

Do not remove this answer page — you will turn in the entire exam. You have two hours to do this exam. No books or notes may be used. You may use a graphing calculator during the exam, but NO calculator with a Computer Algebra System (CAS) or a QWERTY keyboard is permitted. Absolutely no cell phone use during the exam is allowed.

The exam consists of multiple choice and short answer questions. Record your answers on this page. For each multiple choice question, you will need to fill in the box corresponding to the correct answer. For example, if (a) is correct, you must write

a b c d e

Do not circle answers on this page, but please do circle the letter of each correct response in the body of the exam. It is your responsibility to make it CLEAR which response has been chosen. You will not get credit unless the correct answer has been marked on both this page and in the body of the exam.

GOOD LUCK!

1. a b c d e

2. a b c d e

3. a b c d e

4. a b c d e

5. a b c d e

6. a b c d e

7. a b c d e

8. a b c d e

9. a b c d e

10. a b c d e

11. a b c d e

12. a b c d e

13. a b c d e

14. $x = -2, y = -2/9$

15. $Y = 90x + 18x^2$

16. 1

17. $(-\infty, \frac{3}{5})$

18. $\frac{3}{5}$

For grading use:

| | |
|-------|-----------------|
| Total | |
| | (out of 90 pts) |

Multiple Choice Questions

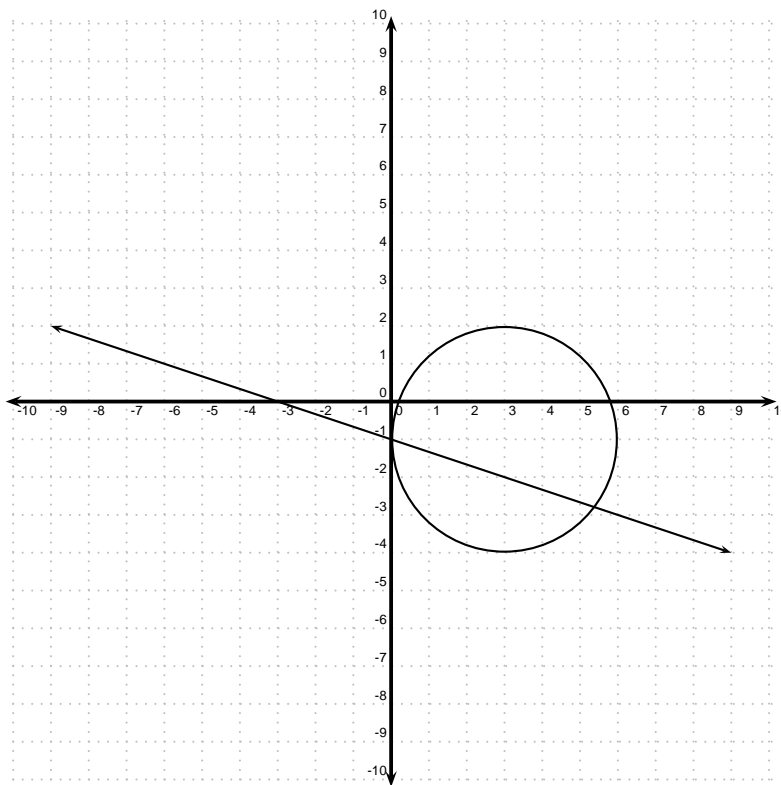
*Show all your work on the page where the question appears.
Clearly mark your answer both on the cover page of this exam
and in the corresponding questions that follow.*

1. Approximate the solution to $(x - 2)^3 = \frac{x}{6}$.

Possibilities:

- (a) $x \approx 2.7732$
 - (b) $x \approx 3.5651$
 - (c) $x \approx 1.3804$
 - (d) $x \approx 1.3866$
 - (e) $x \approx 2.7609$
-

2. Suppose you have a system of equations whose graphs are shown in the picture below. How many solutions are there to this system?



Possibilities:

- (a) 0
 - (b) 1
 - (c) 2
 - (d) 3
 - (e) Infinitely Many
-

3. Let

$$f(x) = \begin{cases} 3 & \text{if } x \leq -5 \\ 6 & \text{if } -5 < x < -1 \\ 9 & \text{if } x \geq -1 \end{cases}$$

Find $f(-4) + f(0)$.

Possibilities:

- (a) 3
 - (b) 6
 - (c) 9
 - (d) 12
 - (e) 15
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4. A rectangle has an area of 65 square feet and a perimeter of 44 feet. Which system of equations would you solve to find the length l and width w of the rectangle?

Possibilities:

- (a) $\begin{cases} lw = 65 \\ 2l + 2w = 44 \end{cases}$
 - (b) $\begin{cases} lw = 44 \\ 2l + 2w = 65 \end{cases}$
 - (c) $\begin{cases} lw = 44 \\ l + w = 65 \end{cases}$
 - (d) $\begin{cases} 2lw = 65 \\ l + w = 44 \end{cases}$
 - (e) $\begin{cases} lw = 65 \\ l + w = 44 \end{cases}$
-

5. Let $f(x) = x^2 + 5x$. Find $\frac{f(x+h) - f(x)}{h}$ if $h \neq 0$.

Possibilities:

- (a) $2x + h + 5$
 - (b) $-2x - h - 5$
 - (c) $\frac{2xh + h^2 + 10x + 5h}{h}$
 - (d) 1
 - (e) $\frac{h^2 + 5h}{h}$
-

6. JJMC manufactures gizmos. If the price of a gizmo is P dollars, JJMC will sell g gizmos where

$$g = \frac{550 - P}{5}.$$

Over a certain period JJMC sold between 25 and 65 gizmos. What was the corresponding range of prices?

