

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.

15.

16.

17.

18.

**For grading use:**

<b>Total</b>	
	<b>(out of 90 pts)</b>

Name: \_\_\_\_\_

---

### 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. Solve the inequality.

$$14 - 5x > 18$$

**Possibilities:**

(a)  $\left(-\infty, \frac{-4}{5}\right)$

(b)  $\left(-\infty, \frac{-4}{5}\right]$

(c)  $\left[\frac{-4}{5}, \infty\right)$

(d)  $\left(\frac{-4}{5}, \infty\right)$

(e) None of the above.

---

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

**Possibilities:**

(a)  $x \approx 2.1448$

(b)  $x \approx 2.1387$

(c)  $x \approx 4.2896$

(d)  $x \approx 4.7321$

(e)  $x \approx 4.2773$

---

3. Suppose you want to graph  $\frac{y}{6} + x^2 = 12$  on your graphing calculator. What should you enter into your calculator?

**Possibilities:**

(a)  $Y = \sqrt{12 - (y/6)}, Y = -\sqrt{12 - (y/6)}$

(b)  $Y = 72 + 6x^2$

(c)  $Y = 2\sqrt{3}, Y = -2\sqrt{3}$

(d)  $Y = -6x^2$

(e)  $Y = 72 - 6x^2$

---

---

4. Let

$$f(x) = \begin{cases} x^2 & \text{if } x \leq -6 \\ x - 9 & \text{if } -6 < x < 1 \\ 9x & \text{if } x \geq 1 \end{cases}$$

Find  $f(-2)$ .

**Possibilities:**

- (a) 4
- (b)  $-11$
- (c)  $-18$
- (d) 4,  $-11$ , and  $-18$
- (e) None of the above

---

5. How many solutions does the following system of equations have?

$$\begin{cases} x = -2 \\ x^2 + y^2 = 4 \end{cases}$$

**Possibilities:**

- (a) No solutions
- (b) One solution
- (c) Two solutions
- (d) Three solutions
- (e) Infinitely many solutions

---

6. Let  $f(x) = 2x + 9$ . Find  $\frac{f(3+h) - f(3)}{h}$ . Assume  $h \neq 0$ .

**Possibilities:**

- (a) 2
- (b)  $\frac{24 + 2h - 2x}{h}$
- (c) 1
- (d)  $-2$
- (e)  $\frac{2h + 9}{h}$

---

7. Let  $f(x) = \frac{1}{x^2 + 3x + 2}$ . Find the domain of  $f(x)$ .

**Possibilities:**

- (a)  $(-\infty, -2) \cup (-2, \infty)$
- (b)  $(-\infty, 1) \cup (1, 2) \cup (2, \infty)$
- (c)  $(-2, -1)$
- (d)  $(-\infty, 2) \cup (2, \infty)$
- (e)  $(-\infty, -2) \cup (-2, -1) \cup (-1, \infty)$

---

8. Solve the inequality.

$$|x + 3| < 2$$

**Possibilities:**

- (a)  $(-\infty, -1)$
- (b)  $(-\infty, -5) \cup (-1, \infty)$
- (c)  $(-5, -1)$
- (d)  $(-\infty, -5)$
- (e)  $(-\infty, -2) \cup (2, \infty)$

---

9. How many solutions does the following system of equations have?

$$\begin{cases} 2x + 8y = 14 \\ 6x + 24y = 42 \end{cases}$$

**Possibilities:**

- (a) No solutions
  - (b) One solution
  - (c) Two solutions
  - (d) Three solutions
  - (e) Infinitely many solutions
-

---

10. Which of the following is NOT a true statement?

**Possibilities:**

- (a) A baby's birthdate is a function of the baby.
- (b) A Super Bowl Champion is a function of the year.
- (c) A UK student is a function of his/her birthdate.
- (d) A UK student is a function of his/her LinkBlue ID.
- (e) The final score is a function of the game.

