Name: _____ **Class:** _____ **Date:** _____ **ID: A**

Algebra EOC Practice Test #2

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

____ 1. Which of the following lines is perpendicular to the line $y = -2$?

a. $y = \frac{1}{5}x + 3$
b. $y + 3 = -5(x + 2)$
c. $y = 2$
d. $x = -2$

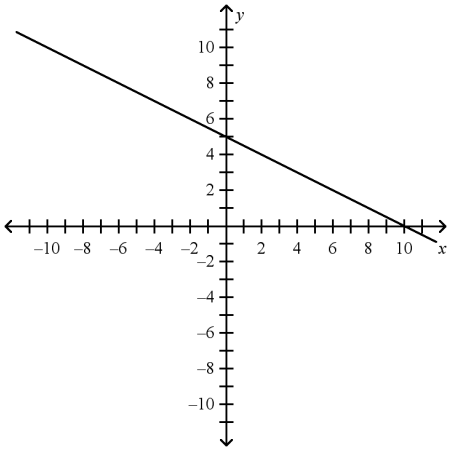
____ 2. Mrs. Nelson is buying folding chairs that are on sale for $10. If she has $50, which inequality can be solved to show the number of chairs c she can buy?

a. $10c \leq 50$
b. $10c \geq 50$
c. $10c > 50$
d. $10c < 50$

____ 3. Find the union and intersection of the pair of sets.
$M = \{1, 6, 8\}; N = \{3, 6, 8, 14, 15\}$

a. $M \cup N = \{1, 3, 6, 8, 14, 15\}$; $M \cap N = \{6\}$
b. $M \cup N = \{6, 8\}$; $M \cap N = \{1, 3, 6, 8, 14, 15\}$
c. $M \cup N = \{1, 3, 6, 8, 14, 15\}$; $M \cap N = \{6, 8\}$
d. $M \cup N = \{1, 3, 6, 8\}$; $M \cap N = \{6, 8\}$

____ 4. Find the x- and y-intercepts.



a. x-intercept: -10, y-intercept: 5
b. x-intercept: 5, y-intercept: 10
c. x-intercept: 10, y-intercept: -5
d. x-intercept: 10, y-intercept: 5

____ 5. Multiply $(x + 7)(x - 7)$.

a. $x^2 - 49$
b. $x^2 + 14x - 49$
c. $2x - 14$
d. $x^2 + 49$

____ 6. Factor $x^2 - 16$.

a. $(x - 4)^2$
b. $(x + 4)(x - 4)$
c. $(x + 4)^2$
d. cannot be factored

____ 7. Factor $16y^2 + 12y$ completely.

a. $y(16y + 12)$
b. $2y(8y + 6)$
c. $4(4y^2 + 3y)$
d. $4y(4y + 3)$

____ 8. Factor: $x(y - 1) + y(y - 1)$

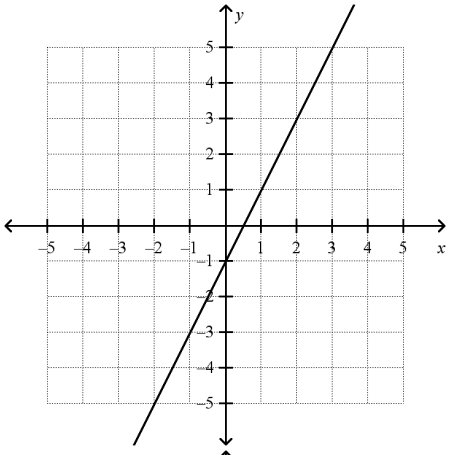
a. $(x + y)(y - 1)$
b. $(x - 1)(y - 1)$
c. $(x - y)(y - 1)$
d. cannot be factored

Name: _____ **ID: A**

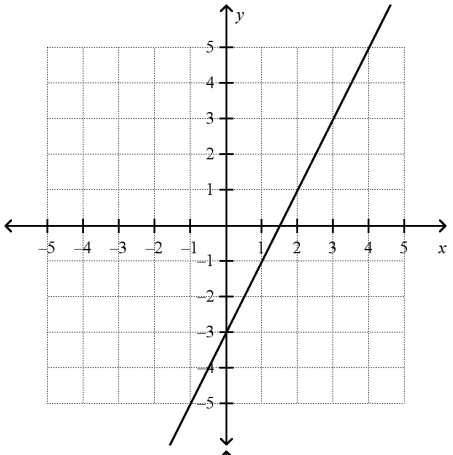
____ 9. Which of the following graphs shows the graph of this equation?

$y + 1 = 2(x - 1)$

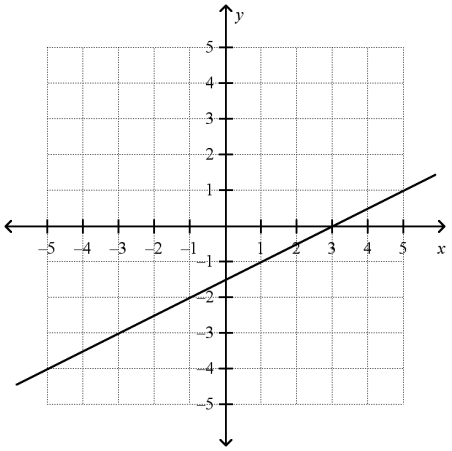
a.



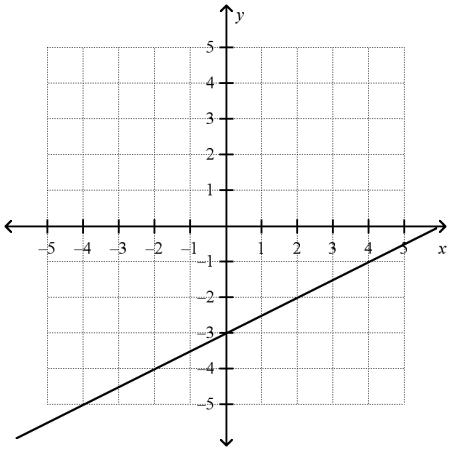
c.



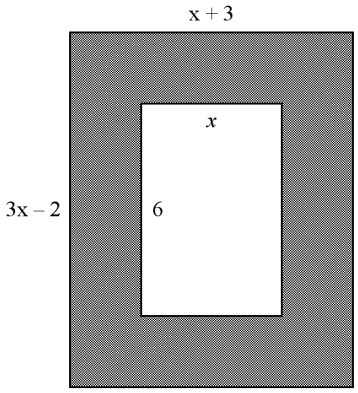
b.



d.



____ 10. The city of Plantation plans to build a new community park with a public swimming pool. The diagram below shows the area of the proposed swimming pool and the stone deck that will surround it.



If the area of the deck region is 24 square units, find the value for x.

a. $x = 2$ units
b. $x = 3$ units
c. $x = 4$ units
d. $x = 5$ units

____ 11. A family is on vacation in Key West and decides to rent bicycles to tour the island. The rental fee for a bike and helmet is $27.00 per person for each hour. There are four people in the family renting bicycles. Which input/output (I/O) model correctly displays the domain and range of the situation where *c*, the total cost for the bicycle rental is a function of *h*, the number of hours the bikes are rented?

I/O Model 1

input	1	2	3	4	5
output	$27	$54	$81	$108	$135

I/O Model 2

input	1	2	3	4	5
output	$108	$216	$324	$432	$540

I/O Model 3

input	$27	$54	$81	$108	$135
output	1	2	3	4	5

I/O Model 4

input	$108	$216	$324	$432	$540
output	1	2	3	4	5

a. I/O Model 1
b. I/O Model 2
c. I/O Model 3
d. I/O Model 4

____ 12. Divide. Simplify your answer.

$(2x^4 - 6x^3 + 4x^2 - 3x) \div (2x)$

a. $x^3 - 3x^2 + 2x - 3$

b. $x^3 - 3x^2 + 2x - \frac{3}{2}$

c. $2x^3 - 6x^2 + 4x - \frac{1}{2}$

d. $x^4 - 4x^3 + 2x^2 - 1x$

____ 13. Which equation represents the data in the table?

x	1	2	3	4	5
y	–3	–2	–1	0	1

a. $y = 0.25x - 3$

b. $y = x - 3$

c. $y = x - 4$

d. $y = 4x - 4$

____ 14. Zahra spent $20.50 on 10 party favors for her party. They party favor for each kid was either a puzzle book or a magic trick. The boys each received a puzzle book that cost $1.75 each. The girls each received a magic trick that cost $2.25 each. How many boys and how many girls attended the party?

a. 4 boys and 6 girls

b. 5 boys and 5 girls

c. 6 boys and 4 girls

d. 7 boys and 3 girls

____ 15. John is considering accepting one of two sales positions. ABC Company offers a yearly salary of $45,000$. XYZ Company offers a yearly salary of $38,000$ plus a 2% annual commission on sales. For what amount of sales s is the salary at XYZ Company greater than the salary at ABC Company?

a. $s > 7000$

b. $s > 35,000$

c. $s > 70,000$

d. $s > 350,000$

____ 16. A manufacturing company is building a rectangular room in their warehouse to store their products. The length of the room is 1 more than 3 times its width. The area of the room is 80 square meters. What are the dimensions of the room?

a. $w = 4$ m, $l = 20$ m

b. $w = 5$ m, $l = 16$ m

c. $w = 5\frac{1}{3}$ m, $l = 15$ m

d. $w = 8$ m, $l = 10$ m

____ 17. At a store, 20 feet of fencing cost $36. At that rate, how much will 15 feet of fencing cost?

a. $27.00

b. $29.75

c. $30.25

d. $48.00

____ 18. Jeremy is training for a marathon. Part of his training is a "walk/run" session where he runs for x minutes and runs for y minutes for a total distance of 6000 meters. His walking speed is 125 meters per minute. His running speed is 225 meters per minute. This situation can be represented by the following equation:

$$125x + 225y = 6000$$

Which of the following represents the slope of the equation?

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

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

c. $\frac{5}{9}$

d. $\frac{9}{5}$

____ 19. The values in the table show a linear relationship. Find the slope.

x	−4	2	8	14
y	10	7	4	1

a. 2

b. −2

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

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

____ 20. Add $(2x^2 - 7) + (7x^2 + 3)$.

a. $2x^2 - 4$

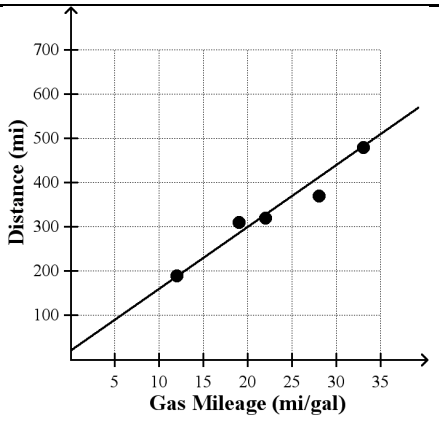
b. $9x^2 - 4$

c. $9x^2 - 7$

d. $9x^4 - 4$

____ 21. The table compares the gas mileage of a car to the distance the car can travel on one tank of gas. A scatter plot of the data is also shown. For this line of best fit, predict what the gas mileage must be for a car to travel 250 miles.

