

## Algebra I Semester 2 Practice Exam

1. What is the  $x$ -coordinate of the point of intersection for the two lines below?

$$x - 2y = -2$$
$$y = -6x + 40$$

- A.  $-\frac{82}{13}$   
B.  $-\frac{42}{13}$   
C. 6  
D. 7

2. What is the  $y$ -coordinate of the point of intersection for the two lines below?

$$-6x + 7y = 20$$
$$2x - 3y = 4$$

- A. -22  
B. -16  
C. 16  
D. 22

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

$$x + y = 4$$
$$-4x - 2y = -8$$

- A. no solution  
B. one solution  
C. two solutions  
D. infinitely many solutions

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

$$-2x + 4y = 1$$
$$3x - 6y = 9$$

- A. no solution  
B. one solution  
C. two solutions  
D. infinitely many solutions

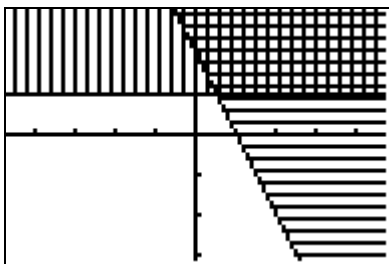
5. Which ordered pair is in the solution set for the system of inequalities shown below?

$$2x - y < 3$$
$$x + 2y > -1$$

- A.  $(-2, -1)$   
B.  $(0, 1)$   
C.  $(1, -2)$   
D.  $(6, 1)$

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6. Which system of inequalities is shown in the graph below? (Assume each tick mark is one unit.)



- A.  $\begin{cases} y \geq 1 \\ y \geq -2x + 2 \end{cases}$
- B.  $\begin{cases} y \geq 1 \\ y \geq -2x - 2 \end{cases}$
- C.  $\begin{cases} y \geq 1 \\ y \geq 2x + 2 \end{cases}$
- D.  $\begin{cases} y \geq 1 \\ y \geq 2x - 2 \end{cases}$

7. Yolanda has 30 coins worth \$2.35. She has only nickels and dimes. How many dimes does Yolanda have?

- A. 15  
B. 17  
C. 19  
D. 23

8. Karla is 3 times as old as Lauren. In 4 years, the sum of their ages will be 56. Which system of linear equations can be used to find the age of Karla ( $k$ ) and Lauren ( $l$ )?

- A.  $\begin{cases} k = 3l \\ 4k + 4l = 56 \end{cases}$
- B.  $\begin{cases} l = 3k \\ 4l + 4k = 56 \end{cases}$
- C.  $\begin{cases} k = 3l \\ (k + 4) + (l + 4) = 56 \end{cases}$
- D.  $\begin{cases} l = 3k \\ l + (k + 4) = 56 \end{cases}$

9. Evaluate  $(x^2)^3$  when  $x = 3$ .

- A. 18  
B. 27  
C. 243  
D. 729

10. Determine the value of  $2^3 \cdot 2^4$ .

- A. 48  
B. 64  
C. 96  
D. 128

11. What is  $1.57 \times 10^4$  in standard (decimal) form?

- A. 0.0000157  
B. 0.000157  
C. 15,700  
D. 1,570,000

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12. Divide:  $\frac{6.0 \times 10^{-5}}{3.0 \times 10^{-3}}$ . What is the quotient in scientific notation?

- A.  $0.2 \times 10^{-8}$
- B.  $0.2 \times 10^{-2}$
- C.  $2.0 \times 10^{-8}$
- D.  $2.0 \times 10^{-2}$

13. If  $\frac{x^y}{x^3} = x^6$ , what is the value of  $y$ ?

- A. 2
- B. 3
- C. 9
- D. 18

14. Which expression is equivalent to

$$(a^2bc^3)(3a^3bc^4)^2?$$

- A.  $6a^{12}b^2c^{24}$
- B.  $6a^8b^3c^{11}$
- C.  $9a^{12}b^2c^{24}$
- D.  $9a^8b^3c^{11}$

15. Simplify the following expression using only positive exponents.

$$(-10a)^0 x^{-2}$$

- A.  $\frac{1}{x^2}$
- B.  $\frac{-10a}{x^2}$
- C.  $10ax^2$
- D.  $-x^2$

16. Evaluate the expression  $2^{-3} \cdot 2^6 \cdot 2$ .

- A. 2
- B. 8
- C. 16
- D. 32

17. Which statement is the *best* approximation of  $\sqrt{85}$ ?

- A. It lies between 9 and 10 and is closer to 10 than it is to 9.
- B. It lies between 9 and 10 and is closer to 9 than it is to 10.
- C. It lies between 81 and 100 and is closer to 100 than it is to 81.
- D. It lies between 81 and 100 and is closer to 81 than it is to 100.

