State the solution to each system below.

1. 

2. 

3. 

4. Determine the solution to the system:

\[
\begin{align*}
4x + 1 &= y \\
x + 4 &= y
\end{align*}
\]

5. Create a table of values for the two equations in the system:

\[
\begin{align*}
y &= x - 5 \\
y &= -2x + 4
\end{align*}
\]

6. Which row in the table shows the solution? 

What is the solution? 

7. Solve the following linear systems by using either substitution, elimination or graphing.

\[
\begin{align*}
y &= 3x - 4 \\
y &= 3x + 2
\end{align*}
\]
Write a system of linear equations to represent each situation.

10. Jason has 18 coins in his pocket valued at $1.60. He only had nickels and dimes. Which of these is a system of equations that could be used to solve for the number of each type coin?

   \[ n + d = 18 \]
   \[ 0.05n + 0.10d = 1.60 \]

11. Suppose that you bought supplies for a party. Three rolls of streamers and 15 party hats cost $30. Later you bought 2 rolls of streamers and 4 party hats for $11. How much did each roll of streamers cost? How much did each party hat cost?

   \[ 3S + 15H = 30 \]
   \[ 2S + 4H = 11 \]

12. Which of the follow system of linear inequality graphs contains the point (8,-3) as a solution?
Simplify the following, there should be no NEGATIVE exponents.

13. \( a^{-3} \cdot a' = a^{2} \cdot \frac{1}{a^{1}} \)

14. \( (8x^2y^3)^3 \)

15. \( \frac{r^{33}}{r^{17}} = r^{33-17} = r^{16} \)

16. \( \frac{a^5b^4c}{a^2b^2c^2} = \frac{a^{5-2}b^{4-2}c^{1-2}}{} \)

Find the area of each figure in simplest exponential form

17. \( 12x^2 \)

18. \( 3x^2y \)

Find the volume of the following figure in simplest exponential form.

19. \( (3x^2y^3)(2x^5y)(9) = 54x^7y^4 \)

Write an exponential function to model the situation and find the amount for the specified time.

19. The population of a city of 450,000 people increases 2.5% per year. Determine what the population of the city will be after 6 years.
   Equation: \( y = 450000(1.025)^x \)
   \( y = 450000(1.025)^6 = 521862 \)

20. John purchased a car for \$25,000 and decreases in value 12% per year. How many years will it take before the car is less than half of its original value?
   Equation: \( y = 25000 \times (0.88)^x \)
   \( \text{years} \)

Tell whether the following tables are linear or exponential. If the table is exponential, also tell whether it is a growth or decay.

21. | x | y |
    |---|---|
    | 0 | 800 |
    | 1 | 1200 |
    | 2 | 1800 |
    | 3 | 2700 |
    | 4 | 4050 |

22. | x | y |
    |---|---|
    | 1 | 2 |
    | 2 | 4 |
    | 3 | 6 |
    | 4 | 8 |
    | 5 | 10 |

23. | x | y |
    |---|---|
    | 0 | 2 |
    | 1 | 5 |
    | 2 | 8 |
    | 3 | 11 |
    | 5 | 17 |

24. | x | y |
    |---|---|
    | 1 | 2048 |
    | 2 | 512 |
    | 3 | 128 |
    | 4 | 32 |
    | 5 | 8 |
Identify whether the following graphs are exponential growth, decay or neither.

Chapter 9 Review Questions
Find the sum, difference or product. Write your answers in descending order.

28. \[(\frac{1}{x^n} - 2n - 1) + (\frac{5n - n^4 + 5}{3n + 1})\]

29. \[(\frac{8y^3 - y + 7}{2y^3 - y + 2}) - (\frac{6y^3 + 3y - 3}{2y^3 - y + 10})\]

30. \[\frac{5m^3(m + 6)}{8m^4 + 30m^3}\]

31. \[3(4x^2 - 5) + 4(x^2 + 6)\]

32. \[\frac{(3y + 8)(5y + 6)}{15y^2 + 18y + 48}\]

33. \[\frac{15y^4 + 58y^3 + 48y}{15y^4 + 58y^3 + 48}\]

34. A triangle has sides of \(2x + 6\), \(6x - 12\) and \(-x + 7\). What is the perimeter of the triangle?

35. A swimming pool has a length of \(2x^2 - 2x + 5\) and a width of \(x + 4\). What is the area of the swimming pool?

36. What is the area of the following triangle?

\[A = \frac{1}{2} \cdot \frac{x^2 + 4x}{x}\]
Factor the following polynomials.