Gas Mileage (mi/gal)	Distance (mi)
22	320
19	310
33	480
28	370
12	190



a. 15 mi/gal
b. 17 mi/gal
c. 19 mi/gal
d. 20 mi/gal

____ 22. You've already earned $48 washing cars and plan to earn $12 for each additional car you wash. Write an equation to represent *d,* the amount earned in dollars, as a function of *c*, the number of additional cars you wash.

a. $d = 12c$
b. $c = 12d$
c. $d = 48 + 12c$
d. $c = 48 + 12d$

____ 23. What are the missing exponents in the equation below? Give the missing exponent on the left side first.

$$2(m^{7}n)^{?} = 2m^{?}n^{3}$$

a. 7; 14
b. 3; 10
c. 3; 21
d. 7; 21

____ 24. Which of the following is the solution to this inequality?

$$3(5 + 2n) \geq 7 + 10n$$

a. $n \geq 2$
b. $n \geq -2$
c. $n \leq 2$
d. $n \leq -2$

____ 25. Write an equation for the line that has a y-intercept of 2 and is perpendicular to the line $3x + y = 6$.

a. $y = -3x + 2$
c. $y = \frac{1}{3}x + 2$
b. $y = -3x - 2$
d. $y = -\frac{1}{3}x + 2$

____ 26. Two snow resorts offer private lessons to their customers. Big Time Ski Mountain charges $5 per hour plus $50 insurance. Powder Hills charges $10 per hour plus $30 insurance. For what number of hours is the cost of lessons the same for each resort?

a. 3 hours
c. 5 hours
b. 4 hours
d. 6 hours

____ 27. Find the intersection of the pair of sets.
W = the set of whole numbers
P = the set of nonzero integers

a. {}
c. the set of negative integers
b. {0}
d. the set of positive integers

____ 28. Multiply. Write the product in simplest form.
$\sqrt{6}\left(\sqrt{4} + \sqrt{6}\right)$

a. $\sqrt{24} + \sqrt{36}$
c. $12 + 6\sqrt{6}$
b. $2\sqrt{6} + 6$
d. $2\sqrt{15}$

____ 29. Employees at the dairy factory are packing cartons of eggs. One carton can hold x eggs. Today the employees have E eggs to pack. When they have finished, they have packed C cartons and have 3 eggs left over.

Use the equation $\frac{E}{x} = C + \frac{3}{x}$ to find C, the number of cartons that were packed.

a. $C = \frac{E - 3}{x}$
c. $C = \frac{E}{x - 3}$
b. $C = \frac{E}{x} - 3$
d. $C = 3 - \frac{E}{x}$

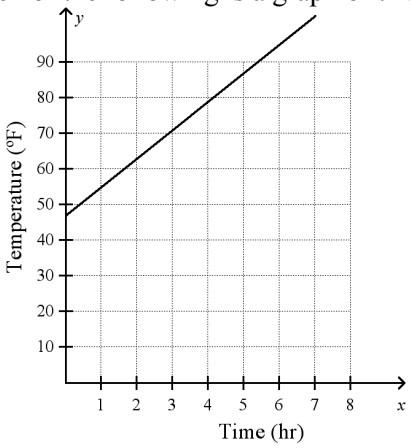
____ 30. The temperature of air in a room that began at 55°F is increasing by 8°F per hour. The following equation represents this situation:

$y = 55 + 8x$

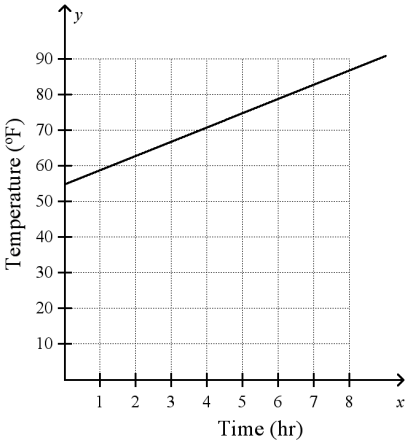
where x represents the number of hours and y represents the temperature.

Which of the following is a graph of this equation?

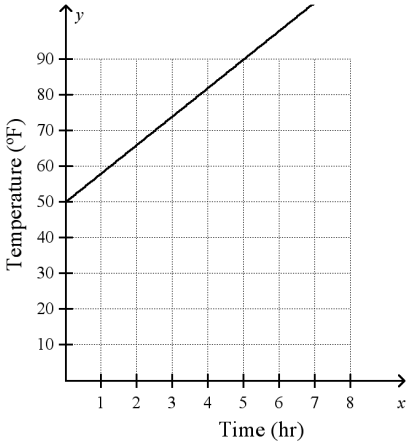
a.



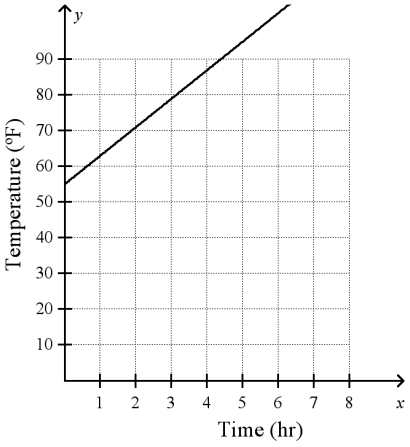
c.



b.



d.



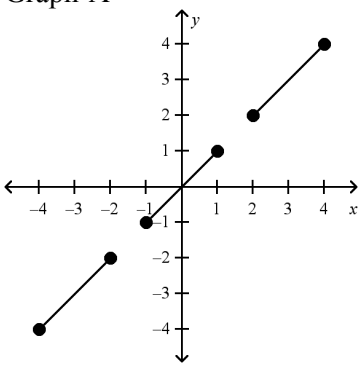
____ 31. Find the value of a.

$$4x^2 + ax = 2x(2x + 1)$$

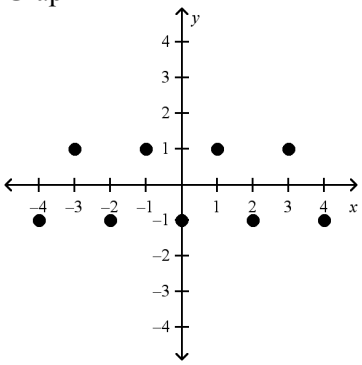
a. 2
b. 4
c. 6
d. 8

____ 32. Determine which of the following graphs represent a function.

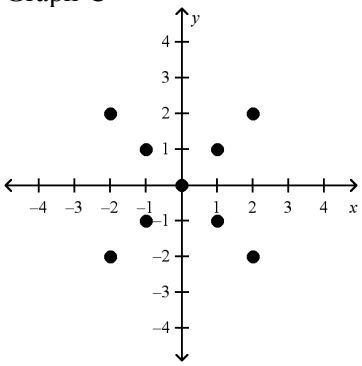
Graph A



Graph B



Graph C



a. None of the graphs are functions.
b. All of the graphs are functions.
c. Graphs A and B are functions.
d. Graphs B and C are functions.

____ 33. Kush simplified the expression below on the board for the class.

$$\sqrt{20} + \sqrt{5x} + 3\sqrt{5}$$

If Kush simplified the expression correctly, which of the following is his answer?

a. $5\sqrt{5} + \sqrt{5x}$
b. $7\sqrt{5} + \sqrt{5x}$
c. $3\sqrt{5} + \sqrt{5x}$
d. $4\sqrt{5} + \sqrt{5x}$

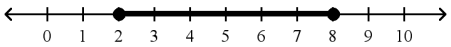
____ 34. Write an equation in slope-intercept form for the line that passes through (3, 7) and (7, 4).

a. $y = -\frac{3}{4}x + \frac{37}{4}$
b. $y = \frac{3}{4}x + \frac{37}{4}$
c. $y = -\frac{4}{3}x + \frac{37}{4}$
d. $y = -\frac{3}{4}x + \frac{4}{37}$

____ 35. Solve $y + w - \frac{3}{4}z = 0$ for z.

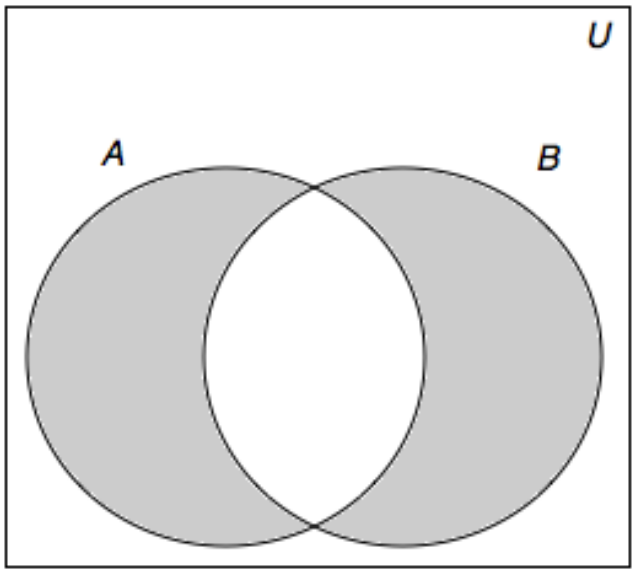
a. $z = \frac{4}{3}(y + w)$
b. $z = \frac{3}{4}(y + w)$
c. $z = \frac{4}{3}w + y$
d. $z = \frac{4y}{3} + w$

____ 36. Which compound inequality is shown by the graph below?



a. $x \geq 2$ AND $x \leq 8$
b. $x \geq 2$ OR $x \geq 8$
c. $x \geq 2$ OR $x \leq 8$
d. $x \leq 2$ OR $x \leq 8$

____ 37. Look at the Venn diagram below. It shows set A and set B in the universe U. Which description represents the shaded regions?



a. the complement of $(A \cap B)$ in U
b. $(A \cup B) \cup$ (the complement of A)
c. (the complement of $(A \cap B)$ in U) $\cap$ $(A \cup B)$
d. $A \cup B$

____ 38. Solve $3(a - 4) + 2(a + 1) = 10 - 5a$.

a. 0
b. 2
c. all real numbers
d. no solution

____ 39. There were T people waiting for buses at the station. When the first bus arrived, n people boarded it. The remaining p people waited for buses to other places.

Use the equation $T - n = p$, to find n, the number of people who boarded the first bus.

a. $n = p - T$
b. $n = \dfrac{T}{p}$
c. $n = T - p$
d. $n = T + p$

____ 40. Divide $(4x^5 + 3x^3 - 2x^2)$ by 2x.

a. $2x^4 + \dfrac{3x^2}{2} - x$
b. $2x^4 + 3x^2 - x$
c. $4x^4 + 3x^2 - 2x$
d. $2x^4 + x^2 - x$

____ 41. Which monomial below writes the product $(3x)(3x)(3x)(3x)(3x)(3x)$ in a more compact form?

a. $6(3x)$
c. $(3x)^6$
b. $3x^6$
d. $18x^6$

____ 42. A printer holds 500 sheets of paper. After printing it held 210 sheets. Of the sheets that were printed, $\frac{1}{2}$ of them were color and $\frac{1}{2}$ of them were grayscale. Which equation can be used to find s, the number of sheets that were printed in color?

a. $\frac{s}{2} - 500 = 210$
c. $210 - 500 = 2s$
b. $500 - \frac{1}{2}s = 210$
d. $500 - 2s = 210$

____ 43. Jamie needs to simplify the expression below before she substitutes values for a and b.

$$\frac{a^{15}b^{12} - a^5b^8}{a^3b^2}$$

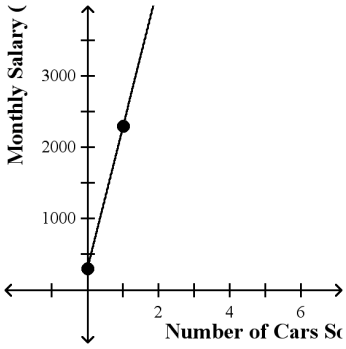
If $a \neq 0$ and $b \neq 0$, which of the following is a simplified version of the expression above?

a. $a^5b^6 - a^5b^4$
c. a^6b^4
b. $a^{12}b^{10} - a^2b^6$
d. a^7b^2

____ 44. Thomas is a car salesman. The table shows the monthly salary that Thomas earns for the number of cars he sells. Use the data to graph the linear function. Write the equation of the line, identify the slope of the line and explain what the slope means.

