

MA 161 - EXAM # 1**GREEN Exam - Test Version 01****INSTRUCTIONS**

1. Make sure the color of your scantron matches the color of this cover page.
2. Use a # 2 pencil to fill in your scantron and fill in the circles. The **GREEN** exam is Test **01**. Your PUID and your 4-digit section number must be correct.
3. There are **7** different pages including this cover page. Make sure you have a complete test. Each problem is worth 8 points. There is an additional free 4 points given.
4. Do any necessary work for each problem on the space provided or on the back of the pages of this test booklet. Circle your answers in this test booklet - in case of a lost scantron.
5. After you have finished the exam, hand in your scantron and your test booklet to your recitation instructor.

ACADEMIC DISHONESTY

1. *Do not open the exam booklet until you are instructed to do so.*
2. *Do not leave the exam room during the first 20 minutes or the last 10 minutes of the exam.*
3. *Do not seek or obtain any kind of help from anyone to answer questions on this exam. If you have questions, consult only your instructor.*
4. *Books, notes, calculators, phones, or any other electronic devices are not allowed on the exam. Students should store them in their pockets and/or backpacks.*
5. *After time is called, students have to put down all writing instruments and remain in their seats and wait for the TAs to collect the scantrons and the exams.*
6. *Anyone who violates these instructions will have committed an act of academic dishonesty. Penalties for academic dishonesty can be very severe. All cases of academic dishonesty will be reported immediately to the Office of the Dean of Students.*

I have read and understand the above statements regarding academic dishonesty:

NAME _____ STUDENT ID # _____

STUDENT SIGNATURE _____

TA NAME _____ RECITATION Section # _____

Liu	Owens	Weld	Yochman
0261	0241	0231	0211
0281	0271	0291	0221

1. Which of the following three statements are **TRUE** ?

(I) $2^x 5^{2x} = 50^x$

(II) $e^{a+2b} = e^a + e^{2b}$

(III) $\ln \sqrt{\frac{a^3}{e^2}} = \frac{3}{2} \ln a - 1$

- A. Only (I)
- B. Only (I) and (III)
- C. Only (I) and (II)
- D. Only (II) and (III)
- E. Only (III)

2. Find $f^{-1}(7)$ if $f(x) = 1 + 2e^{x-3}$.

- A. $f^{-1}(7) = 3 + \ln 6$
- B. $f^{-1}(7) = 3 - \ln 3$
- C. $f^{-1}(7) = -1 + \ln 2$
- D. $f^{-1}(7) = 3 + \ln 2$
- E. $f^{-1}(7) = 3 + \ln 3$

3. If the graph of $f(x)$ is shifted 2 units to the left, reflected across the y -axis, and finally shifted up 3 units, the resulting function is

A. $h(x) = -f(x + 2) - 3$

B. $h(x) = f(-x + 2) + 3$

C. $h(x) = f(x - 2) - 3$

D. $h(x) = -f(x + 2) + 3$

E. $h(x) = -f(-x - 2) + 3$

4. If the tangent line to the curve $y = f(x)$ at $P(3, 7)$ passes through the point $Q(1, 8)$, find $f'(3)$.

A. $f'(3) = \frac{2}{3}$

B. $f'(3) = -\frac{1}{2}$

C. $f'(3) = \frac{7}{3}$

D. $f'(3) = -\frac{1}{3}$

E. $f'(3) = 1$

5. Which of these three statements are **TRUE** ?

(I) $\lim_{x \rightarrow 0} \left\{ x^2 \cos \left(\frac{1}{\pi x} \right) \right\}$ DNE (does not exist).

(II) The function $f(x) = \ln(3x - x^2)$ is continuous for $0 < x < 3$.

(III) $\lim_{x \rightarrow \infty} \frac{x}{\sqrt{5x^3 - 2}} = 0$.

- A. Only (I)
- B. Only (I) and (III)
- C. Only (I) and (II)
- D. Only (II) and (III)
- E. Only (III)

6. $\lim_{x \rightarrow 1} \left(\frac{1-x}{1-\sqrt{x}} \right)^2 =$

- A. 4
- B. 1
- C. $\frac{1}{2}$
- D. $\frac{1}{\sqrt{2}}$
- E. DNE

7. Find a and b so the function $f(x)$ defined below is continuous for all values of x .

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

A. $a = 1, b = 1$

B. $a = 2, b = -1$

C. $a = 4, b = -3$

D. $a = 1, b = 5$

E. No values of a or b , since $\frac{x^2 + 1}{x - 1}$ is not continuous at $x = 1$

8. Evaluate this limit: $\lim_{x \rightarrow \infty} (\sqrt{x^2 + 3x} - x)$.

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

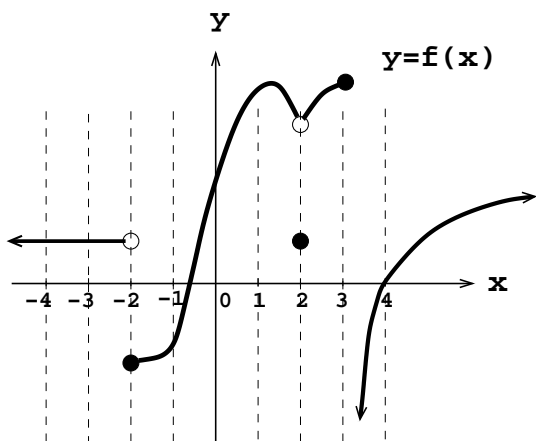
B. $\frac{3}{2}$

C. 0

D. 3

E. DNE

9. Which of the following statements are **TRUE** for this function?



(I) $\lim_{x \rightarrow 3} f(x)$ exists

(II) f is continuous on $[-2, 2)$

(III) $\lim_{x \rightarrow -2^-} f(x) = f(-2)$

- A. Only (I)
- B. Only (I) and (III)
- C. Only (I) and (II)
- D. Only (II) and (III)
- E. Only (II)

10. Find all vertical and horizontal asymptotes of the function $f(x) = \frac{(x - 1)^3(x - 3)^2}{x^2(x^2 - 9)}$.

Vertical Asymptotes

Horizontal Asymptotes

- A. $x = -3, x = 0, x = 3$ and $y = 0$
- B. $x = -3, x = 0$ and $y = 1$
- C. $x = -3, x = 0$ and none
- D. $x = 0, x = 3$ and $y = 1$
- E. $x = 0, x = 3$ and $y = -1, y = 1$

11. If after t seconds the displacement of an object moving along a straight line is $s(t) = 3t^2 - 20t$ meters, find the (instantaneous) velocity at $t = 3$.

A. -6 m/sec

B. -2 m/sec

C. 0 m/sec

D. 18 m/sec

E. 48 m/sec

12. If $f(x) = \left(2 + \frac{3}{x}\right)$, then the expression $\frac{f(a+h) - f(a-h)}{2h} =$

A. $1 + \frac{3}{a^2 - h^2}$

B. $2 + \frac{6}{a^2 - h^2}$

C. $\frac{1}{h} - \frac{1}{2(a^2 - h^2)}$

D. $-\frac{3}{a^2 - h^2}$

E. $-\frac{6}{a^2 - h^2}$