

_____ Name	_____ Student ID Number
_____ Lecturer	_____ Recitation Instructor
	_____ Time of Recitation Class

Instructions:

1. The exam has 14 problems, each worth 7 points, for a total of 100 points (that includes 2 bonus points for taking the exam).
2. Please supply all information requested above.
3. Work only in the space provided, or on the backside of the pages.
4. No books, notes, or calculators are allowed.
5. Use a number 2 pencil on the answer sheet. Print your last name, first name, and fill in the little circles. Under “Section Number”, print the division and section number of your recitation class and fill in the little circles. Under “Test/Quiz Number” print 01 and fill in the little circles. Similarly, fill in your student ID and fill in the little circles. Also, fill in your recitation instructor’s name; the course, MA 161; and the date, Feb. 4, 2002. Be sure to fill in the circles for each of the answers of the 14 exam questions.

1. Solve for x : $x^2 > x + 2$

- A. $x > 0$
- B. $x < -1$ or $x > 2$
- C. $x > -1$
- D. $x < 2$
- E. $x > 2$

2. Find the radius of the circle whose equation is $x^2 + y^2 + 2x - 4y - 5 = 0$.

- A. $\sqrt{5}$
- B. 5
- C. 3
- D. $\sqrt{10}$
- E. 10

3. If $\sin \theta = -\frac{2}{3}$ and $\pi \leq \theta \leq \frac{3\pi}{2}$, then $\tan \theta =$

- A. $\frac{3}{2}$
- B. $-\frac{3}{2}$
- C. $-\frac{\sqrt{5}}{3}$
- D. $-\frac{3}{\sqrt{5}}$
- E. $\frac{2}{\sqrt{5}}$

4. The domain of the function $f(x) = \frac{\ln(x+1)}{\sqrt{x+2}}$ is
- A. $x > -1$
 - B. $x > -2$
 - C. $-2 < x < -1$
 - D. $x > 0$
 - E. $x > 2$
5. The graph of $y = f(x)$ is compressed horizontally by a factor of 4, then translated 3 units to the left, then reflected about the x -axis. The resulting graph has the equation
- A. $y = f(4(x+3))$
 - B. $y = f\left(\frac{1}{4}(x+3)\right)$
 - C. $y = -f(4(x+3))$
 - D. $y = -f\left(\frac{1}{4}(x-3)\right)$
 - E. $y = -f(4(x-3))$
6. A certain radioactive substance has a half-life of 8 days. Initially there are 6 grams of the substance. After 12 days, how many grams of the substance remain?
- A. $6 \cdot \left(\frac{1}{2}\right)^{96}$
 - B. $6 \cdot \left(\frac{1}{2}\right)^{12}$
 - C. $6 \cdot \left(\frac{1}{2}\right)^{1/2}$
 - D. $\frac{3}{2}$
 - E. $6 \cdot \left(\frac{1}{2}\right)^{3/2}$

7. If $\ln(x + 1) - \ln x = 1$, then

- A. $x = \frac{1}{e - 1}$
- B. $x = 1 - \frac{1}{e}$
- C. $x = 1 + \frac{1}{e}$
- D. $x = \sqrt{e}$
- E. There is no solution

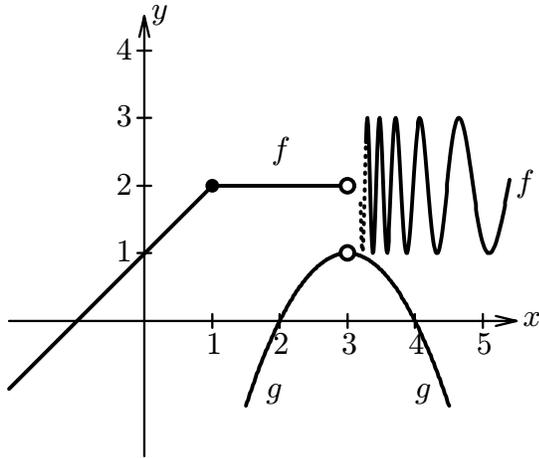
8. Evaluate $\cos(\sin^{-1} x)$.

- A. x
- B. $\sqrt{1 - x^2}$
- C. $\frac{1}{x}$
- D. $\frac{1}{\sqrt{1 - x^2}}$
- E. $x\sqrt{1 - x^2}$

9. The displacement (in feet) of a certain particle moving in a straight line is given by $s = t^2 + t$, where t is measured in seconds. Find the average velocity for the time period beginning at $t = 1$ and lasting for 2 seconds.

- A. 6 ft/s
- B. 3 ft/s
- C. 7 ft/s
- D. 4 ft/s
- E. 5 ft/s

10. The graphs of the functions f and g are given below. Then $\lim_{x \rightarrow 3^-} (g \circ f(x)) =$



- A. Does not exist
- B. 0
- C. 1
- D. $-\infty$
- E. ∞

11. Given that $\lim_{x \rightarrow \pi} f(x) = 2$ and $\lim_{x \rightarrow \pi} g(x) = 0$, then $\lim_{x \rightarrow \pi^-} \frac{\sqrt{3f(x)}}{(x - \pi)(g(x))^2} =$

- A. 0
- B. $\sqrt{3\sqrt{2}}$
- C. ∞
- D. $-\infty$
- E. Cannot be determined

12. $\lim_{h \rightarrow 0} \frac{(3 + h)^{-1} - 3^{-1}}{h} =$

- A. 0
- B. $\frac{1}{9}$
- C. $-\frac{1}{9}$
- D. $-\frac{1}{3}$
- E. Does not exist

13. Find an interval that contains a root of the equation $x^3 + x - 3 = 0$

A. $(-2, -1)$

B. $(-1, 0)$

C. $(0, 1)$

D. $(1, 2)$

E. $(2, 3)$

14. Suppose $f(x) = \begin{cases} 10 - ax, & \text{if } x > a \\ 20 - 7x, & \text{if } x \leq a \end{cases}$ where a is a constant. Find all values of a for which f is continuous.

A. $a = 2, 5$

B. $a = 2, -5$

C. $a = -2, 5$

D. $a = \frac{5}{3}$

E. $a = 5$