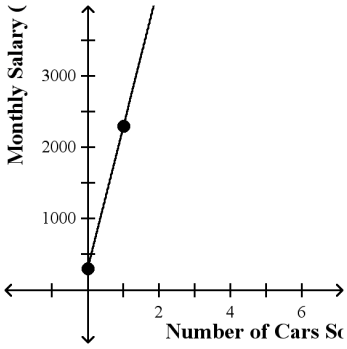
Number of Cars Sold	Monthly Salary Earned
0	$2000
1	$2300
2	$2600
3	$2900
4	$3200

a.



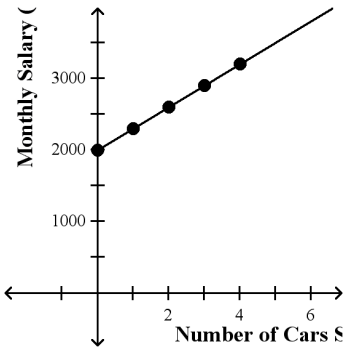
$y = 2000x + 300$; The slope of the line is 300. This means that for every car Thomas sells, he earns and additional $300.

c.



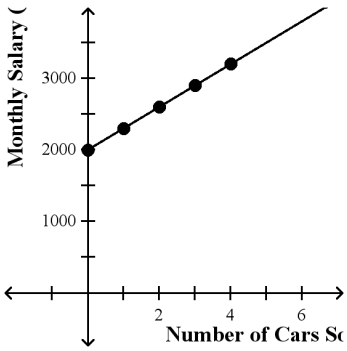
$y = 2000x + 300$; The slope of the line is 2000. This means that for every car Thomas sells, he earns $2000.

b.



$y = 300x + 2000$; The slope of the line is 300. This means that for every car Thomas sells, he earns an additional $300.

d.



$y = 300x + 2000$; The slope of the line is 2000. This means that for every car Thomas sells, he earns $2000.

____ 45. Give the domain and range of the relation.

x	*y*
3	7
6	13
0	0
–7	–13

a. D: {3, 6, –7, 7, 13, –13}; R: {0}
b. D: {–7, 0, 3, 6}; R: {–13, 0, 7, 13}
c. D: {–7, 3, 6}; R: {–13, 7, 13}
d. D: {–13, 0, 7, 13}; R: {–7, 0, 3, 6}

____ 46. When solving the equation, what property was used to go from Step 2 to Step 3?

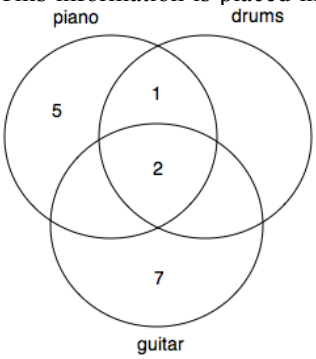
Step 1: $-(2x + 3) = x - 18$
Step 2: $-2x - 3 = x - 18$
Step 3: $-3 = 3x - 18$

a. Addition Property of Equality
b. Subtraction Property of Equality
c. Multiplication Property of Equality
d. Division Property of Equality

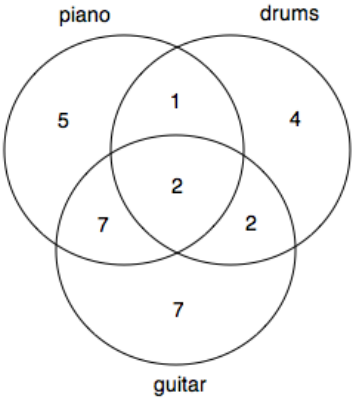
____ 47. In Mr. Rojo's music class, 14 students play piano, 18 students play guitar, and 9 play drums. No student plays any other istruments. The following information is also true:

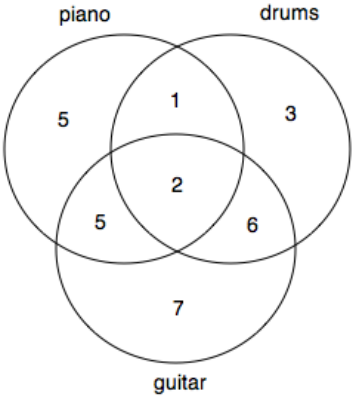
7 students play only guitar;
2 students play all three instruments;
5 students play only piano;
1 student plays piano and drums, but not guitar

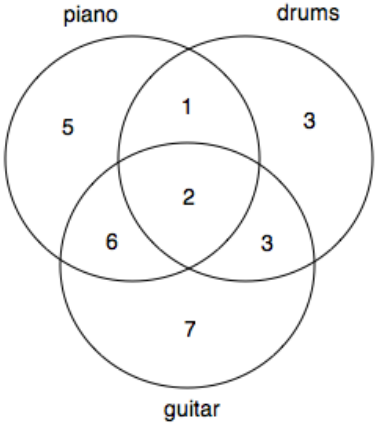
This information is placed in a Venn diagram as shown:

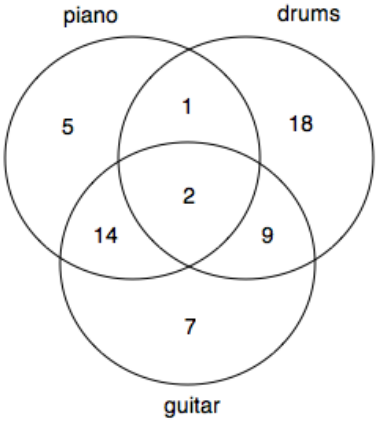


Which of the following correcly shows the completed Venn diagram?

a.


c.


b.


d.


____ 48. Which of the following is a member of $M \times N$?

$M = \{20, 30, 55, 60\}; N = \{30, 55, 65\}$

a. (20, 20)
b. (30, 30)
c. (55, 60)
d. (30, 60)

____ 49. Marc sold 461 tickets for the school play. Student tickets cost $3 and adult tickets cost $4. Marc's sales totaled $1624. How many adult tickets and how many student tickets did Marc sell?

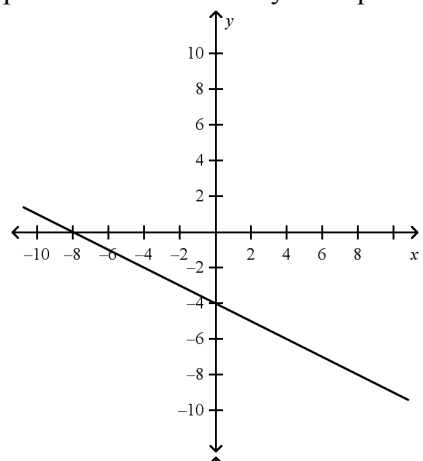
a. 220 adult, 241 student
b. 225 adult, 236 student
c. 236 adult, 225 student
d. 241 adult, 220 student

____ 50. If the exchange rate for 1 U.S. dollar is 1.5 Canadian dollars, how many U.S. dollars will Margie get for 81 Canadian dollars?

a. 28
b. 52
c. 54
d. 112

____ 51. Graph the line described by the equation $-2x - 4y = 16$.

a.



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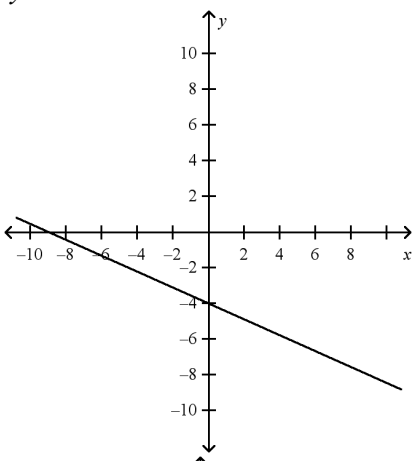

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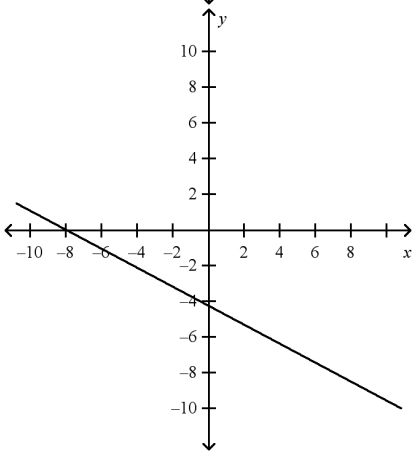
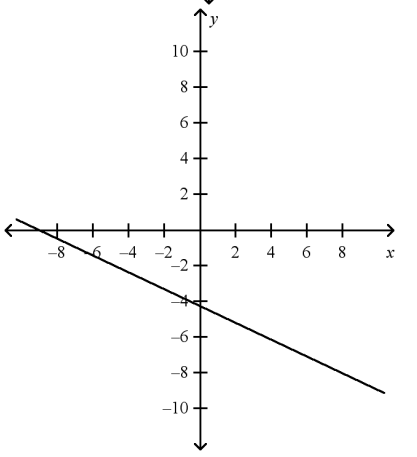


d.



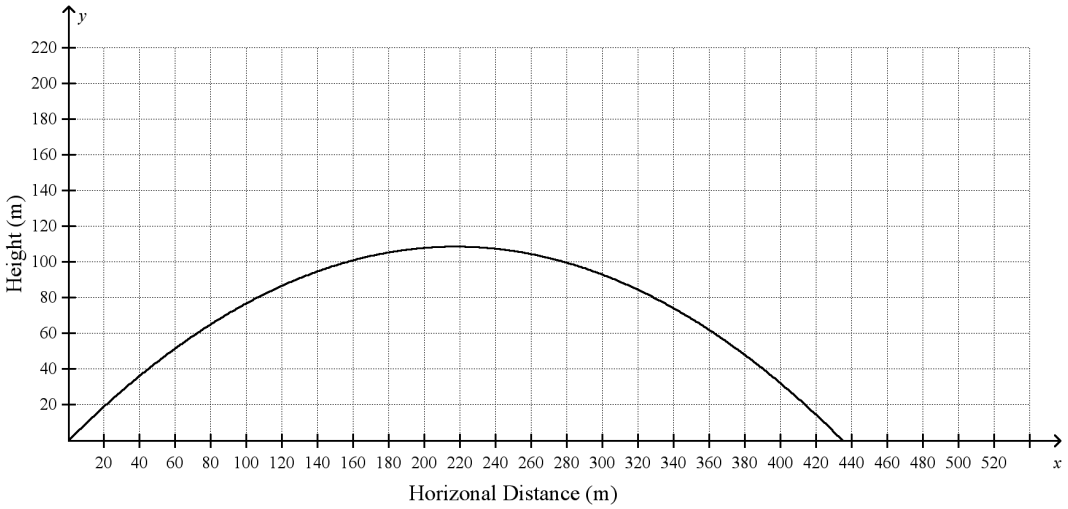
____ 52. An object is thrown upward with an initial velocity of 35 meters per second. The object's distance, d, above the ground at any time, t, can be represented by the equation $d = 35t - 5t^2$. When will the object be 50 feet above the ground?

a. $t = 1$ sec and $t = 0.4$ sec
b. $t = 2$ sec and $t = 5$ sec
c. $t = 2$sec and $t = 10$ sec
d. $t = 5$ sec and $t = 10$ sec

____ 53. Jasmine and her sister are saving to buy MP3 players. Jasmine has $50 and plans to save $10 per week. Her sister has $80 and plans to save $7 per week. In how many weeks will Jasmine have more money saved than her sister?

a. 2 weeks
b. 4 weeks
c. 10 weeks
d. 11 weeks

____ 54. The trajectory of a potato launched from a potato cannon on the ground at an angle of 45 degrees with an initial speed of 65 meters per second can be modeled by the parabola: $f(x) = x - 0.0023x^2$, where the x-axis is the ground. Find the height of the highest point of the trajectory and the horizontal distance the potato travels before hitting the ground.



a. height: 109 m; distance: 435 m
b. height: 121 m; distance: 418 m
c. height: 118 m; distance: 421 m
d. height: 102 m; distance: 409 m

____ 55. 40 candidates apply for a unique job. The job has both a height requirement and a weight requirement. The following information is known about the candidates:

21 candidates meet the height requirement;
17 candidates meet the weight requirement;
8 candidates meet both the weight and height requirements.

