Algebra I H 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?

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

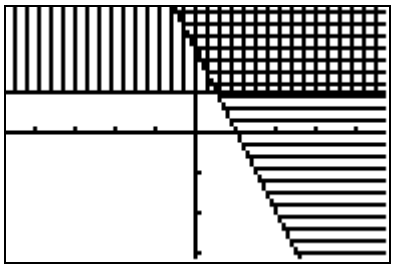
A. $(-2, -1)$

B. $(0, 1)$

C. $(1, -2)$

D. $(6, 1)$

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 $\left(x^2\right)^3$ 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 1.57×10^4 in standard (decimal) form?

A. 0.0000157

B. 0.000157

C. 15,700

D. 1,570,000

12. Divide: $\frac{6.0\times10^{-5}}{3.0\times10^{-3}}$. What is the quotient in scientific notation?

A. 0.2×10^{-8}

B. 0.2×10^{-2}

C. 2.0×10^{-8}

D. 2.0×10^{-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 $\left(a^2bc^3\right)\left(3a^3bc^4\right)^2$?

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:

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

A. $\frac{1}{x^2}$

B. $\frac{-10a}{x^2}$

C. $10ax^2$

D. $-x^2$

16. Evaluate the expression $2^{-3}\cdot2^6\cdot2$.

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. $-\sqrt{\frac{8}{20}}$

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. $\left(20^2 + 25^2\right)$ inches

D. $\left(25^2 - 20^2\right)$ inches

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

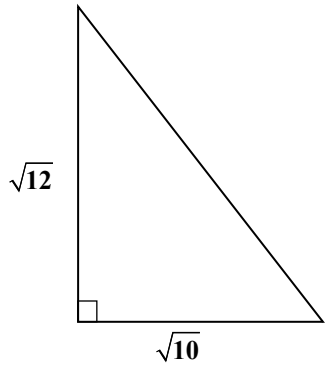
A. 2, 4, 5

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.



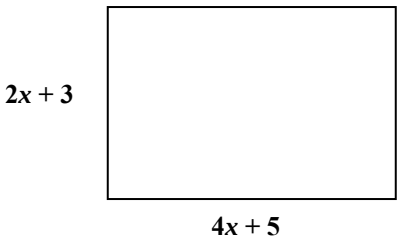
A. $\sqrt{30}$

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. $12x + 16$

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

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:

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

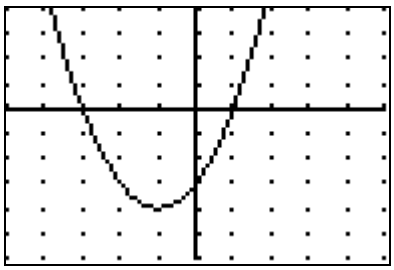
A. (–1, 7)

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: $-3 \le x \le 1$
Range: all real numbers

B. Domain: $-1 \le x \le 3$
Range: all real numbers

C. Domain: all real numbers
Range: $y \le -4$

D. Domain: all real numbers
Range: $y \ge -4$

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. $(x+3)(x-1)=0$

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

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

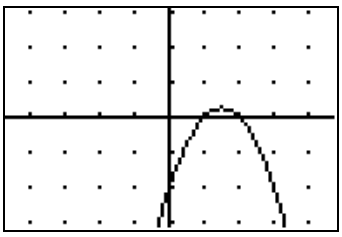
B. $\left\{-\frac{16}{9}, \frac{16}{9}\right\}$

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

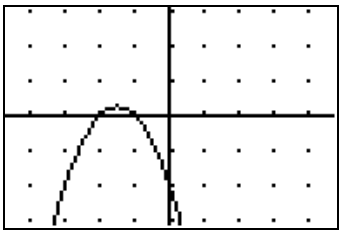
D. $\left\{\frac{16}{9}\right\}$

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

A.



B.



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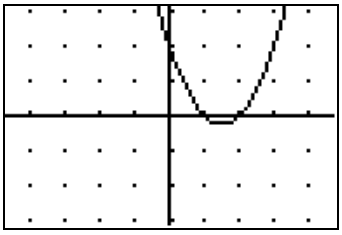
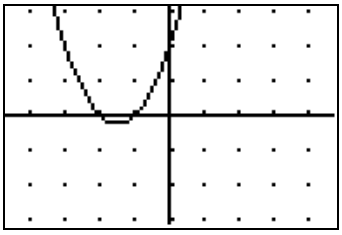
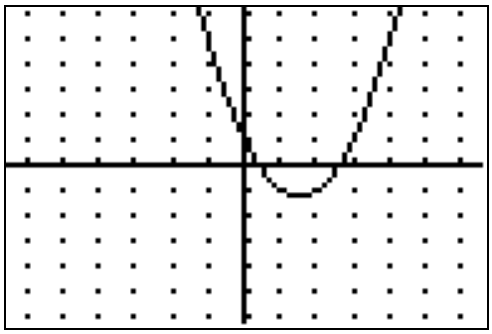


D.



