*A*TM 1st Week Review: Extended Spring Break **Name:** _____ *Pd:*____

Ch 1.1 – 1.3 & 1.7 – 1.9

- Real Numbers & Their Graphs
- Simplifying Expressions
- Basic Properties of Real Numbers
- Solving Equations in One Variable
- Words into Symbols
- Problem Solving with Equations

1. On a number line, the coordinate of point A is -3 and the coordinate of point B is 7. Find the coordinate of the point halfway between A and B.
2. Simplify the expression: $-\sqrt{121}$
3. Simplify. $\dfrac{2 \bullet 5^2 + 1}{2 \bullet 3^2 - 1}$
4. Evaluate $x(y-1)^2$ if $x=4$ and $y=3$.
5. Name the property that is illustrated by this statement. $2a + (3b + c) = (3b + c) + 2a$
6. Is the following *always*, *sometimes*, or *never* true? $8 + 6x - 10 = 10x + 11 - 4x$
7. Solve. $\frac{39}{2}m - 13 = \frac{73}{2}$
8. Solve for *h*. $A = 2\pi r(r + h)$
9. Write an algebraic expression that represents this verbal expression. 40 fewer than a number *t*
10. You start with $15 and save $8 each week. What algebraic expression models the total amount you save?
11. Your little sister has made up a card game where different types of cards are worth different points. Face cards (*F*) are worth 16 points, cards with red numbers (*R*) are worth 9 points, and cards with black numbers (*B*) are worth 6 points. What algebraic expression models the total number of points that you have in your hand? Suppose you have 6 face cards, 3 cards with red numbers, and 2 cards with black numbers. How many points do you have?
12. Tickets to a concert are available online for $20 each, plus a one-time handling fee of $1.75. The total cost is a function of the number of tickets bought. What function rule models the cost of the concert tickets (t)? Evaluate the function for 3 tickets.
13. At 2:00 P.M. Miguel leaves Chicago traveling at 48 mi/h. At 2:15 P.M. Sandor leaves Chicago by the same route at 56 mi/h. At what time will Sandor overtake Miguel?
14. Morton invested part of his $1200 at an annual rate of 5% and part at a rate of 7.5%. His total return on the two investments was $81. How much was invested at 7.5%?

Ch 2.1 – 2.5

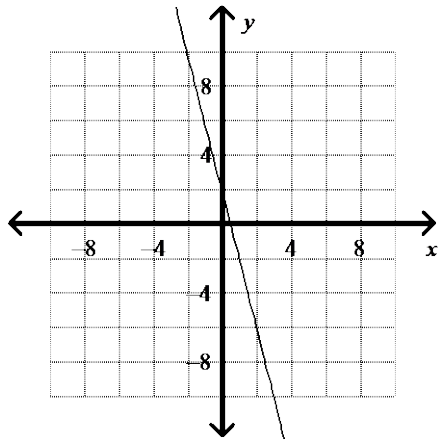
- Solving Inequalities
- Solving Word Problems Using Inequalities
- Absolute Value Equations & Inequalities

15. Solve. $-\frac{m}{2} < -2$
16. Solve. $3(n-1) > 5n+7$
17. Solve. $-3 < 4c+5 \le 1$
18. Solve. Next, write the solution set in interval notation. $4-w \le 3$ or $w+5<3$
19. At the video store, you can rent tapes for $1.50 per day, or you can get unlimited rentals for a monthly fee of $20. At most, how many tapes can you rent at $1.50 before spending more than the cost for a month's unlimited rentals?
20. Solve. $\left|5-\frac{x}{3}\right| = 7$
21. Solve. $|2y+9| < 13$
22. Solve. $|4-h| \ge 5$
23. Describe the graph of the solution set of $|k+3| < 2$

Ch 3.1 – 3.7

- Open Sentences in Two Variables
- Graphs of Linear Equations
- Sloe and Finding the Equation of a Line
- Systems of Equations (Graphing)
- Systems of Equations (Substitution & Elimination)
- Systems of Equations (Word Problems)
- Linear Inequalities
- Systems of Inequalities

24. A box contains nickels, dimes, and quarters worth $1.10. Find all possibilities for the number of each coin if there are the same number of nickels and quarters.
25. Graph $y = \frac{2}{5}x$.
26. What is the graph of the equation? $-5x + y = -4$
27. What are the intercepts of the equation? Graph the equation. $-3x + 4y = -12$
28. Find the slope between the 2 points. (6, 2) and (7, 4)
29. Find the slope between the 2 points. (8, 7) and (5, 7)
30. What is an equation of the line in slope intercept form? $\frac{3}{5}x + \frac{1}{2}y = 6$
31. You are trying to compare the Fahrenheit and Celsius scales and you have two examples: Temperature A is –20 degrees Celsius and –4 degrees Fahrenheit. Temperature B is 60 degrees Celsius and 140 degrees Fahrenheit. What graph models the relationship between the Fahrenheit and Celsius scales? What is an equation of the line in slope-intercept form?
32. What is an equation of the line in slope intercept form?