36. $x^2 + 3x - 18$

$$x^2 + 3x - 18 = (x + 6)(x - 3)$$

37. $x^2 + 15x + 56$

$$x^2 + 15x + 56 = (x + 8)(x + 7)$$

38. $25x^2 + 40x + 16$

$$25x^2 + 40x + 16 = (5x + 4)^2$$

39. $7x^2 + 20x - 3$

$$7x^2 + 20x - 3 = (7x - 1)(x + 3)$$

40. $24a^2b^4c + 18a^4b^2c$

a) $6(4a^2b^4c + 3a^4b^2c)$

b) $a^2b^2c(4b^2 + 3a^2)$

c) $6abc(4b^2 + 3a^2)$

d) $6a^2b^2c(4b^2 + 3a^2)$

Use the figure to answer the following questions.

41. What is the area of the figure?

$$\chi^2 + 2\chi - 15$$

42. What are the factors of the figure?

$$(\chi - 3)(\chi + 5)$$

43. Tammy drew a floor plan for her kitchen, as shown below. Which expression represents the area of Tammy's kitchen?

$$3x^2 + 30x + 5$$

44. What is the perimeter of the following triangle?
Chapter 10 Review Questions

45. How does the graph of \( y = x^2 + 2 \) compare to the graph of \( y = x^2 - 1 \)?

46. How does the graph of \( y = -4x^2 \) compare to the graph of \( y = 4x^2 \)?

47. If the graph of the function \( y = x^2 - 3 \) is moved up 4 spaces, what is the new equation?

48. What are the \( x \)-intercepts of the parabola \( y = x^2 + 4x \)?

49. What are the solutions to the equation \( 5x = x^2 - 6 \)?

50. Which of the following is the graph of the quadratic parent function? What is the equation?

51. Find the solutions of the following equation: \( 0 = x^2 + 3x + 2 \)

52. For each: What is the axis of symmetry? What is the vertex? Is it a maximum or minimum? What is the \( y \)-intercept?

A) \( f(x) = -x^2 - 3x - 2 \)

B) \( A : x = 3 \)  
\( (3, -1) \) vertex 
\( y \)-int \((3, 0)\) 
\( x \)-int \((0, 0)\) 
\( y \)-intercept \((0, 0)\) 
\( y \)-intercept \((3, 0)\) 
\( x \)-intercept \((-1, 0)\) 
\( x \)-intercept \((3, 0)\) 
\( y \)-intercept \((0, 3)\) 
\( y \)-intercept \((3, 0)\) 
\( x \)-intercept \((-1, 0)\) 
\( x \)-intercept \((3, 0)\)
Use the quadratic formula to solve the following questions.

53. \( 9x^2 + 6x = 15 \)

54. \( r^2 - 7r = -3 \)

\[
x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(1)(-3)}}{2(1)}
\]

Identify whether the equations are linear, quadratic or exponential.

55. \( y = 5x^2 - 3x + 7 \) (quadratic)

56. \( y = 2^x \) (exponential)

57. \( y = 2x + 6 \) (linear)

58. \( y = 5 \) (linear)

Identify whether the following graphs are linear, quadratic or exponential.

59. (quadratic)

60. (linear)

61. (linear)

Decide if the data in the table shows direct, inverse variation, or neither. If it is either direct or inverse variation, determine the value of the constant \( k \), and write the corresponding equation.

62. 

<table>
<thead>
<tr>
<th>( x )</th>
<th>8</th>
<th>12</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

- Direct/Inverse/Neither?
- Constant? \( k = \frac{1}{4} \)
- Equation \( y = \frac{1}{4}x \)

63. 

<table>
<thead>
<tr>
<th>( x )</th>
<th>-2</th>
<th>3</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>6</td>
<td>-4</td>
<td>-1.2</td>
</tr>
</tbody>
</table>

- Direct/Inverse/Neither?
- Constant? \( k = 0 \)
- Equation \( y = -1.2x \)
64. A farmer uses a lever to move a large rock. The force required to move the rock varies inversely with the distance from the pivot point to the point the force is applied. A force of 50 pounds applied to the lever 36 inches from the pivot point of the lever will move the rock. Which function models the relationship between \( F \), the amount of force applied to the lever, and \( d \), the distance of the applied force from the pivot point?

\[
F = \frac{1800}{d}
\]

Identify whether the function is linear or quadratic. Identify the reference point.

65. \( y - 5 = -2(x+3)^2 \)  

66. \( y + 7 = 3(x - 6) \)
Fill in the missing information.

