15. The domain of f(x) $= \frac{1}{\sqrt{2+x-x^2}}$ is

A. $(-1, 2)$

B. $(-2, -1)$

C. $(-2, 1)$

D. $(1, 2)$

E. $(-2, 2)$

16. If $f(x) = \begin{cases} 1+x & \text{if } x < 0 \\ 2x+1 & \text{if } 0 \leq x < 1 \\ 2x & \text{if } 1 \leq x \end{cases}$ which of the following statements is true?

A. $\lim_{x \to 0} f(x) = 1$ and $\lim_{x \to 1} f(x) = 3$

B. $\lim_{x \to 0} f(x) = 1$ and $\lim_{x \to 1} f(x) = 2$

C. $\lim_{x \to 0} f(x)$ does not exist and $\lim_{x \to 1} f(x) = 3$

D. $\lim_{x \to 0} f(x) = 1$ and $\lim_{x \to 1} f(x)$ does not exist

E. None of the above.