How many candidates meet only the height requirement?

a. 8
b. 9
c. 13
d. 21

Algebra EOC Practice Test #2
Answer Section

MULTIPLE CHOICE

1. ANS: D PTS: 1 STA: MA.912.A.3.10
2. ANS: A PTS: 1 STA: MA.912.A.3.4
3. ANS: C PTS: 1 STA: MA.912.D.7.1
4. ANS: D PTS: 1 STA: MA.912.A.3.9
5. ANS: A PTS: 1 STA: MA.912.A.4.2
6. ANS: B PTS: 1 STA: MA.912.A.4.3
7. ANS: D PTS: 1 STA: MA.912.A.4.3
8. ANS: A PTS: 1 STA: MA.912.A.4.3
9. ANS: C PTS: 1 STA: MA.912.A.3.8
10. ANS: B PTS: 1 STA: MA.912.A.7.8
11. ANS: B PTS: 1 STA: MA.912.A.2.4
12. ANS: B PTS: 1 STA: MA.912.A.4.4
13. ANS: C PTS: 1 STA: MA.912.A.3.11
14. ANS: A PTS: 1 STA: MA.912.A.3.15
15. ANS: D PTS: 1 STA: MA.912.A.3.5
16. ANS: B PTS: 1 STA: MA.912.A.7.8
17. ANS: A PTS: 1 STA: MA.912.A.5.4
18. ANS: A PTS: 1 STA: MA.912.A.3.9
19. ANS: D PTS: 1 STA: MA.912.A.3.9
20. ANS: B PTS: 1 STA: MA.912.A.4.2
21. ANS: B PTS: 1 STA: MA.912.A.3.11
22. ANS: C PTS: 1 STA: MA.912.A.2.3
23. ANS: C PTS: 1 STA: MA.912.A.4.1
24. ANS: C PTS: 1 STA: MA.912.A.3.4
25. ANS: C PTS: 1 STA: MA.912.A.3.10
26. ANS: B PTS: 1 STA: MA.912.A.3.15
27. ANS: D PTS: 1 STA: MA.912.D.7.1
28. ANS: B

    Distribute $\sqrt{6}$. Use the Product Property of Square Roots to multiply the factors in each term. If the radicand in either term contains any perfect square factors, factor the radicand(s) and simplify. Combine like terms if applicable.

    PTS: 1 STA: MA.912.A.6.2
29. ANS: A PTS: 1 STA: MA.912.A.3.3
30. ANS: D PTS: 1 STA: MA.912.A.3.8
31. ANS: A PTS: 1 STA: MA.912.A.4.2
32. ANS: C PTS: 1 STA: MA.912.A.2.3

33. ANS: A

PTS: 1 STA: MA.912.A.6.2

34. ANS: A PTS: 1 STA: MA.912.A.3.10
35. ANS: A PTS: 1 STA: MA.912.A.3.3
36. ANS: A PTS: 1 STA: MA.912.A.3.4
37. ANS: C PTS: 1 STA: MA.912.D.7.2
38. ANS: B PTS: 1 STA: MA.912.A.3.2
39. ANS: C PTS: 1 STA: MA.912.A.3.3
40. ANS: A PTS: 1 STA: MA.912.A.4.4
41. ANS: C PTS: 1 STA: MA.912.A.4.1
42. ANS: D PTS: 1 STA: MA.912.A.3.5
43. ANS: B PTS: 1 STA: MA.912.A.4.4
44. ANS: B PTS: 1 STA: MA.912.A.3.11
45. ANS: B PTS: 1 STA: MA.912.A.2.4
46. ANS: A PTS: 1 STA: MA.912.A.3.2
47. ANS: B PTS: 1 STA: MA.912.D.7.2
48. ANS: B PTS: 1 STA: MA.912.D.7.1
49. ANS: D PTS: 1
50. ANS: C PTS: 1 STA: MA.912.A.5.4
51. ANS: A PTS: 1 STA: MA.912.A.3.8
52. ANS: B PTS: 1 STA: MA.912.A.7.8
53. ANS: D PTS: 1 STA: MA.912.A.3.5
54. ANS: A PTS: 1 STA: MA.912.A.7.8
55. ANS: C PTS: 1 STA: MA.912.D.7.2

Staple Here

Student Name: _____

Missouri
DEPARTMENT OF ELEMENTARY & SECONDARY
EDUCATION™

End-of-Course Assessment

Algebra II

Practice Test

Directions to the Student

Today you will be taking Session I of the Missouri Algebra II Test. This is a test of how well you understand the course level expectations for Algebra II.

There are several important things to remember:

1. Read each question carefully and think about the answer. Then choose the answer that you think is best.
2. Make sure you clearly mark the correct choice in your test book.
3. If you do not know the answer to a question, skip it and go on. You may return to it later if you have time.
4. If you finish the test early, you may check over your work.

1. **Which of the following is the simplified expression of $2\sqrt{-16} + \sqrt{225}$ in standard form, $a + bi$?**

A. $15 + 4i$

B. $15 - 4i$

C. $15 + 8i$

D. $15 - 8i$

2. **The student council at a high school placed a box in the cafeteria where students could vote for which of three specialty lunch days would be the most popular: Mac & Cheese Monday, Taco Tuesday, or Fish Friday. More than twice as many students voted for Mac & Cheese Monday than the second-place choice Taco Tuesday. Chelsea asked the students at her table which choice they voted for. All but one student said they voted for Taco Tuesday. The other student voted for Fish Friday.**

What is the most likely reason for the difference between the student council's results and Chelsea's?

A. Both survey methods were biased so a difference between the results is understandable.

B. Both the student council and Chelsea collected data in an unbiased sample. Random variation between the two samples accounts for the different results.

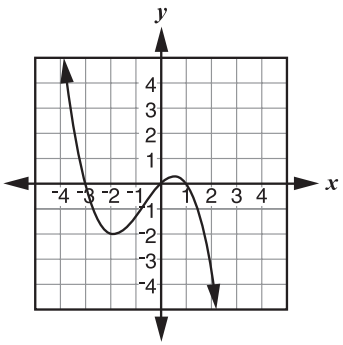
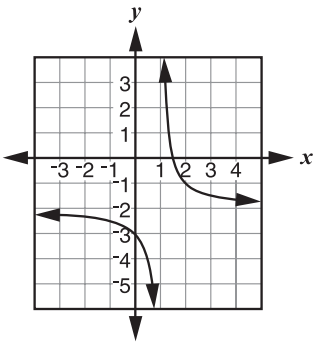
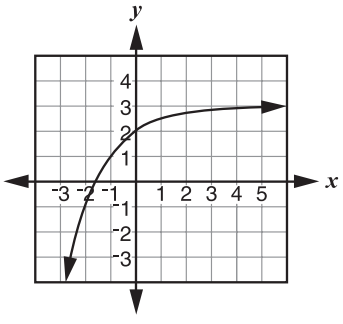
C. The student council's method was biased because students could vote multiple times. Chelsea's method was unbiased and represented the school's population better.

D. Chelsea influenced the students at her table into choosing the option she preferred, and the student council's box was taken over by people that really liked Mac & Cheese.

Go On ▶

3. **Classify each function as either an exponential, polynomial, or rational function.**

Select the correct boxes.

	Exponential	Polynomial	Rational
$f(x) = x^3$			
$f(x) = 3^x$			
$f(x) = \frac{x + 1}{x - 3}$			
			
			
			

4. **Rewrite the exponential equation $5^x = 20$ into an equivalent logarithmic equation.**

Fill in each box with the correct letter of the answer choice.

log $\square$ $\square$ **=** $\square$

A. x

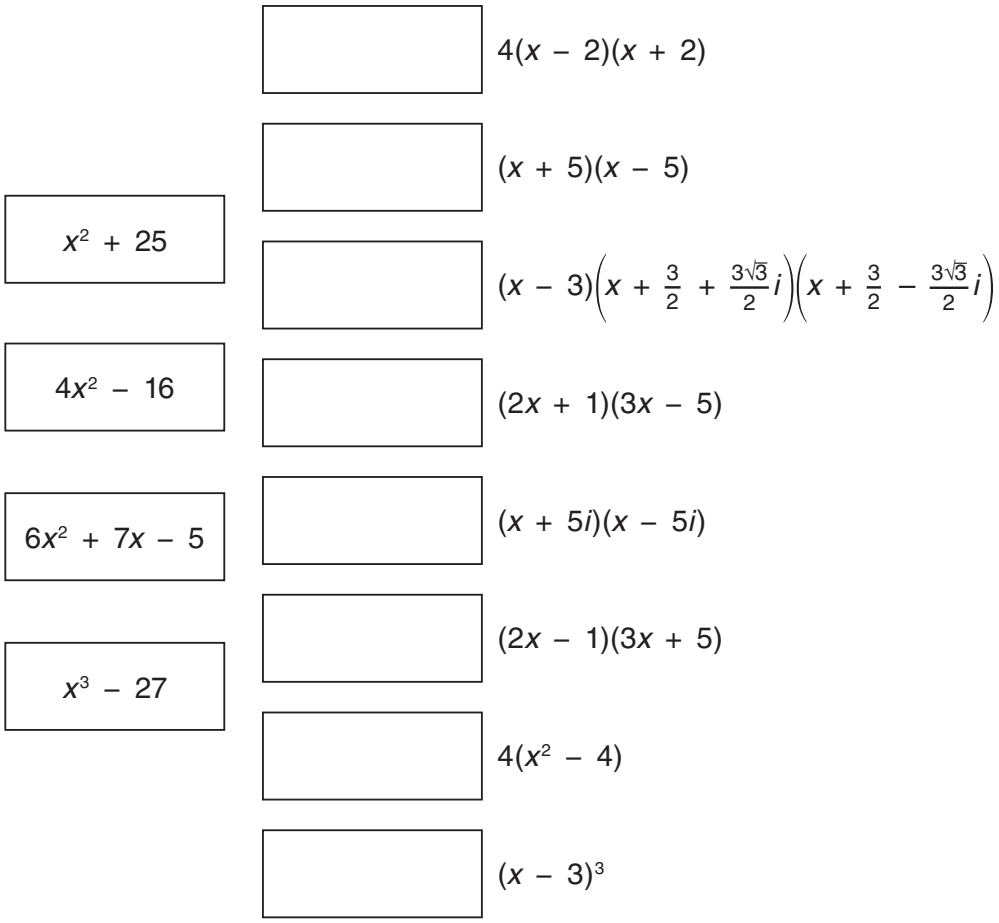
B. 20

C. 4

D. 5

Go On ▶

5. **Factor each polynomial completely. Draw a line from each polynomial on the left to the corresponding factored form on the right.**



6. **Draw a line from each function on the left to the equivalent form of the function on the right. Not all functions on the right side will be used.**

		○	$y = x^2 - 2x - 24$
$y = (x - 6)(x + 4)$	○	○	$y = (x + 12)(x + 2)$
$y = (x - 5)^2 - 49$	○	○	$y = x^2 - 24$
$y = x^2 + 2x - 24$	○	○	$y = (x + 1)^2 - 25$
		○	$y = (x - 12)(x + 2)$

Go On ▶

7. **Condense the following expression into a single term using properties of logarithms.**

$$2\log_3 x + 3\log_3 y - 5\log_3 z$$

Which single term is equivalent to the expression?