33. What is the equation of the given line in standard form? Use integer coefficients. $y = -6.9x + 5.1$
34. Find the equation of the line in slope-intercept form; the line parallel to $y = 8x - 8$ through (5, 2)
35. Solve the system using substitution or elimination. $\begin{cases} -2x - y = -14 \\ 3x - y = 11 \end{cases}$
36. Solve the system using substitution or elimination. $\begin{cases} -x + 2y = 10 \\ -3x + 6y = 11 \end{cases}$
37. Going downstream, a boat traveled 60 mi in 3.75 h. Returning upstream, the same distance took 2.25h longer to cover. What was the boat's speed and the speed of the current?
38. A painter earned \$24/h on a job, while the painter's assistant earned \$10/h. The assistant worked 6 hours more than the painter. If together they were paid \$400, how much did each earn?
39. Solve the system of inequalities by graphing. $\begin{cases} x + y > 1 \\ 2x + 3y \le 7 \end{cases}$

Ch 4.1 – 4.6

- Polynomials
- Laws of Exponents
- Multiplying Polynomials
- Factoring Polynomials

40. Simplify. $\left(x^3 - 5x^2 + 3x + 5\right) - \left(x^2 - 2x - 2\right)$
41. Simplify. $g\left(2g - 6h\right) + 7\left(4gh - 5h^2\right)$
42. Simplify. $\left(3g - 2\right)^3$
43. Simplify. $\left(-x^9\right)^4 x^2$
44. Express $(5t - 3)(4t + 9)$ as a simplified polynomial.
45. Express $mp(m^2 - p^2)(m^2 + p^2)$ as a simplified polynomial.

46. Factor completely. $25t^2 + 30t + 9$
47. Factor completely. $4x^3 - 196x$
48. Factor completely. $6x^2 - 23x - 35$
49. Factor completely. $x^4 - 7x^2 - 18$
50. Solve. $45x^2 = 38x - 8$
51. Solve. $x^7 - 36x^5 = 0$
52. The top of a 10-foot ladder is 2 ft farther up a wall than the foot of the ladder is from the bottom of the wall. How far is the foot of the ladder from the bottom of the wall?

Ch 6.7 – 6.8 & 14.4

- Imaginary Numbers
- Complex Numbers
- Conjugates & Absolute Value of Complex Numbers
- Geometry of Complex Numbers *(Complex Plane Only)

53. Simplify. $3i\sqrt{2} \bullet \sqrt{-12}$
54. Solve. $3x^2 + 14 = 8$
55. Simplify. $(2 + 3i)(1 - i)$
56. Simplify. $\dfrac{3 - 4i}{-2 + i}$
57. In an alternating-current circuit, the voltage E is given by $E = IZ$, where I is the current (in A) Z is the impedance (in Ω). Each of these can be represented by complex numbers. Find the complex number representation for E if $I = 0.835 - 0.427i$ amperes and $Z = 250 + 170i$ ohms.
58. Find the absolute value of the complex number. $-4 + 3i$
59. Find the absolute value of the complex number. $12 - 5i$
60. Graph $(3 - i) + (-1 + 2i)$ in the complex plane.

Ch 7.2-7.3, 7.5-7.7

- Quadratic Formula & the Discriminant
- Quadratic Functions & Their Graphs
- Translating Parabolas
- Writing Quadratic & Polynomial Equations

61. Solve using the Quadratic Formula. $3x^2 - 3x - 3 = 0$
62. State the number and type of roots. $x^2 - 6x = 4$
63. Solve by factoring or using the Quadratic Formula. $-4x^2 - 4 = 8x$

64. Solve. $7x^2 = -7x - 2$

Compare each function with the parent function. Without graphing, what are the vertex, axis of symmetry, and transformations of the parent function? (#'s 65-66)

65. $y = (x-5)^2 - 4$

66. $y = (x+7)^2 + 3$

67. Find the x-intercept(s) and y-intercept for the following function. $y = -x^2 - 4x + 7$

68. Graph the following equation. $y = -3(x-2)^2 + 5$

69. Graph the following equation. $f(x) = x^2 - 2x - 5$

70. Write an equation for the parabola whose vertex is at $(3, 3)$ and which passes through $(5, 27)$.

71. What is a cubic polynomial function in standard form with zeros –7, 8, and 4?

72. What is a quartic polynomial function in standard form with zeros –2, 0,*2* and *5*?

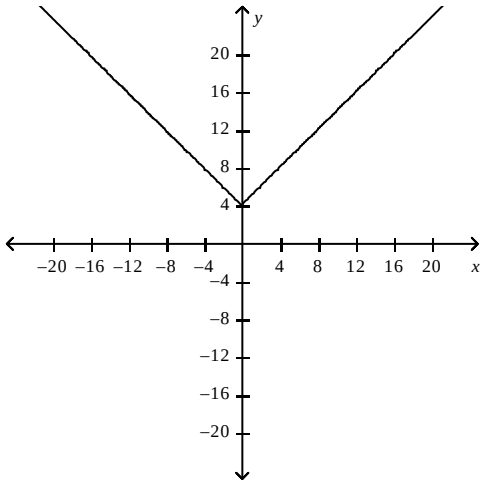
ATM 2nd Week Review: Extended Spring Break **Name:_____ Pd:___**

Multiple Choice

Identify the choice that best completes the statement or answers the question.