Possibilities:

- (a) Between \$97 and \$105.
- (b) Between \$675 and \$875.
- (c) Between \$225 and \$425.
- (d) Between \$14 and \$54.
- (e) Between \$555 and \$563.

7. Which of the following windows is an appropriate viewing window for $y = 4x^2 + 80x + 350$?

Possibilities:

- (a) $-10 \leq x \leq 10, -100 \leq y \leq 100$
- (b) $-5 \leq x \leq 25, 0 \leq y \leq 20$
- (c) $-10 \leq x \leq 10, -10 \leq y \leq 10$
- (d) $-20 \leq x \leq 5, -60 \leq y \leq 100$
- (e) None of the above windows gives a complete graph.

8. How many solutions does the system of equations have?

$$\begin{cases} x - 5y = 10 \\ x - y^2 - y = -22 \end{cases}$$

Possibilities:

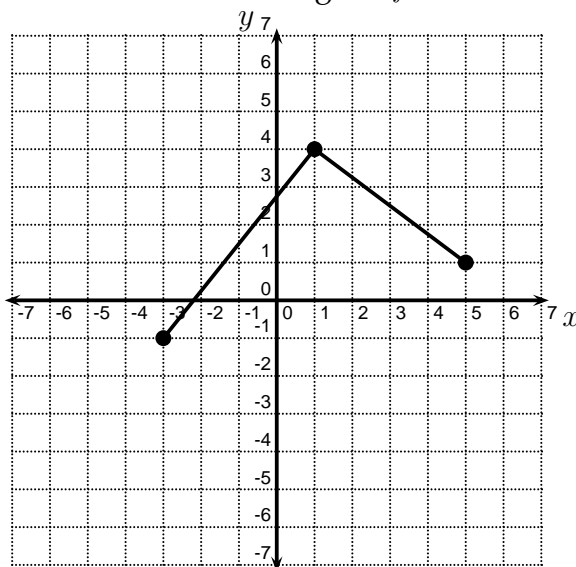
- (a) No Solutions
- (b) One Solution
- (c) Two Solutions
- (d) Three Solutions
- (e) Four Solutions

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9. Jane has \$5000. She invests a portion of her money at a simple interest rate of 3% and the rest of her money at a simple interest rate of 4.6%. After one year, the total interest earned on these investments is \$182.00. How much money did she invest at 3%?

Possibilities:

- (a) \$3000.00
- (b) \$3500.00
- (c) \$4500.00
- (d) \$4000.00
- (e) \$2500.00

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10. The graph of $y = f(x)$ is shown below. Find the domain and range of f .



Possibilities:

- (a) Domain: $[-1, 1]$
Range: $[-3, 5]$
- (b) Domain: $[-1, 4]$
Range: $[-3, 5]$
- (c) Domain: $[-3, 5]$
Range: $[-1, 4]$
- (d) Domain: $[-3, 5]$
Range: $[-1, 1]$
- (e) Domain: $[-3, 1]$
Range: $[-1, 4]$

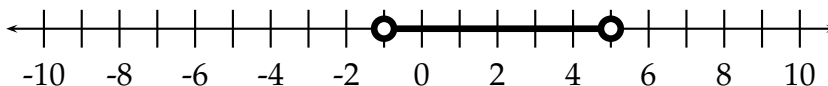
11. Which of the following three statements are true?

- (I) For every function, $f(2 + 3) = f(2) + f(3)$.
- (II) Given any function, for every output of the function, there is exactly one input.
- (III) A person is a function of his/her social security number.

Possibilities:

- (a) (I) and (III) are true
- (b) (I) and (II) are true
- (c) (II) and (III) are true
- (d) Only (III) is true
- (e) Only (II) is true

12. Find the inequality that corresponds to the number line below.



Possibilities:

- (a) $|x - 3| > 2$
- (b) $|x - 3| < 2$
- (c) $|x + 2| < 3$
- (d) $|x - 2| > 3$
- (e) $|x - 2| < 3$

13. Solve the inequality.

$$x^2 - 3x \leq 40$$

Possibilities:

- (a) $[-5, 8]$
- (b) $(-\infty, -5] \cup [8, \infty)$
- (c) $[8, \infty)$
- (d) $(-\infty, -5]$
- (e) $(-5, 8)$

Short Answer Questions

Clearly write your answers in the spaces provided on the following pages.

14. Find all the solutions of the system of equations, or state that there are no solutions.

$$\begin{cases} 4x - 9y = -6 \\ 5x - 9y = -8 \end{cases}$$

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15. Suppose you want to graph $2x^2 + 11x = x + \frac{y}{9}$ on your graphing calculator. What should you enter into your calculator?

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16. The radius of a circle is 9cm. By what amount must the radius be increased to increase the area by 19π square centimeters? (HINT: Recall that the area of a circle is $A = \pi r^2$.)
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17. Solve the inequality. Make sure your answer is in interval notation.

$$11 - 5x > 8$$

18. Let $f(x) = \frac{x}{x+2}$. Find $f(3)$.