A. $\log_3\left(\frac{x^2y^3}{z^5}\right)$

B. $\log_3\left(\frac{6xy}{5z}\right)$

C. $\log_3 (2x + 3y - 5z)$

D. $\log_3\left(\frac{2x + 3y}{5z}\right)$

8. **Simplify the following rational expression completely:**

$$\frac{x^2 - 1}{x^2 + 2x + 1} \div \frac{1 - x}{x + 1}$$

Enter the simplified answer in the box.

Go On ▶

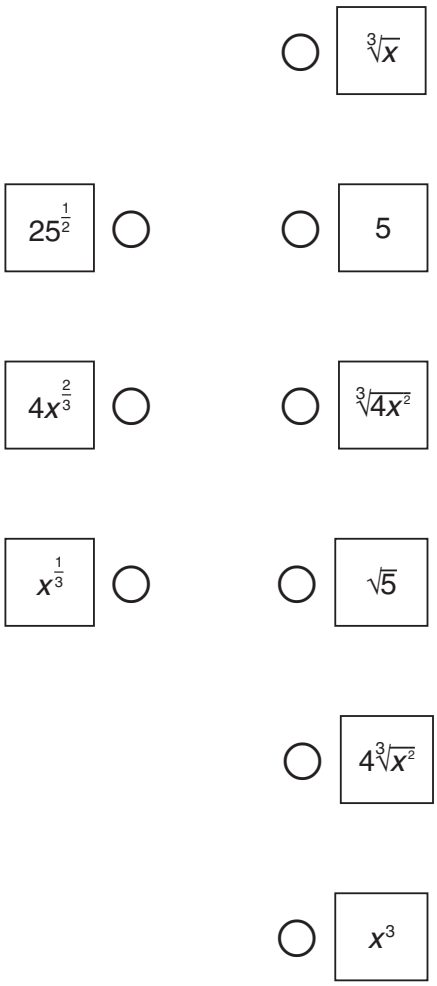
9. All functions of form $f(x) = x^n$, where n is an integer, can be graphed on a Cartesian coordinate plane.

Function transformations are listed in the first column of the table. Transformed functions are listed in the top row.

Select the box or boxes that match each function with the transformation that took place.

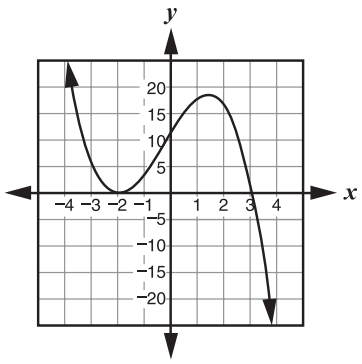
	$g(x) = -(x - h)^n$	$j(x) = ax^n + k$	$m(x) = (x + h)^n - k$
Reflection across the x-axis			
Translation of h units to the left			
Translation of k units up			
Vertical dilation			

10. **Draw a line from each rational expression on the left to its equivalent radical expression on the right.**



Go On ▶

11. **The graph below is of a polynomial function $y = f(x)$.**



Which of the following is the <u>most likely</u> factorization of $f(x)$?

A. $f(x) = (x - 2)^2(x + 3)$

B. $f(x) = -(x - 2)^2(x + 3)$

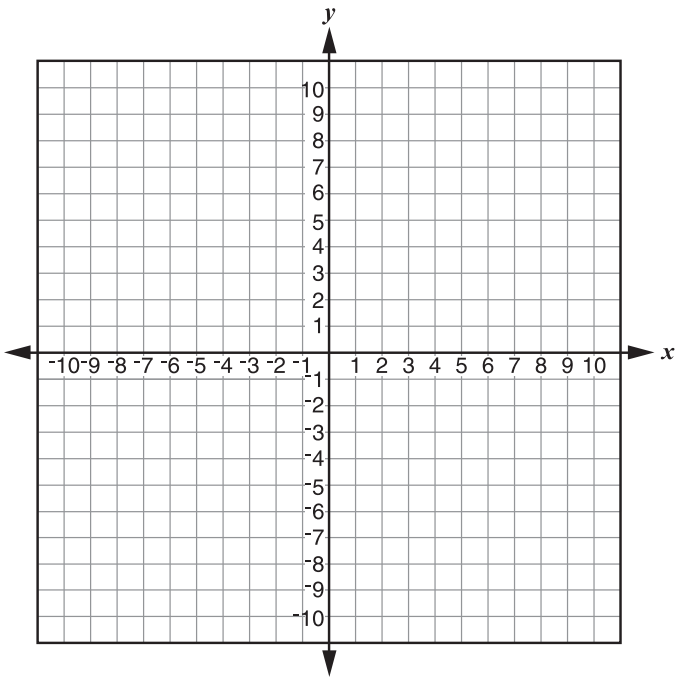
C. $f(x) = (x + 2)^2(x - 3)$

D. $f(x) = -(x + 2)^2(x - 3)$

12. Function f is defined as $f(x) = x^2$. Three transformations are performed on function f to produce a new function g. The transformations are listed.

- horizontal translation of 5 units right
- vertical stretch of 2
- reflection across the x-axis

Graph function g.



Go On ▶

13. **A total of 150 students have taken an Algebra II final exam. The scores are normally distributed with a mean of 71% and a standard deviation of 6%. How many students would you expect to have scored between 65% and 77%?**

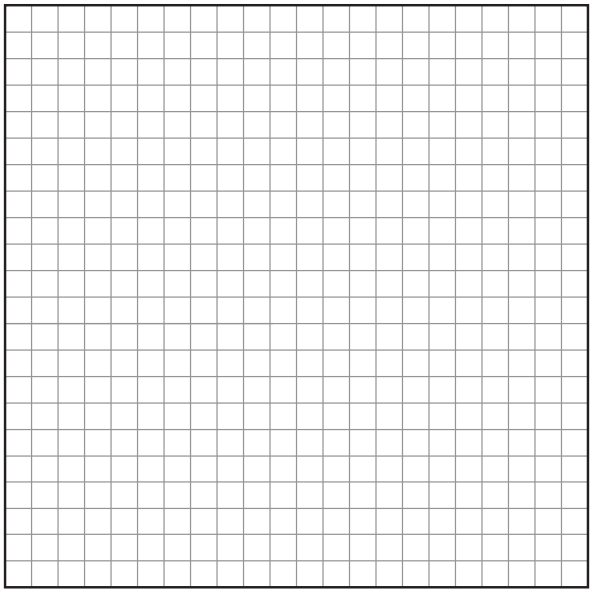
A. 51

B. 68

C. 102

D. 142

14. **Create a graph to show the intersection of $y = (x - 5)^2 + 1$ and $y = x - 2$. Be sure to include labels for the axes and appropriate increments for the axes.**



Go On ▶

15. **Which of the following expressions are solutions for x in the equation $4^x = 12$? Select <u>all</u> that apply.**

A. $\frac{\log 4}{\log 12}$

B. $\frac{\log 12}{\log 4}$

C. $\frac{\ln 4}{\ln 12}$

D. $\frac{\ln 12}{\ln 4}$

E. $\log_4(12)$

F. $\log_{12}(4)$

16. **Which are factors of the polynomial $p(x) = x^3 + 5x^2 + 2x - 8$? Select <u>all</u> that apply.**

A. $(x - 4)$

B. $(x - 2)$

C. $(x - 1)$

D. $(x + 1)$

E. $(x + 2)$

F. $(x + 4)$

Go On ▶

17. **The following question has two parts. First, answer Part A. Then, answer Part B.**

Part A

Which of the following is the inverse of $f(x) = \frac{1}{2}x - 6$?

A. $f^{-1}(x) = -\frac{1}{2}x + 6$

B. $f^{-1}(x) = \frac{1}{2}x + 6$

C. $f^{-1}(x) = 2x - 12$

D. $f^{-1}(x) = 2x + 12$

Part B

What is the result when the two functions are composed, $f(f^{-1}(x))$?

Enter your answer in the box.

$f(f^{-1}(x)) =$ ☐

18. **For the polynomial function $f(x) = x^3 + 5x^2 + 9x + 45$, select the values that correctly complete each statement.**

The polynomial has ____ total zeros.

- ○ 3
- ○ 2
- ○ 1
- ○ 0

The polynomial has ____ real zeros.

- ○ 3
- ○ 2
- ○ 1
- ○ 0

The polynomial has ____ non-real zeros.

- ○ 3
- ○ 2
- ○ 1
- ○ 0

Go On ▶

19. **Sound intensity is measured in decibels (*dB*) on a logarithmic scale. The formula $dB = 10\log(\frac{P}{P_0})$ is used to determine the decibel level of a sound, where P is the intensity of the sound heard and P_0 is the intensity of the softest sound a human ear can hear. Normal conversation is measured at 60*dB*. What is the ratio $\frac{P}{P_0}$ for normal conversation?**

A. 10^{60}

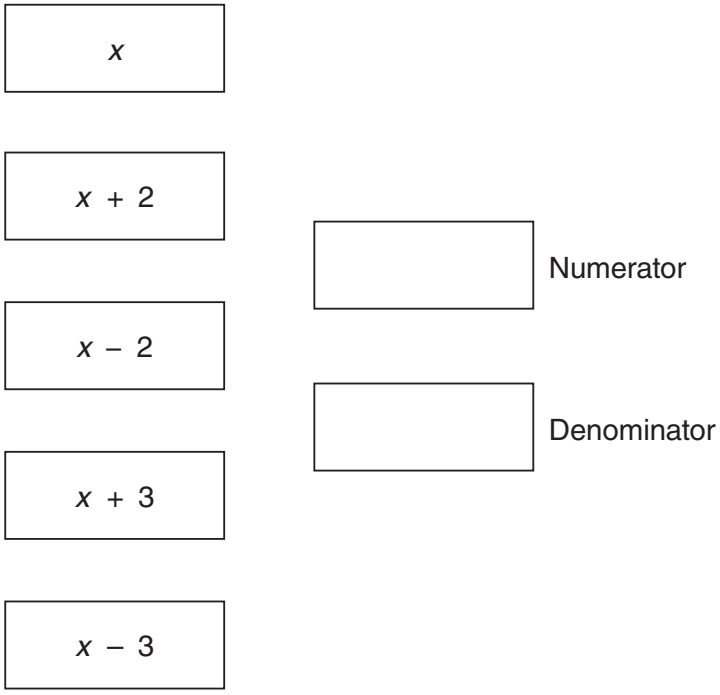
B. 10^{50}

C. 50^{10}

D. 10^{6}

20. **Perform the given operation. Draw lines from the algebraic expressions to form the simplified rational expression.**

$$\frac{x^3 + 2x^2 - 9x - 18}{x^2 - 4} \div \frac{x^2 - 3x}{x - 2} = \frac{\text{numerator}}{\text{denominator}}$$



Go On ▶

21. **A random sample of 11th grade students from two high schools took a mathematics test. The table below displays each school's results. A score of 35 indicates that the student is college ready.**

Test Results

	School A	School B
Number of Students	18	22
Mean Score	37.4	35.7
Median Score	37.0	35.5
Standard Deviation	4.2	3.8

Which of the following statements are supported by the results?