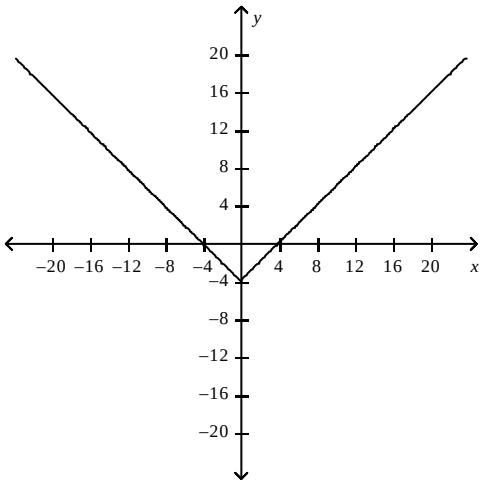
____ 1. Graph the function $f(x) = |x| + 4$. Identify its domain and range.

a.



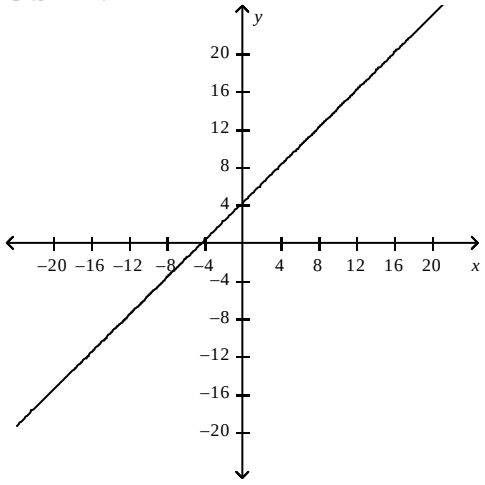
The domain of the function is all real numbers. The range of the function is $\{y|y \geq 4\}$.

c.



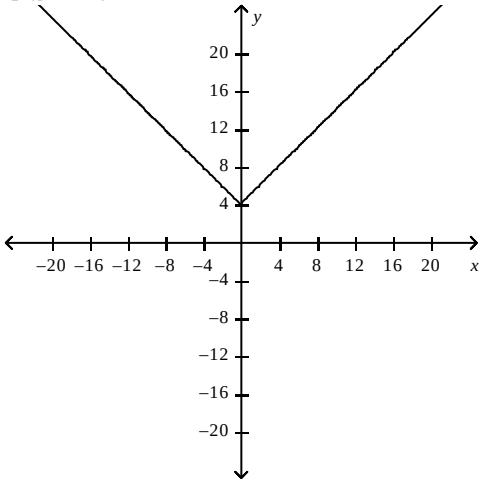
The domain of the function is all real numbers. The range of the function is $\{y|y \leq 4\}$.

b.



The domain of the function is all real numbers. The range of the function is $\{y|y \geq 4\}$.

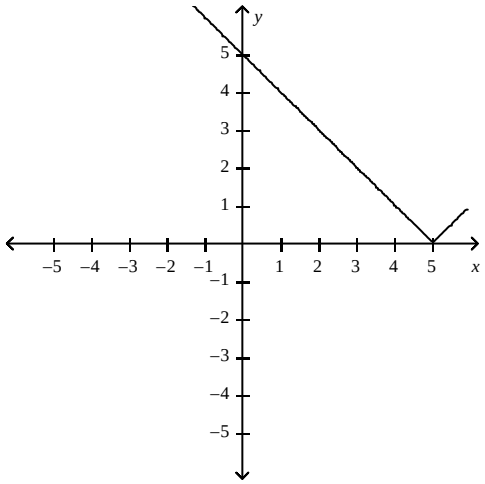
d.



The domain of the function is all integers. The range of the function is $\{y|y \leq 4\}$.

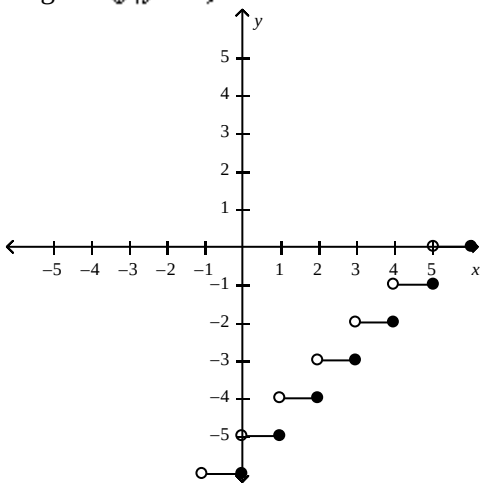
____ 2. Graph the function $f(x) = | x - 5 |$. Identify the domain and range.

a.



