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   11. a | b | **c** | d | e

2. a | b | **c** | d | e   12. **a** | b | c | d | e

3. a | b | **c** | d | e   13. a | **b** | c | d | e

4. a | b | c | d | **e**   14. a | b | **c** | d | e

5. a | b | c | d | **e**   15. $x = -1, y = 8/3$

6. a | b | c | **d** | e   16. $13/7 + 2/7x$

7. a | b | c | **d** | e   17. $\left(-\infty, \dfrac{-1}{5}\right)$

8. a | b | c | d | **e**   18. $f(4) = 0$

9. a | b | **c** | d | e   19. $\dfrac{3\sqrt{7}}{7}$

10. a | b | c | **d** | e   20. 2

For grading use:

Total	
	(out of 100 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. Which of the following is a graph of a function?

(I)

(II)

(III)
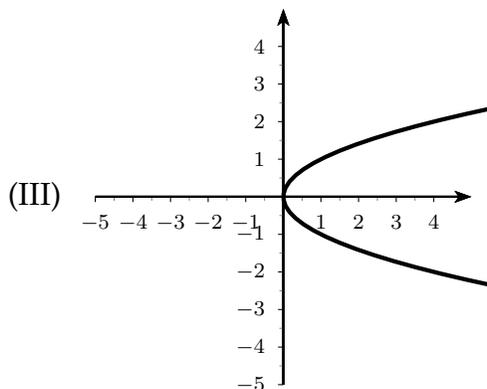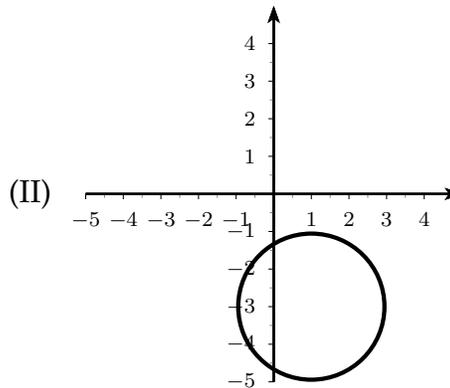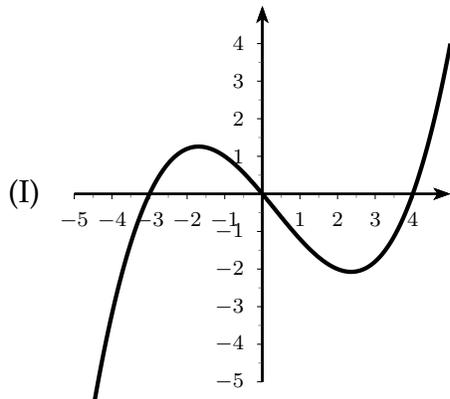
Possibilities:

(a) Only (I) is the graph of a function.

(b) (I) and (III) are both graphs of functions.

(c) (I) and (II) are both graphs of functions.

(d) Only (III) is the graph of a function.

(e) Only (II) is the graph of a function.

2. Let
$$f(x) = \begin{cases} 25, & \text{if } x > 18 \\ -1, & \text{if } 0 < x \leq 18 \\ 11, & \text{if } x \leq 0. \end{cases}$$
If $f(a) = 25$, which of the following values could a possibly be?

Possibilities:

(a) 0
(b) -1
(c) 28
(d) 18
(e) -7

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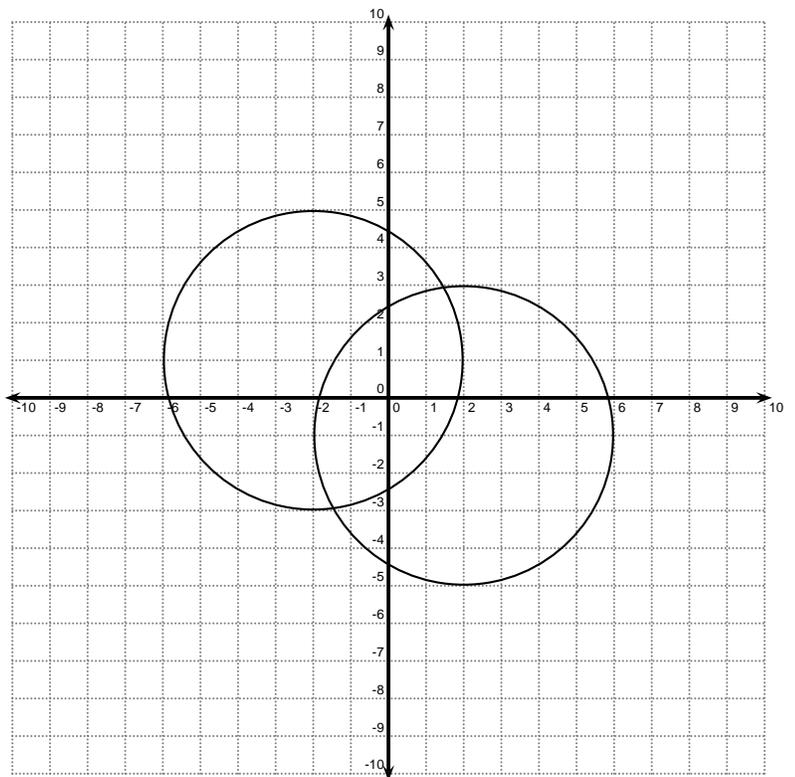
Possibilities:

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

3

4. A rectangle has an area of 75 square feet and a perimeter of 68 feet. Which system of equations would you solve to find the length l and width w of the rectangle?