Select <u>all</u> that apply.

A. At least half the students at both schools scored as college ready.

B. The data from both schools do not appear to be skewed because the mean and the median scores for both are close.

C. School A does a better job instructing its students because the median score at School A is higher than it is at School B.

D. The difference between the mean scores at the two schools is not sufficient to claim that the students at School A perform better than those at School B.

E. Since the standard deviation of the scores of School B is less than the standard deviation of the scores of School A, School B does a better job of making its students college ready.

22. Select <u>all</u> the expressions that are equivalent to $\sqrt[5]{32a^4b^{12}c^{-5}}$.

A. $6.4a^2c\sqrt[5]{a^4b^2}$

B. $\dfrac{2b^2\sqrt[5]{a^4b^2}}{c}$

C. $\dfrac{6.4a^{\frac{4}{5}}b^{\frac{12}{5}}}{c}$

D. $2a^{\frac{4}{5}}b^{\frac{12}{5}}c^{-1}$

E. $2b^2c\sqrt[5]{a^4b^2}$

F. $\dfrac{2a^{\frac{4}{5}}b^{\frac{12}{5}}}{c}$

Go On ▶

23. **Solve the following logarithmic equation for x:**

$$\log_2(3x - 1) = 5$$

Enter the numeric value of x in the box.

24. **Three high school students are trying to determine what proportion of households in their community recycle.**

- **Student A surveyed 25 of his family members and closest friends.**
- **Student B divided the community into 5 equivalent sections and randomly surveyed 5 households from each section.**
- **Student C surveyed the first 25 people who walk into the local mall.**

Which data set is most reliable and why?

Select the choices that correctly complete the sentence.

Student ____ data set is most reliable

- ○ A's
- ○ B's
- ○ C's

because the student collected data from a _____ .

- ○ random sample
- ○ normal sample
- ○ carefully selected sample

Go On ▶

25. What is the solution for the equation $\frac{2}{x^2 - x} = \frac{1}{x - 1}$?

Enter the answer in the box.

$x =$ ☐

26. Given $f(x) = x^2 + 8x - 20$ and $g(x) = 4x - 10$, what is $(f \circ g)(x)$?

A. $4x^2 + 32x - 90$

B. $16x^2 - 48x$

C. $16x^2 + 32x - 200$

D. $4x^3 + 22x^2 - 160x + 200$

Go On ▶

27. **A city council is trying to pass a new proposition to increase funding for the local schools. In order to pass the proposition, they will need over 50% of the votes in the upcoming election. A poll of a random sample of 600 resident voters was conducted, and 52% of those residents support the new budget.**

The margin of error in the poll is ±4%. Should the city council strongly believe that the new budget will be approved?

A. No, the confidence interval includes values that are less than 50%.

B. No, the margin of error is too high. There might have been a problem with the poll.

C. Yes, the confidence interval includes values that are mostly greater than 50%.

D. Yes, a 4% margin of error means that there is a 96% chance that the results are correct and 52% of voters will support the new proposition.

28. **Solve the logarithmic equation.**

$$\log_5(2) + \log_5(x - 3) = 2\log_5(4)$$

Enter the answer in the box.

$x =$ ☐

Go On ▶

29. **What is $(\sqrt{3} + 5)(\sqrt{2} + \sqrt{6})$ written in simplest form?**

A. $6\sqrt{6} + \sqrt{18} + 5\sqrt{2}$

B. $\sqrt{6} + 5\sqrt{6}$

C. $5\sqrt{6} + 8\sqrt{2}$

D. $6\sqrt{6} + 8\sqrt{2}$

30. **Determine the least common multiple for the polynomials $x^2 + 7x + 6$, $x^2 - 1$, and $2x^2 + 9x - 18$.**

Which are factors of the least common multiple? Select <u>all</u> that apply.

A. $(x + 1)$

B. $(x + 3)$

C. $(x + 6)$

D. $(x - 1)$

E. $(x - 3)$

F. $(2x - 3)$

Go On ▶

31. Sound intensity (I) is measured in watts per meters squared $\left(\frac{W}{m^2}\right)$, and the loudness of the sound, $L(I)$, which is measured in decibels (dB), is described by the function $L(I) = 10\log\left(\frac{I}{I_0}\right)$. A barely audible sound has intensity $I_0 = 10^{-12}\frac{W}{m^2}$.

Rounded to the nearest tenth of a decibel, what is the loudness, in decibels, of a musical group that plays with sound intensity of $I = 6.7 \times 10^{-3}\frac{W}{m^2}$?

A. 8.2

B. 9.8

C. 76.5

D. 98.3

STOP

Directions to the Student

Today you will be taking Session II of the Missouri Algebra II Test. This is a test of how well you understand the course level expectations for Algebra II.

There are several important things to remember:

1. Read the performance event carefully and think about how to answer the question.
2. Show all of the work that you did to answer the question with a number 2 pencil. If a box is provided, make sure all of your work is in the box. If a line is provided to write your answer on, be sure your answer is on the line.
3. If you do not know the answer to a question, skip it and go on. You may return to it later if you have time.
4. If you finish the test early, you may check over your work.
5. Write or mark your answers directly in your test book with a number 2 pencil.

Go On ▶

Corinne is planning to invest in a savings account and Sally intends to purchase a car. Help Corinne and Sally with their financial planning.

1. **The following question has two parts. First, answer Part A. Then, answer Part B.**

For her birthday, Corinne's grandfather is giving her a choice of investment plans. She can choose either Plan X or Plan Y.

Plan X: A single deposit of $500 is invested at 6% interest rate, compounded continuously.

Plan Y: An annuity with a deposit of $5 per month is invested at an interest rate of 6% per year, compounded monthly.

To determine the value of the account under Plan Y, use $A = \dfrac{P\left(\left(1 + \frac{r}{12}\right)^{12t} - 1\right)}{\frac{r}{12}}$ **, where** A **is the amount of money in the account,** P **is the monthly deposit,** r **is the interest rate, and** t **is the number of years.**

Part A

After 7 years, how much money would each plan have? Enter the amounts, rounded to the nearest cent, in the boxes.

Plan X: $ ____

Plan Y: $ ____

Part B

How many years will it be before the amount of money in Plan Y exceeds the amount of money in Plan X? Select the number of years that correctly completes the sentence.

It will be _____ before the amount of money in Plan Y exceeds

- ○ 10 years
- ○ 12 years
- ○ 14 years
- ○ 16 years

the amount of money in Plan X.

Go On ▶

2. **The following question has two parts. First, answer Part A. Then, answer Part B.**

Part A

Corinne has $500 to invest. She wants to see how much money she would have at the end of 4 years if she invested her money in an account with a 6% interest rate. Rounded to the nearest cent, enter the amount of money each option would have at the end of 4 years in the boxes below.

Plan A—Compounded Annually: $ ☐

Plan B—Compounded Quarterly: $ ☐

Plan C—Compounded Monthly: $ ☐

Plan D—Compounded Continuously: $ ☐

Part B

Select the number of years that correctly completes the sentence.

It will take _____ for Corinne to double her investment if her investment is compounded continuously.

- ◯ 10 years
- ◯ 12 years
- ◯ 14 years
- ◯ 16 years

3. **Sally is buying a car for $3,295. She has saved $900, but she must borrow money from her family for the remainder. Her family will loan her the remainder at 5% interest, compounded quarterly. She will not have to make payments for 2 years but will pay the entire loan in one lump sum.**

Rounded to the nearest cent, how much money will she owe her family at the end of 2 years? Enter the amount owed in the box.

$ ☐

When Sally pays back the loan at the end of 2 years, her family lets her keep the interest on the loan. Rounded to the nearest cent, enter the amount of money Sally will get to keep in the box.

$ ☐

STOP

ITEM TYPES

CR – Constructed Response
ESR – Evidence-Based Selected Response
MC – Multiple Choice
MS – Multi-Select Response
SA – Short Answer
TE – Technology Enhanced
WP – Writing Prompt

Session	Item	Type	MLS Code	Answer	Point(s)	Point Breakdown
1	1	MC	A2.NQ.B.5	C	1	
1	2	MC	A2.DS.A.3	A	1	
1	3	MS	A2.IF.A.1	Letters = columns Numbers = rows B1, A2, C3, B4, C5, A6	2	• 2 points for 6 correct answers • 1 point for 6 correct answers and 1 incorrect answer • 1 point for 5 correct answers and 0-1 incorrect answers • 1 point for 4 correct answers and 0 incorrect answers • 0 points for all other scenarios
1	4	MS	A2.SSE.A.1	D, B, A	1	• 1 point for 3 correct answers
1	5	MS	A2.APR.A.1	Letters = left column Numbers = right column A5, B1, C6, D3	2	• 2 points for 4 correct answers • 1 point for 4 correct answers and 1 incorrect answer • 1 point for 3 correct answers and 0-1 incorrect answers • 0 points for all other scenarios
1	6	MS	A2.IF.A.2	Letters = left column Numbers = right column A1, B5, C4	1	• 1 point for 3 correct answers
1	7	MC	A2.SSE.A.3	A	1	
1	8	SA	A2.APR.A.4	-1	1	
1	9	MS	A2.BF.A.3	Letters = columns Numbers = rows A1, C2, B3, B4	2	• 2 points for 4 correct answers • 1 point for 4 correct answers and 1 incorrect answer • 1 point for 3 correct answers and 0-1 incorrect answers • 0 points for all other scenarios
1	10	MS	A2.NQ.A.2	Letters = left column Numbers = right column C1, A2, B5	1	• 1 point for 3 correct answers
1	11	MC	A2.APR.A.5	D	1	
1	12	TE	A2.BF.A.3	The graph is a downward-opening parabola. The vertex is at (5, 0). Two points on the parabola are (4, -2) and (6, -2) OR (3, -8) and (-7, 8). Note: Full credit if parabola is correct and parent points are left.	2	• 2 points for all 3 transformations correctly applied • 1 point for 2 out of 3 transformations correctly applied • 0 points for 0-1 of the transformations correctly applied
1	13	MC	A2.DS.B.8	C	1	