18. What is the *simplest* form of the radical expression  $-\sqrt{\frac{64}{400}}$ ?

- A.  $-\frac{2}{5}$
- B.  $-\frac{8}{20}$
- C.  $-\sqrt{\frac{2}{5}}$
- D.  $-\sqrt{\frac{8}{20}}$

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19. Simplify the radical  $\sqrt{108}$ .

- A.  $2\sqrt{3}$
- B.  $2\sqrt{6}$
- C.  $3\sqrt{3}$
- D.  $6\sqrt{3}$

20. Simplify the product  $\sqrt{18} \cdot \sqrt{3}$ .

- A.  $2\sqrt{3}$
- B.  $2\sqrt{6}$
- C.  $3\sqrt{3}$
- D.  $3\sqrt{6}$

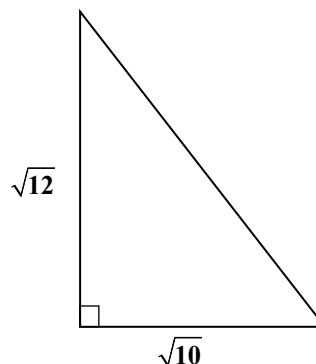
21. The length of a rectangular television is 20 inches. The diagonal measures 25 inches. Which expression below can be used to find the width, in inches, of the television?

- A.  $\sqrt{25^2 - 20^2}$  inches
- B.  $\sqrt{20^2 + 25^2}$  inches
- C.  $(20^2 + 25^2)$  inches
- D.  $(25^2 - 20^2)$  inches

22. Use the converse of the *Pythagorean Theorem* to determine which 3 numbers could represent the sides of a right triangle.

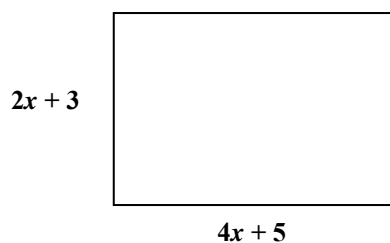
- A. 2, 4, 5
- B. 3, 3, 5
- C. 4, 4, 5
- D. 6, 8, 10

23. Find the area of the figure. Give the exact answer in *simplest form*.



- A.  $\sqrt{30}$
- B.  $\sqrt{120}$
- C.  $2\sqrt{30}$
- D.  $10\sqrt{20}$

24. Which expression represents the perimeter of the rectangle?



- A.  $6x + 8$
- B.  $6x + 16$
- C.  $12x + 8$
- D.  $12x + 16$

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25. The function  $g(x)$  is the amount of money Shawn has in the bank at the beginning of the month. The function  $f(x)$  is the amount of money withdrawn from the account during the month. Which expression represents the amount of money left at the end of the month?

$$f(x) = x^2 - 3x + 12$$

$$g(x) = 6x^2 - 2x + 20$$

- A.  $5x^2 - 5x + 8$   
B.  $5x^2 + x + 8$   
C.  $-5x^2 - x - 8$   
D.  $-5x^2 - 5x + 8$
26. Which expression below represents the product of  $(5x + 6)$  and  $(2x - 5)$ ?