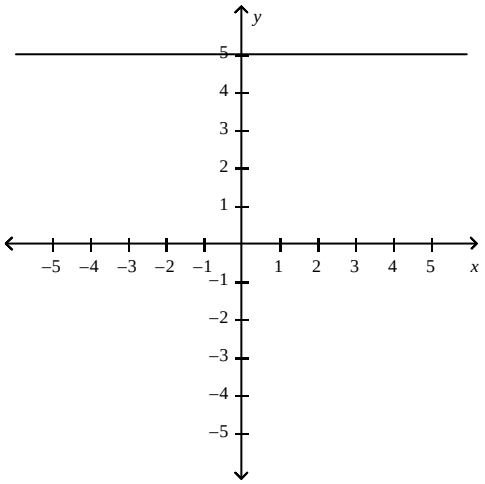
The domain is all real numbers and the range is $\{y|y \geq 0\}$.

b.



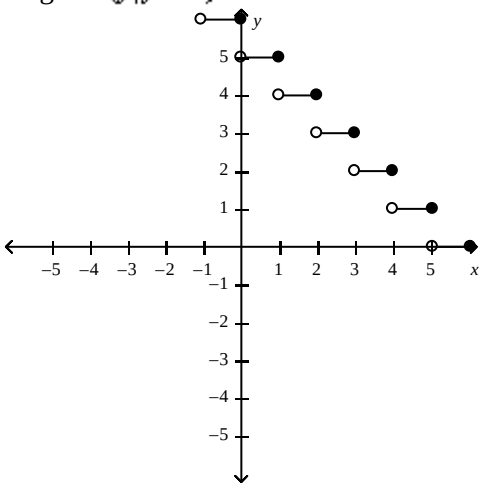
The domain is all numbers and the range is $\{y \mid 5 \geq y\}$.

c.



The domain is all real numbers and the range is $\{y|y \geq 0\}$.

d.



The domain is all integers and the range is $\{y|y \geq 0\}$.

____ 3. Find the value of $f(-10)$ and $g(3)$ if $f(x) = -10x + 9$ and $g(x) = 3x + 27x^{-2}$.

a. $f(-10) = -30$
   $g(3) = -29.73$

b. $f(-10) = 91$
   $g(3) = 6$

c. $f(-10) = -1$
   $g(3) = 36.11$

d. $f(-10) = 109$
   $g(3) = 12$

____ 4. Allen wants to spend his Easter break skiing. The table lists the prices of the various ski packages available. Which matrix represents this information?

Snowman Sports		**Eskimo Sports**	
Bargain Package	$150.00	Bargain Package	$175.50
Basic Package	$220.50	Basic Package	$232.00
Upgrades		**Upgrades**	
Boot Upgrade	$75.50	Boot Upgrade	$55.00
Deluxe Skis	$100.00	Deluxe Skis	$75.00

a. $\begin{bmatrix} 150.00 & 220.50 & 175.50 \\ 175.50 & 232.00 & 130.00 \end{bmatrix}$

b. $\begin{bmatrix} 150.00 & 175.50 \\ 220.00 & 232.00 \\ 175.50 & 130.00 \end{bmatrix}$

c. $\begin{bmatrix} 150.00 & 220.50 & 296.00 & 320.50 \\ 175.50 & 232.00 & 287.00 & 307.00 \end{bmatrix}$

d. $\begin{bmatrix} 150.00 & 220.50 \\ 175.50 & 232.00 \end{bmatrix}$

Perform the indicated matrix operation.

____ 5. $5\begin{bmatrix} 9 \\ -6 \\ 10 \end{bmatrix} + \begin{bmatrix} -7 \\ -7 \\ 9 \end{bmatrix} - \frac{1}{3}\begin{bmatrix} -12 \\ 18 \\ 24 \end{bmatrix}$

a. $\begin{bmatrix} 42 \\ -43 \\ 51 \end{bmatrix}$

b. $\begin{bmatrix} 34 \\ -31 \\ 67 \end{bmatrix}$

c. $\begin{bmatrix} 14 \\ -71 \\ 87 \end{bmatrix}$

d. $\begin{bmatrix} 42 \\ -31 \\ -5 \end{bmatrix}$

Write a matrix equation for the given systems of equations.

____ 6. $5x - 6y - 3z = 4$

$5y - 3z = -5$

$5y + 4z = 2$

a. $\begin{bmatrix} 5 & -6 & -3 \\ 5 & -3 & \\ 5 & 4 & \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 4 \\ -5 \\ 2 \end{bmatrix}$

b. $\begin{bmatrix} 5 & -6 & -3 \\ 0 & 5 & -3 \\ 0 & 5 & 4 \end{bmatrix} \cdot \begin{bmatrix} 4 \\ -5 \\ 2 \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$

c. $\begin{bmatrix} 5 & -6 & -3 \\ 0 & 5 & -3 \\ 0 & 5 & 4 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 4 \\ -5 \\ 2 \end{bmatrix}$

d. $\begin{bmatrix} 5 & -6 & -3 \\ 5 & -3 & 0 \\ 5 & 4 & 0 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 4 \\ -5 \\ 2 \end{bmatrix}$

Factor the polynomial completely. Then, find the roots.