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 $\frac{1}{2}\left(x^2 + 9x - 36\right)$. 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. $\frac{4y^4}{x^3}$

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

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. $\{3,8\}$

51. Which of the following graphs could model the graph of the equation $y=\left(\frac{1}{3}\right)^x$? (Assume each tick mark represents one unit.)

A.

B.

C.

D.

52. A used truck purchased for $10,000 depreciates at the rate of 15% per year. Which of the following equations would be used to find the value of the truck after 5 years?

A. $V = -0.15(5) + 10{,}000$

B. $V = 0.15(5) + 10{,}000$

C. $V = 10{,}000(1 + 0.15)^5$

D. $V = 10{,}000(1 - 0.15)^5$

53. Solve the radical equation $9 + \sqrt{2x - 1} = 16$ for x.

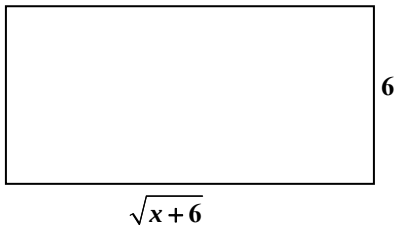
A. 25

B. 16

C. 5

D. 4

54. The perimeter of the rectangle below is 30.



Find the value of x.

A. 18

B. 19

C. 75

D. 570

55. The midpoint of $\overline{AB}$ is $(2,-3)$. If A is the point $(5,-10)$, what are the coordinates of point B?

A. ☐

B. (−1, 4)

C. ☐

D. (−2, 7)

56. Which equation can be used to find the distance between point $E(5, 2)$ and point $F(3, 6)$?

A. $d = \sqrt{(5-2)^2 + (3-6)^2}$

B. $d = \sqrt{(5+2)^2 - (3+6)^2}$

C. $d = \sqrt{(3-5)^2 + (6-2)^2}$

D. $d = \sqrt{(3+5)^2 - (6+2)^2}$

57. What number should be added to both sides of the equation to complete the square for the equation $x^2 + 8x = 17$?

A. 4

B. 16

C. 29

D. 49

58. The table shows a function.

x	*y*
−2	4
−1	1
0	0
1	1
2	4

Which model *best* fits the data?

A. absolute value

B. exponential

C. linear

D. quadratic

59. A teacher needs to choose 3 students to carry boxes to the office. How many *unique* groups of 3 could she choose from the 5 students in her room?

A. 6

B. 10

C. 15

D. 60

60. A baseball coach needs to select a pitcher and a catcher from the 11 people on the team. If the coach randomly chooses the pitcher and then the catcher, how many *different* ways could he choose them?

A. 21

B. 42

C. 110

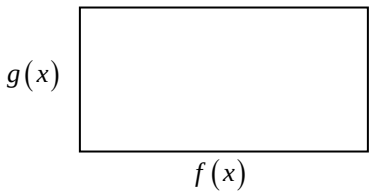
D. 220

Algebra I H Semester 2 Practice Exam
Free Response

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

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

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?

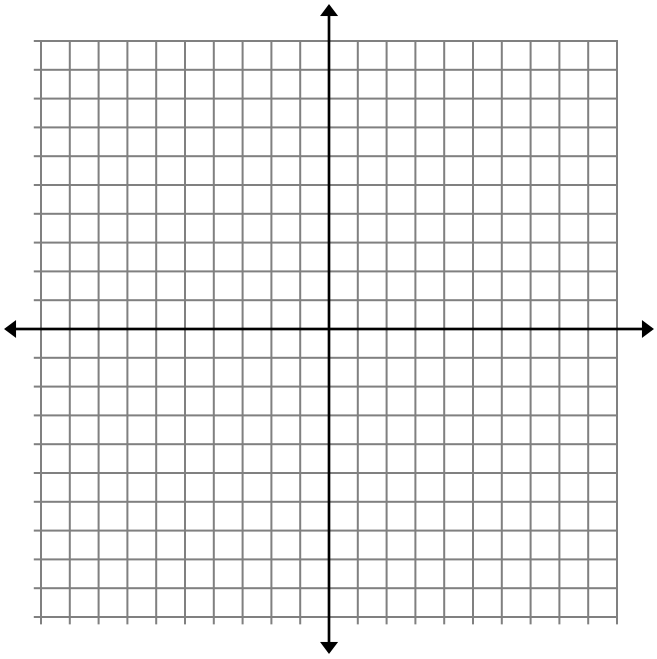
B. If the patio's area were 11 square feet, what would be the value of x?

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.