- A.  $10x^2 - 37x - 30$   
B.  $10x^2 - 13x - 30$   
C.  $10x^2 + 13x - 30$   
D.  $10x^2 + 37x - 30$

27. Multiply the polynomials:

$$(2x - 1)(4x^2 + 5x - 2)$$

- A.  $8x^3 + 6x^2 - 9x + 2$   
B.  $8x^3 + 6x^2 - x + 2$   
C.  $8x^3 - 14x^2 - 9x + 2$   
D.  $8x^3 - 14x^2 - x + 2$

28. Expand the expression:  $(2x - 7)^2$

- A.  $4x^2 - 49$   
B.  $4x^2 + 49$   
C.  $4x^2 - 28x + 49$   
D.  $4x^2 + 28x + 49$

29. Which of the following is a factor of  $3x^2 + 16x - 12$ ?

- A.  $(3x - 2)$   
B.  $(3x - 3)$   
C.  $(3x - 4)$   
D.  $(3x - 5)$

30. How many  $x$ -intercepts does the graph of  $y = 9x^2 + 30x + 25$  have?

- A. 0  
B. 1  
C. 2  
D. 3

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31. Which of the following are true statements about the graph of  $y = -3x^2 + 12x - 6$ ?

I. Opens up

II. Opens down

III. Axis of symmetry  $x = -2$

IV. Axis of symmetry  $x = 2$

A. I and III only

B. I and IV only

C. II and III only

D. II and IV only

32. Find the vertex of the parabola given by the equation below:

$$y = -3x^2 - 6x + 4$$

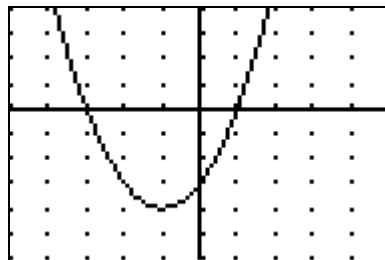
A.  $(-1, 7)$

B.  $(-1, -5)$

C.  $(2, -20)$

D.  $(-3, -5)$

33. Determine the domain and range of the function  $y = (x - 1)(x + 3)$  shown in the graph below. (Assume each tick mark represents one unit.)



A. Domain:  $-3 \leq x \leq 1$

Range: all real numbers

B. Domain:  $-1 \leq x \leq 3$

Range: all real numbers

C. Domain: all real numbers

Range:  $y \leq -4$

D. Domain: all real numbers

Range:  $y \geq -4$

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34. Which of the following is the correct use of the quadratic formula to find the solution set of the equation  $3x^2 + 4x = -8$ ?

- A.  $\left\{ \frac{4 - \sqrt{(4)^2 - 4(3)(8)}}{2(3)}, \frac{4 + \sqrt{(4)^2 - 4(3)(8)}}{2(3)} \right\}$
- B.  $\left\{ \frac{4 - \sqrt{(4)^2 - 4(3)(-8)}}{2(3)}, \frac{4 + \sqrt{(4)^2 - 4(3)(-8)}}{2(3)} \right\}$
- C.  $\left\{ \frac{-4 - \sqrt{(4)^2 - 4(3)(8)}}{2(3)}, \frac{-4 + \sqrt{(4)^2 - 4(3)(8)}}{2(3)} \right\}$
- D.  $\left\{ \frac{-4 - \sqrt{(4)^2 - 4(3)(-8)}}{2(3)}, \frac{-4 + \sqrt{(4)^2 - 4(3)(-8)}}{2(3)} \right\}$

35. What is the solution set for the equation below?

$$x^2 - 6x + 9 = 16$$

- A.  $\{-7, 1\}$
- B.  $\{-1, 7\}$
- C.  $\{3, 4\}$
- D.  $\{3\}$

36. What are the roots (solutions) of the equation  $x^2 - 6x = -3$ ?

- A.  $\{3 - \sqrt{6}, 3 + \sqrt{6}\}$
- B.  $\{-3 - \sqrt{6}, -3 + \sqrt{6}\}$
- C.  $\{3 - 2\sqrt{6}, 3 + 2\sqrt{6}\}$
- D.  $\{-3 - 2\sqrt{6}, -3 + 2\sqrt{6}\}$

37. Which of the following equations has roots of  $-3$  and  $1$ ?

- A.  $(x - 3)(x + 1) = 0$
- B.  $(x - 3)(x - 1) = 0$
- C.  $(x + 3)(x + 1) = 0$
- D.  $(x + 3)(x - 1) = 0$

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38. Solve the equation:  $9x^2 - 16 = 0$