67.

<table>
<thead>
<tr>
<th>Table</th>
<th>Graph</th>
<th>Algebraic (write an equation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \begin{array}{</td>
<td>c</td>
<td>c</td>
</tr>
</tbody>
</table>

Verbal (describe the transformations from the parent function)

Linear
shifted right 7 units and down 8 units

Complete the Square.

68. \( x^2 + 8x + \boxed{16} \)

69. \( x^2 - 9x + \frac{81}{4} \)

70. \( 4x^2 - 16x + \boxed{64} \)

Solve for \( x \) by completing the square.

71. \( x^2 + 8x + 6 = 0 \)

72. \( x^2 - 4x - 8 = 0 \)

73. \( x^2 + 9x = 19 \)

74. \( x^2 - 14x + 44 = 4 \)
75. A lawn is shaped like a parallelogram with a base of 32 feet and a height of 15 feet. Covering the lawn with grass will cost $2.60 per square foot. How much money will it cost to cover the lawn with grass?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

76. Look at the drawing shown below.

If ΔKMP is a right triangle formed by the placement of 3 squares, what is the area of the shaded square?

A 135 in.²
B 24 in.²
C 66 in.²
D 81 in.²

77. Describe the effect on the area of a circle when the radius is doubled.

F The area is reduced by \( \frac{1}{2} \).
G The area remains constant.
H The area is doubled.
J The area is increased four times.

78. If \((x, -3.2)\) is a solution to the equation \(4x = 5y - 17\), what is the value of \(x\)?

F 0.84
G 0.25
H -5.96
J -8.25

\(x = -8.25\)
79. Which equation could be used to represent the graph of this function? 

A. \( y = -3x + 2 \)
B. \( y = \frac{3}{2}x + 6 \)
C. \( y = \frac{2}{3}x + 6 \)
D. \( y = \frac{2}{3}x + 6 \)

80. What is the slope of the line that contains the coordinate points (6, -9) and (-3, 9)?

\( m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-9 - 9}{6 - (-3)} = \frac{-18}{9} = -2 \)

A. \( m = -1 \)
B. \( m = 2 \)
C. \( m = 2 \)
D. \( m = -2 \)

81. An amusement park charges an admission fee of $5.50 plus 75¢ per ride ticket. Which equation best represents \( c \), the total cost for a person to enter the amusement park and purchase \( r \) ride tickets?

A. \( c = 0.75 + 5.50r \)
B. \( r = 5.50 + 0.75c \)
C. \( c = 5.50 + 0.75r \)
D. \( r = 0.75 + 5.50c \)

82. Yummy Bakery sells apple and blueberry pies each Saturday. Apple pies cost $8 each and blueberry pies cost $12 each. Last Saturday, the bakery sold 4 more apple pies than blueberry pies for total sales of $232. Which system of equations can be used to find \( a \), the number of apple pies and \( b \), the number of blueberry pies sold?

A. \( 8a + 12b = 232 \)
B. \( 8a + 12b = 232 \)
C. \( a = b + 4 \)
D. \( 8a + 12b = 232 \)

83. The amount of leather needed to wrap around a baseball best represents the ball's—

A. perimeter
B. circumference
C. surface area
D. volume

84. Which monomial represents the area of a rectangle with a length of \( 3a^2bc^3 \) units and a width of \( 5ab^2c^4 \) units?

A. \( 8a^3b^4c^7 \)
B. \( 15abc \)
C. \( 15a^3b^3c^7 \)
D. \( 8abc \)
85. Mike is packing a rectangular box that contains 8 tightly packaged bars of Spanish soap, called Jabón, shaped like rectangular prisms, as shown below.

What is the approximate volume in cubic inches of this rectangular box?

A 13 in.³
B 30 in.³
C 105 in.³
D 221 in.³

86. The water wheel of a mill makes 45 revolutions per minute. How many revolutions will the wheel make in \( \frac{1}{2} \) hour?

\[
\frac{45 \text{ rev}}{\text{min}} \times \frac{\text{min}}{30 \text{ min}} = \frac{x}{30 \text{ min}}
\]

A 450
B 600
C 900
D 1350

87. In a particular town, there is a small park in the shape of a triangle, as shown below.

The side of the park facing First Avenue is 110 feet long and the side of the park facing Main Street is 130 feet long. Which of the following is closest to the length of the side of the park facing Air Depot Road?

\[
x^2 + 110^2 = 130^2
\]

A 20 feet
B 70 feet
C 140 feet
D 4800 feet