____ 7. $24x^3 - 40x^2 + 3x - 5$

a. $8x^2(3x - 5) - 1(3x - 5)$

b. $(8x^2 + 1)(3x - 5)$

c. $(24x^3 - 40x^2) + (3x - 5)$

d. $8x^2(3x - 5) - 3x + 5$

____ 8. $63x^2 - 4x - 35$

a. $(9x - 7)(7x + 5)$

b. $(9x + 7)(7x - 5)$

c. $(9x - 7)(7x - 5)$

d. $(9x + 7)(7x + 5)$

Solve the given equation.

____ 9. $3x^2 + 27 = 0$

a. $\pm 3i$

b. ± 9

c. ± 3

d. $\pm \sqrt{-9}$

____ 10. $6^{8n+6} = 1{,}296$

a. $n = \frac{5}{4}$

b. $n = -\frac{1}{4}$

c. $n = -\frac{3}{8}$

d. $n = -2$

____ 11. $(-1 + 10i)(-12 - 7i)$

a. $12 - 113i + 70$

b. $71 + 120i$

c. $82 - 113i$

d. $12 - 113i - 70i^2$

____ 12. $\frac{7 - 29i}{8 - 13i}$

a. $\frac{-321 - 141i}{-105}$

b. $\frac{7 - 29i}{233}$

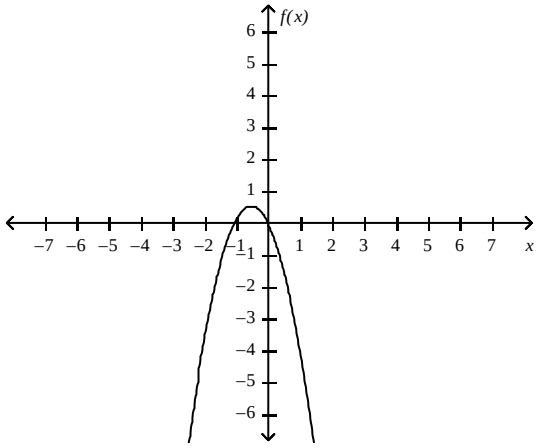
c. $\frac{433 - 141i}{233}$

d. $\frac{433 + 141i}{233}$

Solve the equation by graphing. If exact roots cannot be found, state the consecutive integers between which the roots are located.

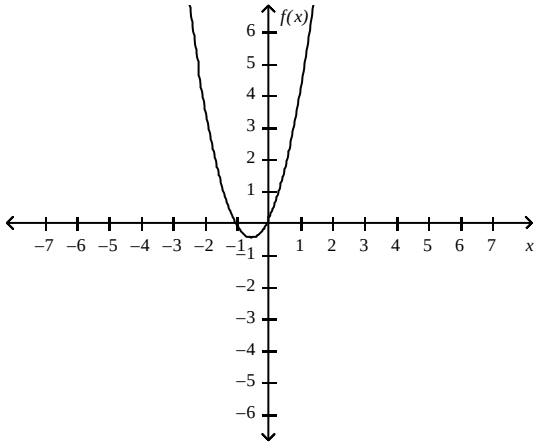
____ 13. $-2x^2 - 2x = 0$

a.



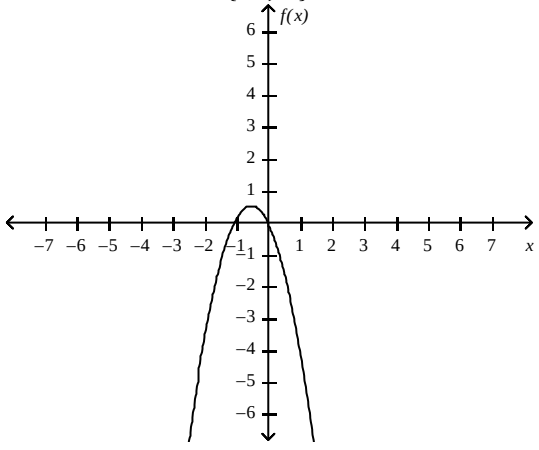
The solution set is {–1, 0}.

c.



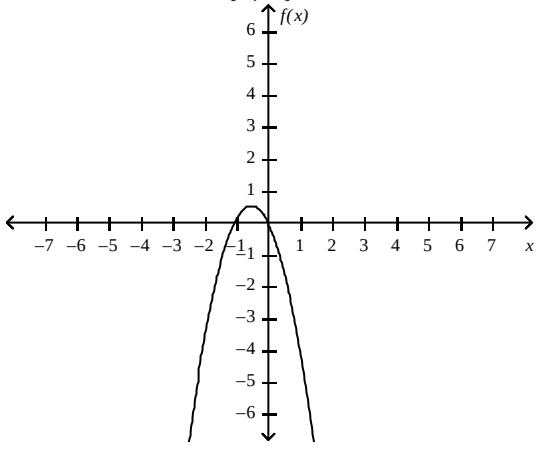
The solution set is {0, 1}.

b.