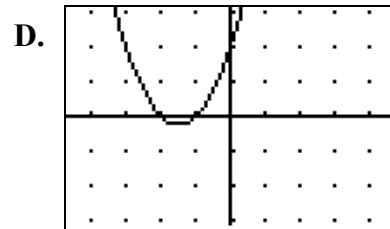
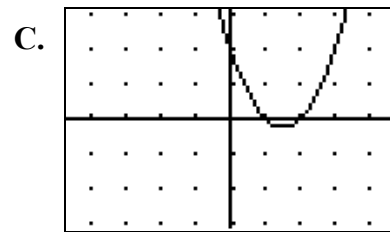
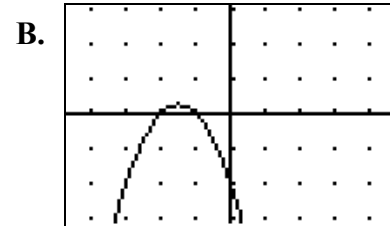
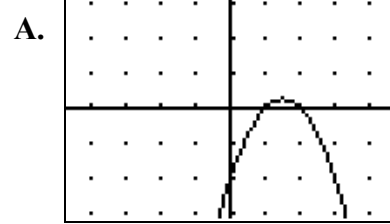
A.  $\left\{-\frac{4}{3}, \frac{4}{3}\right\}$

B.  $\left\{-\frac{16}{9}, \frac{16}{9}\right\}$

C.  $\left\{\frac{4}{3}\right\}$

D.  $\left\{\frac{16}{9}\right\}$

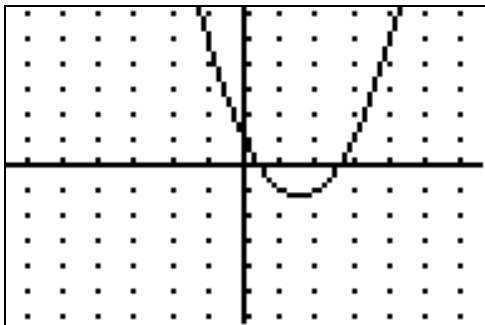
39. Which of the following is the graph of  $y = x^2 + 3x + 2$ ? (Assume each tick mark represents one unit.)





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40. Which equation *best* represents the graph below? (Assume each tick mark represents one unit.)



- A.  $y = x^2 - 6x + 2$   
 B.  $y = -x^2 + 6x - 2$   
 C.  $y = x^2 - 3x + 1$   
 D.  $y = -x^2 + 3x - 1$
41. The area of a right triangle is represented by  $\frac{1}{2}(x^2 + 9x - 36)$ . Which pair of expressions could represent the base and height of the right triangle?
- A.  $x + 6, x - 6$   
 B.  $x + 9, x - 4$   
 C.  $x + 12, x - 3$   
 D.  $x + 18, x - 2$
42. Simplify the rational expression:  

$$\frac{9x^3 - 27x^2}{x^2 - 8x + 15}$$
- A.  $-\frac{9x^2}{5}$   
 B.  $\frac{9x^2}{x - 5}$   
 C.  $\frac{9x - 27}{15 - 8x}$   
 D.  $\frac{3x^2(3x - 9)}{(x - 5)(x - 3)}$
43. Which answer shows a simplified form of the expression below?
- $$\frac{12x^2}{y^3} \div \frac{3x^5}{y^7}$$
- A.  $\frac{36x^7}{y^{10}}$   
 B.  $\frac{4x^7}{y^{10}}$   
 C.  $\frac{36y^4}{x^3}$   
 D.  $\frac{4y^4}{x^3}$

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44. What is  $\frac{x^2-3}{x+4} + \frac{2x-5}{x+4}$  in simplest form?