ITEM TYPES

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Session	Item	Type	MLS Code	Answer	Point(s)	Point Breakdown
1	14	TE	A2.REI.B.3	Correct graph of functions $y = (x-5)^2 + 1$ and $y = x - 2$ and correctly labeled axes with appropriate numbers.	2	• 1 point for correct graph of functions $y = (x-5)^2 + 1$ and $y = x - 2$ • 1 point for correct labeled axes with appropriate numbers, perhaps using increments of 10
1	15	MS	A2.SSE.A.2	B, D, E	1	• 1 point for 3 correct answers
1	16	MS	A2.APR.A.2	C, E, F	1	• 1 point for 3 correct answers
1	17	ESR	A2.BF.A.2	**Part A** D **Part B** x	2	**Part A** • 1 point for correct answer **Part B** • 1 point for correct answer **NOTE:** 1 point can be given if part B is correct based on option chosen in Part A
1	18	MC	A2.NQ.B.7	First response "3" Second response "1" Third response "2"	1	• 1 point for 3 correct answers
1	19	MC	A2.SSE.A.4	D	1	
1	20	MS	A2.APR.A.4	Letters = left column Numbers = right column A2, D1	2	• 2 points for 2 correct answers • 1 point for 1 correct answer • 0 points for no correct answers
1	21	MS	A2.DS.A.7	A, B, D	1	• 1 point for 3 correct answers
1	22	MS	A2.NQ.A.1	B, D, F	2	• 2 points for 3 correct answers and 0 incorrect answers • 1 point for 3 correct answers and 1 incorrect answer • 1 point for 2 correct answers and 0 incorrect answers • 0 points for all other scenarios
1	23	SA	A2.SSE.A.2	11	1	
1	24	MC	A2.DS.A.1	B's, Random Sample	1	• 1 point for 2 correct answers
1	25	SA	A2.REI.A.2	2	1	
1	26	MC	A2.BF.A.1	B	1	
1	27	MC	A2.DS.A.4	A	1	
1	28	SA	A2.SSE.A.3	11	1	
1	29	MC	A2.NQ.A.3	D	1	

ITEM TYPES

CR – Constructed Response
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WP – Writing Prompt

Session	Item	Type	MLS Code	Answer	Point(s)	Point Breakdown
1	30	MS	A2.APR.A.3	A, C, D, F	2	• 2 points for 4 correct answers and 0 incorrect answers • 1 point for 4 correct answers and 1 incorrect answer • 1 point for 3 correct answers and 0 incorrect answers • 0 points for all other scenarios
1	31	MC	A2.SSE.A.4	D	1	
2	1	ESR	A2.FM.A.1	**Part A** Plan X: $760.98 Plan Y: $520.37 **Part B** 12 Years	3	**Part A** • 2 points for 2 correct answers • 1 point for 1 correct answer • 0 points for 0 correct answers **Part B** • 1 point for correct answer
2	2	ESR	A2.REI.A.1	**Part A** Plan A: $631.24 Plan B: $634.49 Plan C: $635.24 Plan D: $635.62 **Part B** 12 Years	5	**Part A** • 4 points for 4 correct answers • 3 points for 3 correct answers and 0-1 incorrect answers • 2 points for 2 correct answers and 0-2 incorrect answers • 1 point for 1 correct answer and 0-3 incorrect answers • 0 points for no correct answers **Part B** • 1 point for correct answer
2	3	SA	A2.REI.B.3	$2645.24, $250.24	2	• 2 points for 2 correct answers • 1 point for 1 correct answer • 0 points for no correct answers

Algebra II Practice Test

Objective: 1.1a

1. Which is equivalent to $49^{\frac{3}{2}}$?
   A 21
   B 98
   C 294
   D 343

2. Which expression is another way to write $\sqrt[3]{125x^4}$?
   A $5x^{\frac{3}{4}}$
   B $5x^{\frac{4}{3}}$
   C $25x^{\frac{3}{4}}$
   D $25x^{\frac{4}{3}}$

3. If x and y are real numbers, what is the simplified radical form of $\left(x^2y^5\right)^{\frac{1}{5}}$?
   A $y\sqrt[5]{x^2}$
   B $y\sqrt{x^5}$
   C $|y|\sqrt[5]{x^2}$
   D $|y|\sqrt{x^5}$

Objective 1.1b

4. What is the simplified expression of $\sqrt{\frac{36x^8}{4x^6}}$?
   A $3x$
   B $9x$
   C $3x^2$
   D $9x^2$

5. What is the simplified form of $\left(2\sqrt{5}+3\right)\left(\sqrt{5}-1\right)$?
   A $\sqrt{5}-3$
   B $\sqrt{5}+7$
   C $2\sqrt{5}-3$
   D $2\sqrt{5}+7$

6. What is the sum of $\frac{1}{3\sqrt{25}}$ and $\frac{1}{2\sqrt[3]{27}}$?

A $\frac{2}{21}$

B $\frac{7}{30}$

C $\frac{2}{33}$

D $\frac{11}{90}$

7. The area of a square is $2\sqrt{2}+3$. What is the length of a side of the square?

A $\sqrt{2}-1$

B $\sqrt{2}+1$

C $2\sqrt{2}-1$

D $2\sqrt{2}+1$

Objective 1.2a

8. Which expression represents the quotient? $\frac{8x^6z^4+4x^4z^2}{4x^2z}$

A $2x^4z^3+x^2z$

B $2x^3z^4+x^2z^2$

C $4x^4z^3+3x^2z$

D $4x^3z^4+3x^2z^2$

9. Which expression represents the quotient? $\frac{4x^2y}{8xy^2}\div\frac{12xy^2}{8x^6y^3}$

A $\frac{x^5}{3}$

B $\frac{3}{x^5}$

C $\frac{x^6}{3}$

D $\frac{3}{x^6}$

10. Which expression represents the quotient? $\left(y^2-4y-32\right)\div(y+4)$

A $y-8$

B $y+8$

C $y-4$

D $y+4$

11. A rectangular prism has a volume of $8x^3+14x^2+x-2$ and a height of $2x+1$. Which expression represents the area of the base of the prism?

A $4x^2+5x-2$

B $4x^2+5x+2$

C $4x^2+9x+4$

D $4x^2+9x+5$

objective 1.2b

12. What is the completely simplified equivalent of $\frac{x^2+x-12}{x^2-6x+9}$?

A $\frac{x-3}{x+4}$

B $\frac{x+4}{x-3}$

C $2x^2+5x-3$

D $2x^2+7x+21$

13. Which expression represents the result of this subtraction $\frac{3x-1}{x+2}-\frac{x-2}{x-1}$?

A $\frac{2x+1}{3}$

B $\frac{2x+1}{x^2+x-2}$

C $\frac{3x^2-4x+5}{3}$

D $\frac{2x^2-4x+5}{x^2+x-2}$

14. What is the simplified equivalent of $2-x-\frac{1}{3-x}$?

A $\frac{1}{3-2x}$

B $\frac{x^2-x+3}{3-x}$

C $\frac{x^2-5x+5}{3-x}$

D $\frac{x^2-5x+7}{3-x}$

objective 1.3b

15. Which expression is equivalent to $(4i)^3$?

    A $-12i$
    B $12i$
    C $-64i$
    D $64i$

16. A circuit has a current of (8 + 7*i*) amps, and another circuit has a current of (5 − 3*i*) amps. What is the difference between the currents of the two circuits?

    A (3 − 4*i*) amps
    B (3 + 4*i*) amps
    C (3 − 10*i*) amps
    D (3 + 10*i*) amps

17. Which expression is equivalent to $\sqrt{-6}\left(\sqrt{-4}-\sqrt{3}\right)$?

    A $2\sqrt{6}+3\sqrt{2}$
    B $-24-6i\sqrt{3}$
    C $2\sqrt{6}-3i\sqrt{2}$
    D $-2\sqrt{6}-3i\sqrt{2}$

18. What is the product of $(2+3i)$ and $(5-4i)$?

    A $-2-23i$
    B $-2+7i$
    C $22-23i$
    D $22+7i$

19. What is the completely simplified equivalent of $\frac{2}{5+i}$?

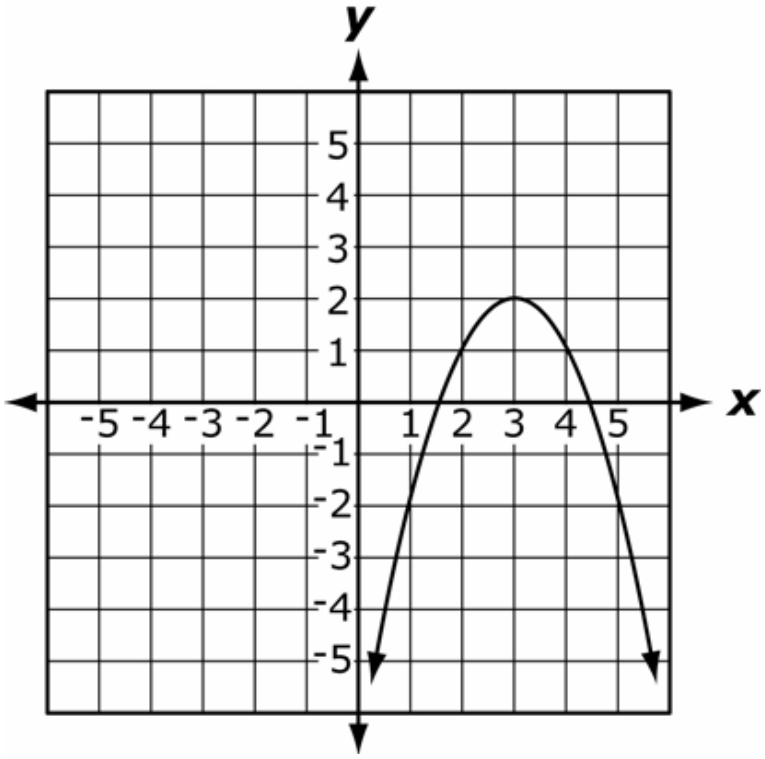
    A $\frac{5-i}{12}$
    B $\frac{5+i}{12}$
    C $\frac{5-i}{13}$
    D $\frac{5+i}{13}$

objective 2.1a

20. What is the parent graph of the following function and what transformations have taken place on it: $y=(x-3)^2$?

    A The parent graph is $y=x^2$, which is shifted 3 units up.
    B The parent graph is $y=x^2$, which is shifted 3 units down.
    C The parent graph is $y=x^2$, which is shifted 3 units to the left.
    D The parent graph is $y=x^2$, which is shifted 3 units to the right.

