MA 161 EXAM III **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 12 problems, each worth 8 points. You get 4 points for your TA's name.
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. Let $f(x) = \dfrac{x}{4 + x^2}$ for $x \in [1, 8]$. Then $f(x)$ attains its absolute maximum at x equal

   a.

   b.

   c.

   d.

   e.

2. The function $f(x) = x^3 + 6x^2 + 9x$ is decreasing

   a.

   b.

   c.

   d.

   e.

3. If $f(x)$ has its derivative satisfying $f'(x) = (x-1)(x-2)^2(x-3)$ then $f(x)$ has

   a.

   b.

   c.

   d.

   e.

4. The function $f(x) = e^{-x^2}$ is concave down on

   a.

   b.

   c.

   d.

   e.

5. The function $f(x) = 8x^2 - x^4$ has inflection point(s).

   a.

   b.

   c.

   d.

   e.

6. If $f'(x) > 0$ on $(-\infty, 1)$, $f'(x) < 0$ on $(1, \infty)$, $f''(x) > 0$ on $(-\infty, 0)$, and $f''(x) < 0$ on $(0, \infty)$ then the graph for $f(x)$ looks most like

   a.

   b.

   c.

   d.

   e.

7. The linear approximation of $f(x) = x^{1/2}$ at $a = 16$ is used to find the approximate value for $17^{1/2}$. The approximate value found is

   a.

   b.

   c.

   d.

   e.

8. $\lim_{x \to \infty} \frac{x^2}{e^x}$ equals

   a.

   b.

   c.

   d.

   e.

9. $\lim_{x \to 0} \dfrac{(e^x + e^{-x} - 2)}{x^2}$ equals

a.

b.

c.

d.

e.

10. $\lim_{x \to 0^+} (1 + 2x)^{\frac{1}{x}}$ equals

a.

b.

c.

d.

e.

11. Two sides of the right triangle pictured changes with time. Find $x'(t)$ when $h'(t) = 2$ and $x(t) = 4$.

a.

b.

c.

d.

e.

12. A girl walks east on a beach and is observed from a boat 100 ft. from shore. Determine $x'(t)$ when $x(t) = 100$ ft and $G'(t) = 4$ radeans/minute.

a.

b.

c.

d.

e.