The solution set is {–0.5, 0.5}.

d.



The solution set is {0, 1}.

Solve the equation by using the Square Root Property.

____ 14. $16x^2 + 16x + 4 = 49$

a. $\{\frac{5}{4}, -\frac{9}{4}\}$

b. $\{\frac{9}{4}, -\frac{5}{4}\}$

c. $\{-\frac{1}{2}\}$

d. $\{-\frac{1}{2}, 7\}$

____ 15. Find $(f \cdot g)(x)$ for the following functions.

$f(x) = 3x^2 - 4x - 13$

$g(x) = 5x - 9$

a. $15x^3 - 47x^2 + 36x - 182$

b. $15x^3 - 47x^2 - 29x - 117$

c. $15x^3 + 27x^2 - 49x + 117$

d. $15x^3 - 47x^2 - 29x + 117$

Find the inverse of the given relation.

____ 16. $\{(6,-4),(-9,4),(12,-2)\}$

a. $\{(4,-6),(4,-9),(-2,12)\}$

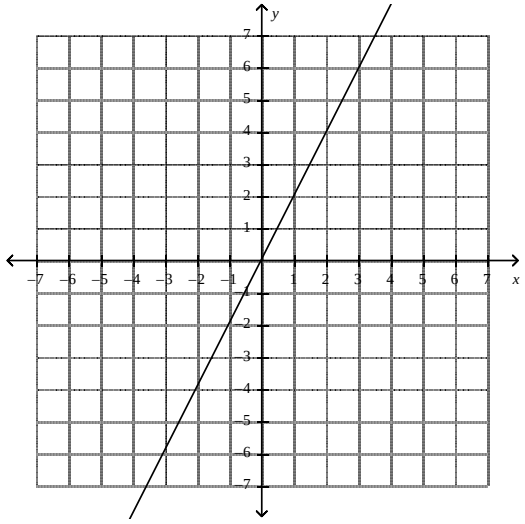
b. $\{(-4,6),(4,-9),(-2,12)\}$

c. $\{(-4,6),(-4,9),(-2,12)\}$

d. $\{(-4,6),(4,-9),(2,-12)\}$

Identify the type of function represented by the graph.

____ 17.



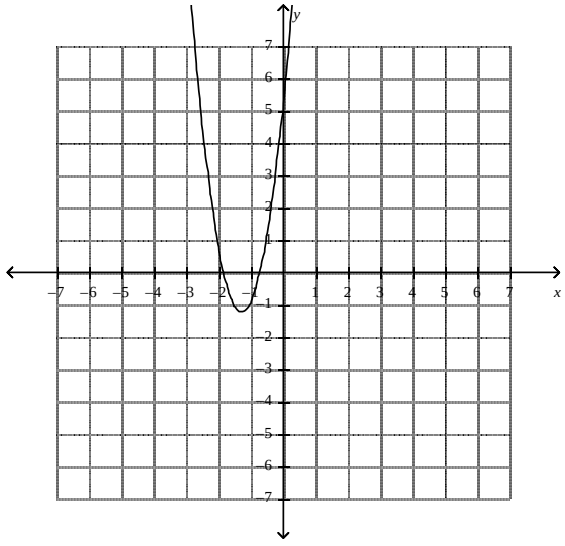
a. absolute value function

b. constant function

c. square root function

d. direct variation function

____ 18.



a. absolute value function

b. inverse variation function

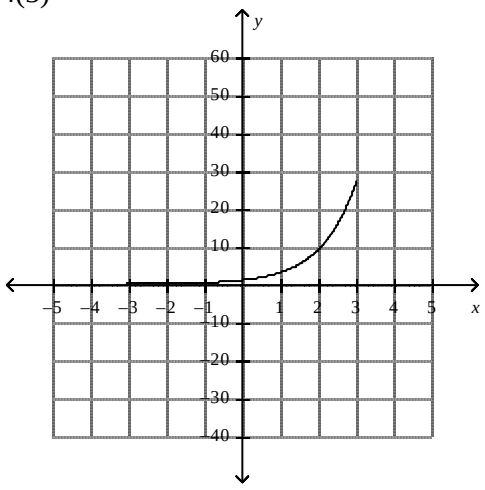
c. quadratic function

d. rational function

Sketch the graph of the given function. Then state the function's domain and range.