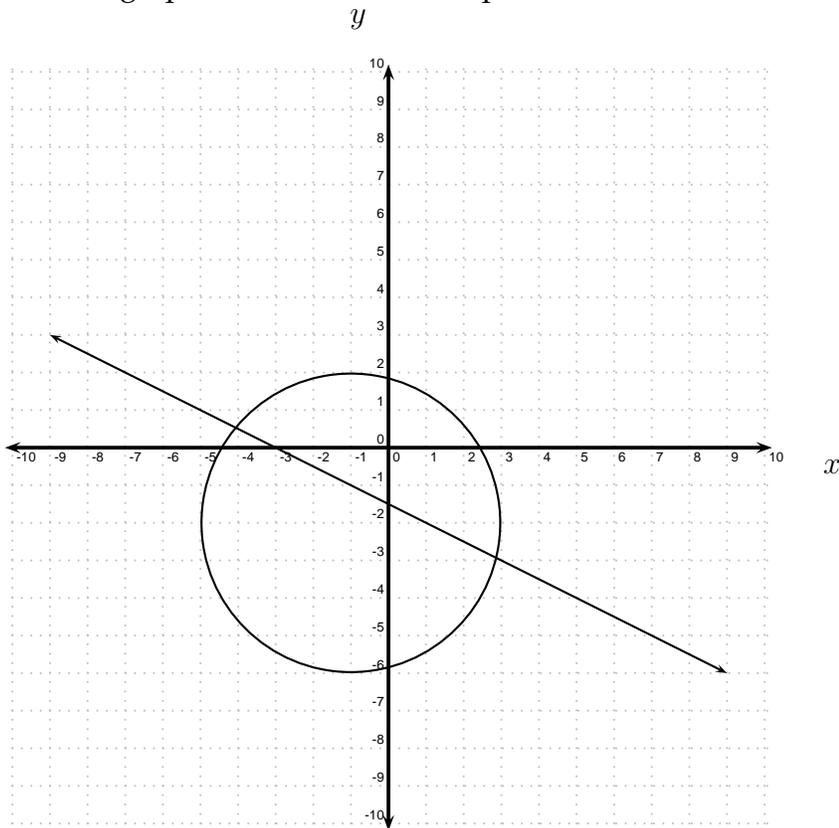
---

11. What quantity,  $x$ , of a 30% acid solution must be mixed with a 35% acid solution to produce 5000 mL of a 31.5% solution?

**Possibilities:**

- (a) 3500 mL
  - (b) 1900 mL
  - (c) 1100 mL
  - (d) 3300 mL
  - (e) 2300 mL
-

- 
12. 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
- 
13. Find the interval on the Celsius scale corresponding to a Fahrenheit temperature between  $50^{\circ}F$  and  $90^{\circ}F$ . Recall that the relationship between degrees Celsius ( $C$ ) and degrees Fahrenheit ( $F$ ) is given by the equation  $F = \frac{9}{5}C + 32$ .

**Possibilities:**

- (a) The temperature is between about  $147.60^{\circ}C$  and  $219.60^{\circ}C$ .
  - (b) The temperature is between about  $122.00^{\circ}C$  and  $194.00^{\circ}C$ .
  - (c) The temperature is between about  $96.40^{\circ}C$  and  $168.40^{\circ}C$ .
  - (d) The temperature is between about  $10.00^{\circ}C$  and  $32.22^{\circ}C$ .
  - (e) The temperature is between about  $32.40^{\circ}C$  and  $104.40^{\circ}C$ .
-

### Short Answer Questions

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

---

14. Find all real solutions of the system of equations.

$$\begin{cases} 6x + 4y = 38 \\ x - y = 3 \end{cases}$$

---

15. Approximate all real solutions to  $x^5 + 4 = 6x$ . You need to include at least 4 decimal places.

---

16. Solve the inequality. Be sure to write your solution in interval notation.

$$x^2 - x \leq 30$$

---

- 
17. A 25 foot ladder rests against a wall. The bottom of the ladder is 7 feet from the wall. If the bottom of the ladder is pulled out 4 feet farther from the wall, how far does the top of the ladder move down the wall?

- 
18. The graph of  $y = f(x)$  is shown below. Use the graph to find  $f(-4)$ . (**HINT:** The answer is an integer.)