   Possibilities:

   (a) $\begin{cases} lw = 75 \\ l + w = 68 \end{cases}$

   (b) $\begin{cases} lw = 68 \\ 2l + 2w = 75 \end{cases}$

   (c) $\begin{cases} 2lw = 75 \\ l + w = 68 \end{cases}$

   (d) $\begin{cases} lw = 68 \\ l + w = 75 \end{cases}$

   (e) $\begin{cases} lw = 75 \\ 2l + 2w = 68 \end{cases}$

5. Let $f(x) = 2x^2 + 6$. Find $\dfrac{f(x+h) - f(x)}{h}$.

   Possibilities:

   (a) $\dfrac{2h^2 + 6}{h}$

   (b) $-4x - 2h$

   (c) $2h$

   (d) 1

   (e) $4x + 2h$

6. What quantity, x, of a 40% acid solution must be mixed with 1600 mL of a 55% acid solution to produce a 49.6% solution?

   Possibilities:

   (a) 500 mL

   (b) 700 mL

   (c) 800 mL

   (d) 900 mL

   (e) 600 mL

7. Let $f(x) = \dfrac{2x - 4}{x + 3}$. Find the domain of $f(x)$.

Possibilities:

(a) $(2, \infty)$

(b) $(3, \infty)$

(c) $(-\infty, -2] \cup (2, \infty)$

(d) $(-\infty, -3) \cup (-3, \infty)$

(e) $(-3, \infty)$

8. Use the graphing function on your calculator to find all real solutions to the equation below.

$$x^5 + 4 = x^2$$

Possibilities:

(a) $x \approx 1.4534$

(b) $x \approx -1.1995$

(c) $x \approx -1.2056$ and $x \approx 1.4534$

(d) $x \approx -1.3195$ and $x \approx 0.0000$

(e) $x \approx -1.2056$

9. Find the interval on the Celsius scale corresponding to a Fahrenheit temperature between $50°F$ and $80°F$. Recall that the relationship between degrees Celsius (C) and degrees Fahrenheit (F) is given by the equation $F = \dfrac{9}{5}C + 32$.

Possibilities:

(a) The temperature is between about $32.40°C$ and $86.40°C$.

(b) The temperature is between about $122.00°C$ and $176.00°C$.

(c) The temperature is between about $10.00°C$ and $26.67°C$.

(d) The temperature is between about $96.40°C$ and $150.40°C$.

(e) The temperature is between about $147.60°C$ and $201.60°C$.

10. Solve the inequality and graph the solution set on the real number line.

$$x^2 - 4x - 21 \leq 0$$

Possibilities:

(a)

(b)

(c)

(d)

(e)
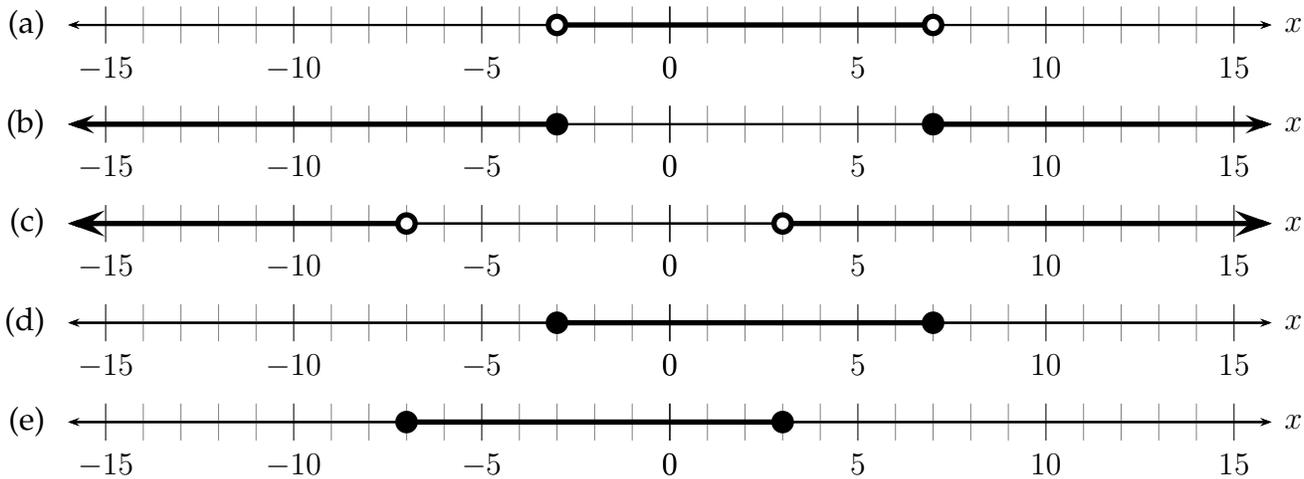
11. In the picture below, the graph of the function $y = g(x)$ is shown. Find the true statement.
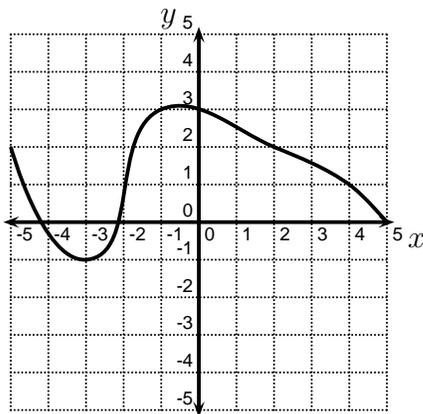
Possibilities:

(a) $g(4) = 5$

(b) $g(-5) \neq 2$

(c) $g(-3) = -1$

(d) $g(-1) = -3$

(e) $g(2) \neq 2$

12. A painter's extension ladder can be between 10 feet and 18 feet in length. The painter places the bottom of the ladder exactly 3 feet from the wall. What is the highest height on the wall that the painter's ladder can reach?

Possibilities:

(a) $\sqrt{315}$ feet

(b) 18 feet

(c) $\sqrt{333}$ feet

(d) 315 feet

(e) $\sqrt{91}$ feet

13. Solve the inequality.
$$|x + 7| > 5$$

Possibilities:

(a) $(-\infty, -5) \cup (5, \infty)$

(b) $(-\infty, -12) \cup (-2, \infty)$

(c) $(-2, \infty)$

(d) $(-\infty, -12)$

(e) $(-\infty, -2)$

14. How many solutions does the system of equations have?
$$\begin{cases} x - 5y = 10 \\ x - y^2 - 17y = 45 \end{cases}$$

Possibilities:

(a) No Solutions

(b) One Solution

(c) Two Solutions

(d) Three Solutions

(e) Four Solutions

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

$$\begin{cases} -4x - 3y = -4 \\ -3x - 3y = -5 \end{cases}$$

16. Suppose you want to graph $2x - 7y + 13 = 0$ on your graphing calculator. What should you enter into your calculator? **Be sure to use calculator syntax.**

17. Solve the inequality. **Make sure your answer is in interval notation.**

$$14 - 5x > 15$$

18. The graph of $y = f(x)$ is shown below. Use the graph to find the value of $f(4)$. (**HINT:** The answer is an integer.)
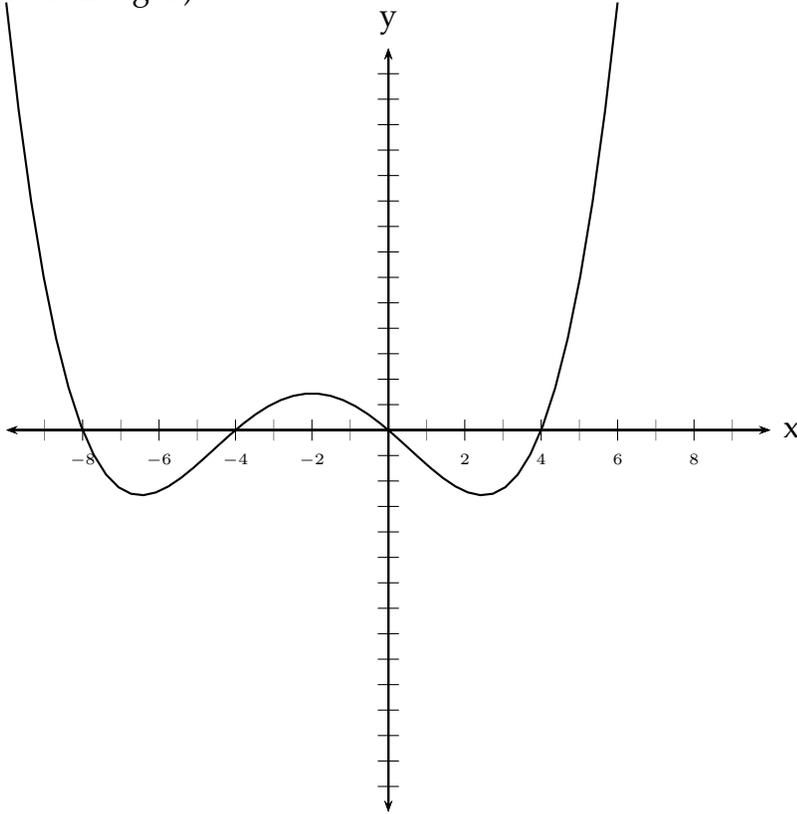
19. Let $f(x) = \dfrac{x + 1}{\sqrt{x + 5}}$. Find $f(2)$.

20. Use the graphing function on your calculator to find the number of solutions to the equation below.

$$x^4 + 2x = x^2 - 1$$