MA 161 EXAM 2 SPRING 2010
TEST NUMBER 01

STUDENT NAME _____

STUDENT ID _____

LECTURE TIME _____

RECITATION INSTRUCTOR _____

RECITATION TIME _____

INSTRUCTIONS

1. Fill in all the information requested above and the test number of the test on your scantron sheet.
2. This booklet contains 12 problems, each worth 8 points. There are 4 free 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.

MA 161 EXAM 2 **SPRING 2010**

1. Let $f(x) = \begin{cases} 1, & \text{for } x \leq 0 \\ \frac{\sin x}{x}, & \text{for } 0 < x \leq \pi \\ x, & \text{for } x > \pi. \end{cases}$

Which of the following describes the numbers at which f is continuous?

A. f is continuous at all numbers except 0 and π.

B. f is continuous at all numbers except 0.

C. f is continuous at all numbers except π.

D. f is continuous at all numbers in $(-\infty, 0) \cup (\pi, \infty)$.

E. f is continuous at all numbers.

2. Evaluate $\lim_{x \to \infty} (\sqrt{16x^2 + x} - 4x)$.

A. ∞

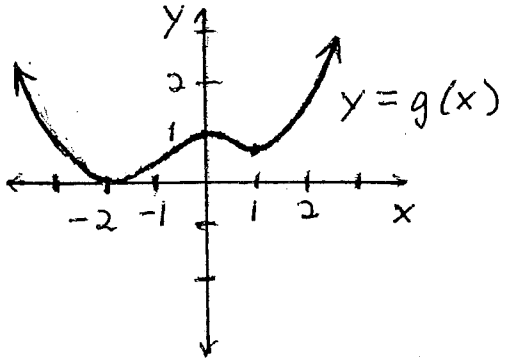
B. $\frac{1}{8}$

C. $\frac{1}{6}$

D. 0

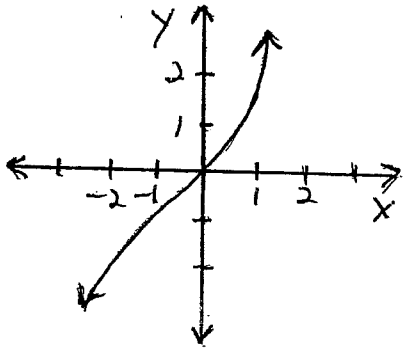
E. The limit does not exist.

3. If the graph of $g(x)$ is given by

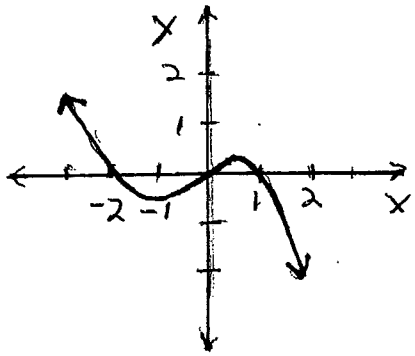


which of the following is most like the graph of $g'(x)$?

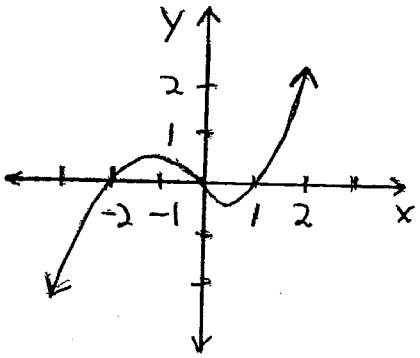
A.



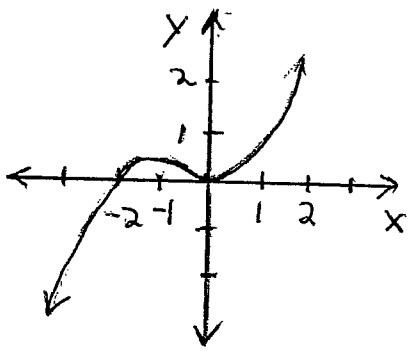
B.