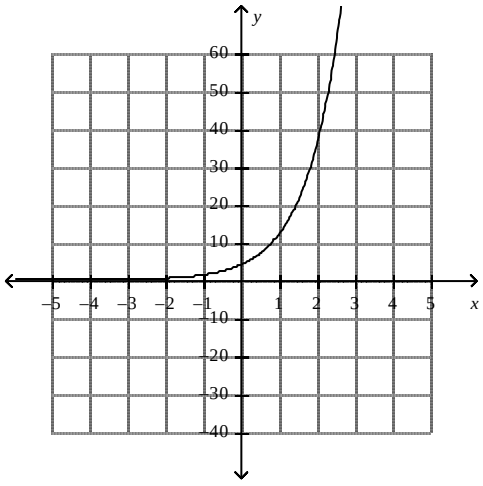
____ 19. $y = 4(3)^x$

a.



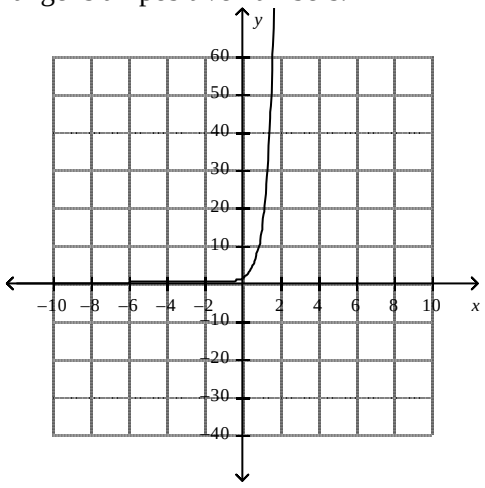
The domain is all real numbers and the range is all positive numbers.

c.



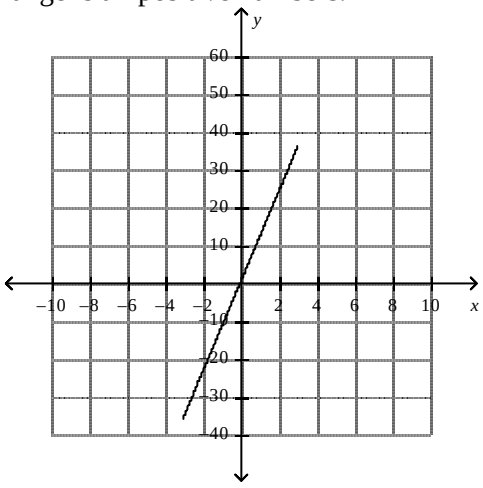
The domain is all real numbers and the range is all positive numbers.

b.



The domain is all real numbers and the range is all positive numbers.

d.



The domain is all real numbers and the range is all real numbers.

Write the given equation in logarithmic form.

____ 20. $7^4 = 2{,}401$

a. $\log_4 2{,}401 = 7$

b. $\log_7 2{,}401 = 4$

c. $\log_3 2{,}401 = 4$

d. $\log_3 2{,}401 = 7$

Write the given equation in exponential form.

____ 21. $\log_8 \frac{1}{512} = -3$

a. $8^{-3} = \frac{1}{512}$

b. $8^3 = \frac{1}{512}$

c. $8^{-3} = 512$

d. $3^{-8} = \frac{1}{512}$

27. If $(x - 4)(x + 3) = 8$
    a. What are the possible values of x?
    b. Which value of x holds true for the equation $x^2 + 3x + 6 = 10$?

Find the product, if possible.

____ 28. $\begin{bmatrix} 3 & 8 \\ -3 & 4 \end{bmatrix} \cdot \begin{bmatrix} 5 & 8 \\ 7 & -5 \end{bmatrix}$

a. $\begin{bmatrix} -71 & 16 \\ -13 & 44 \end{bmatrix}$

b. $\begin{bmatrix} 15 & 64 \\ -21 & -20 \end{bmatrix}$

c. Not possible

d. $\begin{bmatrix} 71 & -16 \\ 13 & -44 \end{bmatrix}$

____ 29. $\begin{bmatrix} 2 & 9 & 3 \\ -2 & 1 & -2 \end{bmatrix} \cdot \begin{bmatrix} 2 & 8 \\ 7 & -5 \end{bmatrix}$

a. $\begin{bmatrix} 67 & -29 \\ 3 & -21 \end{bmatrix}$

b. $\begin{bmatrix} 70 & -26 \\ 1 & -23 \end{bmatrix}$

c. Not possible

d. $\begin{bmatrix} 4 & 72 & -2 \\ -14 & -5 & -2 \end{bmatrix}$

____ 30. Use $A = \begin{bmatrix} 1 & 9 \\ -3 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 6 & 9 \\ 7 & 5 \end{bmatrix}$ to determine whether $AB = BA$ for the given matrices.

a. No

b. Yes

____ 31. Use $A = \begin{bmatrix} 2 & 6 \\ -2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 5 \\ 6 & -3 \end{bmatrix}$, and $C = \begin{bmatrix} 2 & 7 \\ -3 & -8 \end{bmatrix}$ to determine whether $A(B + C) = AB + AC$ for the given matrices.