- A.  $x^2 + 2x - 8$
- B.  $x - 2$
- C.  $\frac{2x^2 - 8}{x + 4}$
- D.  $\frac{x - 2}{x + 4}$

45. What is  $\frac{x-5}{x+2} - \frac{3}{x-2}$  in simplified form?

- A.  $\frac{x^2 - 10x + 16}{x^2 - 4}$
- B.  $\frac{x^2 - 10x + 4}{x^2 - 4}$
- C.  $\frac{x^2 - 4x + 16}{x^2 - 4}$
- D.  $\frac{x^2 - 4x + 4}{x^2 - 4}$

46. For what values of  $x$  is the rational expression  $\frac{x^2 - 10x + 24}{x^2 - 36}$  undefined?

- I.  $x = -6$
- II.  $x = 4$
- III.  $x = 6$

- A. I only
- B. III only
- C. I and III only
- D. I, II, and III

47. Simplify the quotient:

$$\frac{x^2 - 6x + 9}{x^2 + 5x + 6} \div \frac{4x - 12}{x^2 + 2x}$$

- A.  $\frac{-3}{4(x-3)}$
- B.  $\frac{x}{4}$
- C.  $\frac{x(x-3)}{4(x+3)}$
- D.  $\frac{1}{4x}$

48. Eighteen is what percent of 30?

- A. 5.4 %
- B. 24.6%
- C. 55%
- D. 60%

49. Solve the equation below for  $x$ :

$$\frac{2x + 5}{4} = \frac{x + 6}{10}$$

- A. -20
- B.  $-\frac{13}{8}$
- C.  $-\frac{1}{2}$
- D. 1

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50. Which solution set represents the values of  $x$  that satisfy the equation below?

$$\frac{x+3}{2} = \frac{7}{x+8}$$

- A.  $\{-10, -1\}$
- B.  $\{-8, -3\}$
- C.  $\{1, 10\}$
- D.  $\{3, 8\}$



## Algebra I Semester 2 Practice Exam Free Response

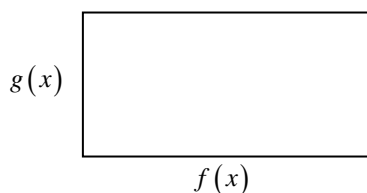
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1. Simplify the following expression. Justify each step with the applicable property of exponents. Express your answer with no negative exponents.

$$\frac{64a^3b^{-5}}{2a^4b^6} \cdot \frac{6a^4b^2}{-4a^5}$$

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2. A rectangular patio has length  $f(x)$  feet and width  $g(x)$  feet, where  $f(x) = 3x + 7$  and  $g(x) = x + 5$ :



- A. If the patio's perimeter were 88 feet, what would be the value of  $x$ ?
- 
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- B. If the patio's area were 11 square feet, what would be the value of  $x$ ?

## Algebra I Semester 2 Practice Exam Free Response

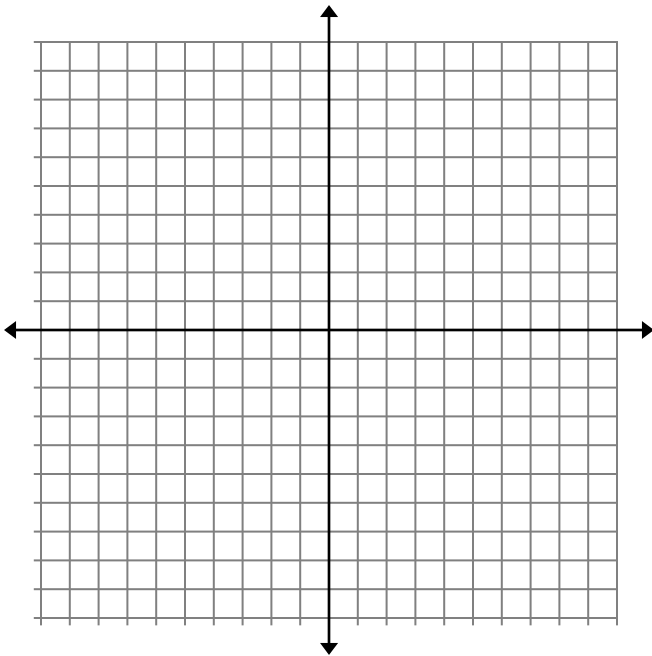
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3. Use the equation  $y = -x^2 + 8x - 15$  to answer the following questions:

A. Find the  $x$ -intercepts.

B. Find the vertex.

C. Sketch the graph.



D. State the domain and range.