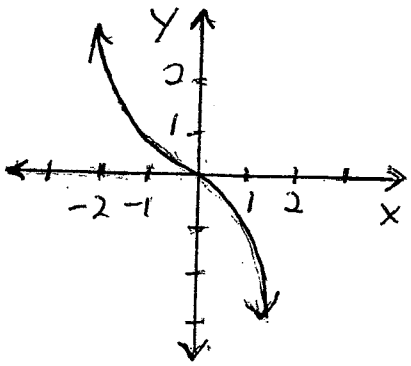
C.



D.



E.



4. If $f(x) = x^3 + \dfrac{4}{\sqrt{x}}$, what is $f'(2)$?

   A. $3 - 8\sqrt{2}$

   B. $3 - 4\sqrt{2}$

   C. $12 - 2\sqrt{2}$

   D. $12 - \dfrac{1}{\sqrt{2}}$

   E. $12 - \dfrac{2}{\sqrt{2}}$

5. At what values of x does the graph of $y = 2x^3 + 3x^2 - 120x + 1$ have a horizontal tangent?

   A. -5 and 4

   B. 5 and -4

   C. $-1 \pm \dfrac{\sqrt{164}}{2}$

   D. 6 and -1

   E. -1 and 6

6. The tangent line to the graph of $f(x) = \dfrac{e^x}{x^2+2}$ at $x = 1$ is:

A. $y = \dfrac{e}{2}x - \dfrac{e}{6}$

B. $y = \dfrac{e}{2}x + \dfrac{e}{6}$

C. $y = \dfrac{e}{9}x + \dfrac{2e}{9}$

D. $y = \dfrac{e}{9}x - \dfrac{4e}{9}$

E. $y = \dfrac{e}{9}x - \dfrac{2e}{9}$

7. If the base of a rectangle increases at the rate of 2 cm./sec. and the height increases at a rate of 3 cm./sec., what is the rate of increase of the area of the rectangle when the base is 5 cm. and the height is 7 cm.?

A. 6 cm./sec.^{2}

B. 29 cm./sec.^{2}

C. 31 cm./sec.^{2}

D. 35 cm./sec.^{2}

E. 210 cm./sec.^{2}

8. Compute $\dfrac{d}{d\theta}\left(\dfrac{1}{\sec\theta+\tan\theta}\right)$.

A. $\dfrac{-\sec\theta}{\sec\theta+\tan\theta}$

B. $-\dfrac{1}{(\sec\theta+\tan\theta)^2}$

C. $\dfrac{\sec\theta}{(\sec\theta+\tan\theta)^2}$

D. $\dfrac{\tan\theta}{\sec\theta+\tan\theta}$

E. $\dfrac{-\tan\theta}{\sec\theta+\tan\theta}$

9. If $f(x)=(\sqrt{2x^2+1}-2)^3$, compute $f'(2)$.

A. 2

B. 6

C. 3

D. 4

E. 12

10. If the curve C is defined by $x^2y^3 + x - y^2 = 5$, find the slope of the line tangent to C at $(2, 1)$.

A. $-\frac{3}{2}$

B. -2

C. $-\frac{1}{2}$

D. $-\frac{5}{14}$

E. $-\frac{5}{12}$

11. Compute $\frac{d}{dx}\left(\frac{1}{\ln x}\right)$.

A. $-\frac{1}{(\ln x)^2}$

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

C. $\frac{1}{x^2(\ln x)^2}$

D. $\frac{1}{x \ln x}$

E. $-\frac{1}{x(\ln x)^2}$

12. If $x(t) = (2t^2 + 2)^{3/2}$ denotes the position of a particle in meters and t is measured in seconds, compute the acceleration when $t = 1$.

A. 6 m/sec.^{2}

B. 12 m/sec.^{2}

C. 24 m/sec.^{2}

D. 8 m/sec.^{2}

E. 18 m/sec.^{2}