a. Yes

b. No

____ 32. Find $(f+g)(x)$ for the following functions.

$f(x) = 14x^2 + 6x + 8$

$g(x) = 5x + 6$

a. $14x^2 + 11x + 14$

b. $19x^3 + 12x + 8$

c. $14x^2 + 11x + 8$

d. $19x^2 + 12x + 8$

____ 33. Find $(f-g)(x)$ for the following functions.

$f(x) = 13x + 19$

$g(x) = -12x^2 + 9x + 26$

a. $25x^2 - 9x - 7$

b. $-12x^2 - 4x + 7$

c. $12x^2 + 4x - 7$

d. $-12x^2 - 4x - 7$

____ 34. Find $[g \circ h](x)$ and $[h \circ g](x)$.

$g(x) = 12x$

$h(x) = -10x^3 + 6x^2 - 11x + 1$

a. $[g \circ h](x) = -120x^4 + 72x^3 - 132x^2 + 12x$
$[h \circ g](x) = -17280x^4 + 864x^3 - 132x^2 + 1x$

b. $[g \circ h](x) = -120x^3 + 72x^2 - 132x + 12$
$[h \circ g](x) = -17280x^3 + 864x^2 - 132x + 12$

c. $[g \circ h](x) = 120x^3 + 72x^2 - 132x + 12$
$[h \circ g](x) = -17280x^3 + 864x^2 - 132x + 1$

d. $[g \circ h](x) = -120x^3 + 72x^2 - 132x + 12$
$[h \circ g](x) = -17280x^3 + 864x^2 - 132x + 1$

____ 35. Find $\left[g \circ h\right](x)$ and $[h \circ g](x)$.

$g(x) = 11x$

$h(x) = -11x - 5$

a. $[g \circ h](x) = -121x + 55$
$[h \circ g](x) = -121x + 5$

b. $[g \circ h](x) = -121x - 55$
$[h \circ g](x) = -121x - 55$

c. $[g \circ h](x) = -121x - 55$
$[h \circ g](x) = -121x - 5$

d. $[g \circ h](x) = -121x^2 - 55x$
$[h \circ g](x) = -121x^2 - 5x$

Find the inverse of the given function.

____ 36. $f(x) = \dfrac{6x - 9}{20}$

a. $f^{-1}(x) = \dfrac{6x - 20}{9}$

b. $f^{-1}(x) = \dfrac{20x + 9}{6}$

c. $f^{-1}(x) = \dfrac{20x - 9}{6}$

d. $f^{-1}(x) = \dfrac{6x + 20}{9}$

____ 37. $f(x) = \dfrac{21}{12}x - 13$

a. $f^{-1}(x) = \dfrac{12}{21}x + 13$

b. $f^{-1}(x) = \dfrac{12x + 156}{21}$

c. $f^{-1}(x) = \dfrac{12}{21}x - 13$

d. $f^{-1}(x) = \dfrac{12x - 156}{21}$

____ 38. Determine whether each pair of functions are inverse functions.

1) $f(x) = \dfrac{8x + 9}{8}$

$g(x) = \dfrac{10x - 7}{8}$

2) $f(x) = x - 6$

$g(x) = x + 6$

a. Neither 1 nor 2 is an inverse function.
b. Only 2 is an inverse function.
c. Only 1 is an inverse function.
d. Both 1 and 2 are inverse functions.

____ 39. Determine whether each pair of functions are inverse functions.

1) $f(x) = 2x - 10$

$g(x) = \dfrac{1}{2}(x + 10)$

2) $f(x) = 7x + 13$

$g(x) = 7x - 13$

a. Neither 1 nor 2 is an inverse function.
b. Only 1 is an inverse function.
c. Only 2 is an inverse function.
d. Both 1 and 2 are inverse functions.

Solve the given equation. If necessary, round to four decimal places.

____ 40. $\log_2 9 + \log_2 a = \log_2 11$

a. 2
b. 22
c. 1.22
d. 0.82

____ 41. $\log_5 (x + 2) - \log_5 7 = \log_5 49$

a. 341
c. 5
b. 343
d. 54

____ 42. $3^y = 38$

a. 3.3111
c. 79.6443
b. 3.6376
d. 1.1027

____ 43. Express the given logarithm in terms of common logarithms. Then approximate its value to four decimal places.
$\log_7 6.3$

a. –0.0458
c. 1.9459
b. 0.9459
d. 1.0572

____ 44. Express the logarithm in terms of common logarithms. Then approximate its value to four decimal places.
$\log_3 12$

a. 2.2619
c. 1.0986
b. 10.9861
d. 24.8491

____ 45. $f(x) = \dfrac{3}{x^2 - 14x + 48}$

a. asymptotes: $x = 8$
b. asymptotes: $x = 3$
c. asymptotes: $x = 6;\ x = -8$
d. asymptotes: $x = 6;\ x = 8$

____ 46. $f(x) = \dfrac{x - 6}{x^2 - 7x + 6}$

a. asymptotes: $x = 1$
b. asymptotes: $x = -6$
c. asymptotes: $x = 6$
d. asymptotes: $x = -1$