21. What is the parent function of this graph?



A $f(x)=x^2$

B $f(x)=x^4$

C $f(x)=-x^2$

D $f(x)=-x^4$

objective 2.1b

22. If $f(x)=3x^2-2$ and $g(x)=4x+2$, what is the value of $(f+g)(-1)$?

A −7

B −1

C 1

D 7

23. If $f(x)=x^2-1$ and $g(x)=x-1$, what is the value of $\left(\frac{f}{g}\right)(x)$?

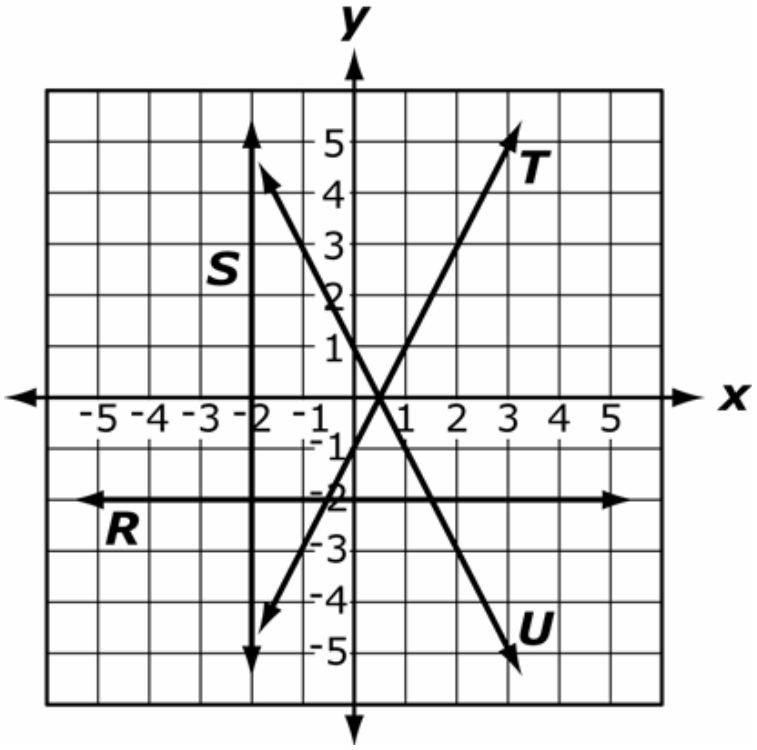
A $x-1$

B $x+1$

C $\frac{1}{x-1}$

D $\frac{1}{x+1}$

24.



If $f(x)=x-\frac{1}{2}$ and $g(x)=-2$, which graph corresponds to the function of $(fg)(x)$?

A line R
B line S
C line T
D line U

Objective 2.1c

25. If $f(x)=2x+7$ and $g(x)=3x^2-1$, what expression represents $(f(g(x))$?

A $6x^2+5$
B $6x^2+12$
C $3x^2-2x-8$
D $3x^2+2x+6$

26. If $(f\circ g)(x)=2x-1$, how might $f(x)$ and $g(x)$ be defined?

A $f(x)=(x-1)$ and $g(x)=(2x-1)$
B $f(x)=(x-1)$ and $g(x)=(2x+1)$
C $f(x)=(2x-1)$ and $g(x)=(x-1)$
D $f(x)=(2x+1)$ and $g(x)=(x-1)$

Objective 2.1d

27. Which statement is true for the function $f(x)=\frac{1}{x+4}$?

A 4 is not in the range of the function.
B 4 is not in the domain of the function.
C -4 is not in the range of the function.
D -4 is not in the domain of the function.

28. What is the domain of the function $f\left(x\right)=\frac{x+5}{x^2+2x-8}$?

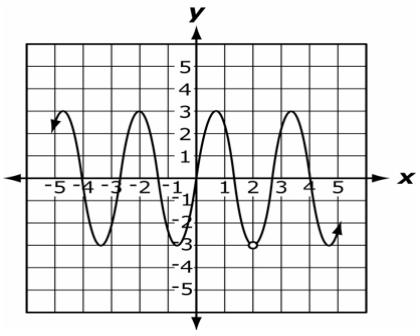
A $\left\{x:x\neq 0\right\}$
B $\left\{x:x\neq -5\right\}$
C $\left\{x:x\neq -2,4\right\}$
D $\left\{x:x\neq 2,-4\right\}$

29. Which intervals correctly define the domain of $f\left(x\right)=\frac{1}{x+4}-2$?

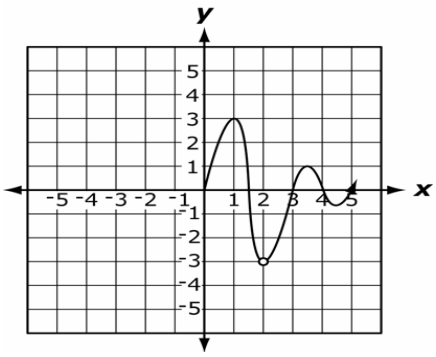
A $\left(-\infty,4\right)$ and $\left(4,\infty\right)$
B $\left(-\infty,-4\right)$ and $\left(4,\infty\right)$
C $\left(-\infty,-4\right)$ and $\left(-4,\infty\right)$
D $\left(-\infty,-4\right)$ and $\left(-2,\infty\right)$

30. Domain: $\{x|x\geq 0, x\neq 2\}$ Range: $\{y|-3<y\leq 3\}$ Which graph corresponds to the given constraints?

A



B



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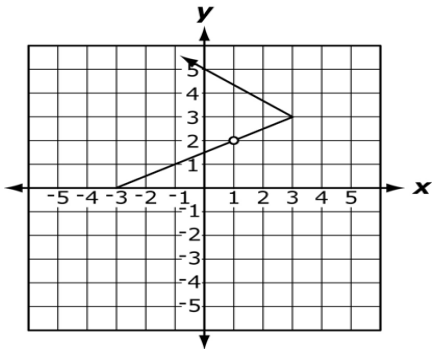
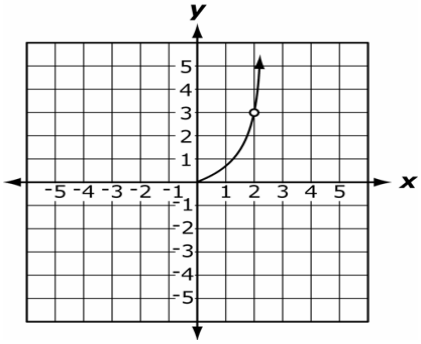


D



31. Which function has the fewest domain restrictions for real numbers?

A $f(x)=\frac{1}{x-1}$

B $f(x)=\frac{1}{x+1}$

C $f(x)=\frac{1}{x^2-1}$

D $f(x)=\frac{1}{x^2+1}$

Objective 2.1e

32. What is the inverse of $f(x)=x+1$?

A $f^{-1}(x)=-x-1$

B $f^{-1}(x)=x-1$

C $f^{-1}(x)=\frac{-1}{1-x}$

D $f^{-1}(x)=\frac{1}{1+x}$

33. What is the inverse of the function $f(x)=(x+4)^2$?

A $f^{-1}(x)=\sqrt{x}-4$

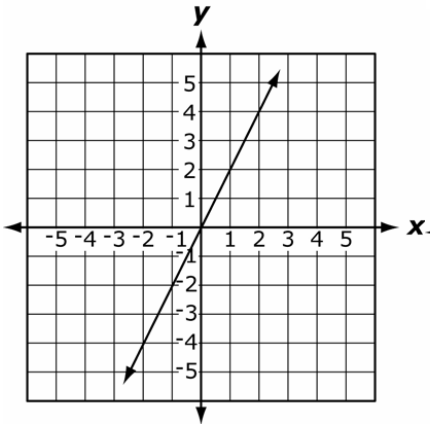
B $f^{-1}(x)=\dfrac{1}{(x+4)^2}$

C $f^{-1}(x)=\pm\sqrt{x}-4$

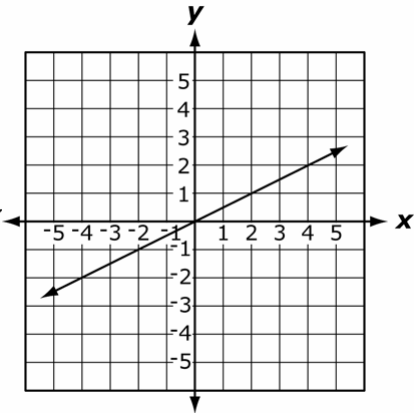
D $f^{-1}(x)=(x-4)^2$

34. Which graph represents the inverse of $f(x)=2x$?

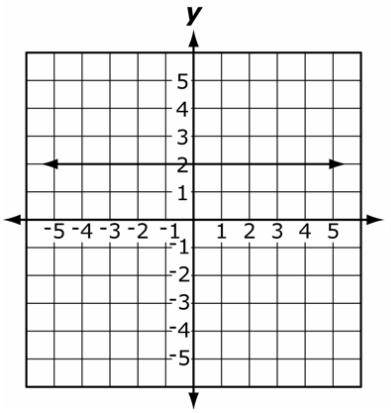
A



B



C



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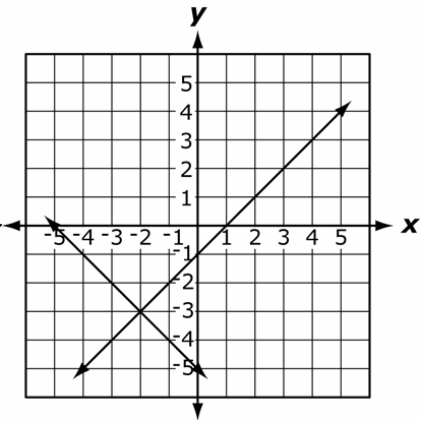


35. Which statement about graphs and their inverse is true?

A They are symmetric about $y=x$.

B They are symmetric about the origin.

C They are symmetric about the x-axis.

D They are symmetric about the y-axis.

Objective 2.2a

36. Profits, *P*, are equal to sales, *S*, minus expenses, *E*. If expenses are equal to travel, *T*, plus materials, *M*, which system of equations models this situation?

A $\begin{aligned} P &= S - E \\ E &= T + M \end{aligned}$

B $\begin{aligned} P &= S + E \\ E &= T + M \end{aligned}$

C $\begin{aligned} P &= S - E \\ E &= T - M \end{aligned}$

D $\begin{aligned} P &= S + E \\ E &= T - M \end{aligned}$

37. Tyrone wants to spend at most \$10,000 on two televisions, *R* and *S*. Each television must cost at least \$3,000, and television *R* must cost at least twice as much as television *S*. Which system of inequalities models the amount of money spent on each television?

A $\begin{aligned} R + S &\geq 10,000 \\ R &\geq 2S \\ R &\geq 3,000 \\ S &\geq 3,000 \end{aligned}$

B $\begin{aligned} R + S &\leq 10,000 \\ S &\geq 2R \\ R &\geq 3,000 \\ S &\geq 3,000 \end{aligned}$

C $\begin{aligned} R + S &\leq 10,000 \\ R &\geq 2S \\ R &\geq 3,000 \\ S &\geq 3,000 \end{aligned}$

D $\begin{aligned} R + S &\geq 10,000 \\ S &\geq 2R \\ R &\geq 3,000 \\ S &\geq 3,000 \end{aligned}$

38. Meredith invests \$50,000 in her new business. It costs the company \$10 to produce each unit, which is sold for \$15. Let C represent the cost and R represent the revenue for x units. Which statement is true about the graphs of the equations $C = 50,000 + 10x$ and $R = 15x$?

A Both slopes are positive.
B Both slopes are negative.
C One slope is positive, and the other is zero.
D one slope is negative, and the other is positive.

Objective 2.2b

39. Which quadrants contain the solutions to this system of inequalities?

$$\begin{Bmatrix} y - 2x \leq -3 \\ 3y + x \geq -4 \end{Bmatrix}$$

A quadrants I and IV
B quadrants II and III
C quadrants III and IV
D quadrants II, III, and IV

40. What is the solution to this system of equations? $\left\{\begin{matrix}3x-y+5=0\\2x+3y-4=0\end{matrix}\right\}$

A $x=-1, y=-2$
B $x=-1, y=2$
C $x=2, y=-1$
D $x=2, y=1$

41. The corners of a triangle are (2,1), (4,4), and (6,2). Which system of inequalities describes the interior of the triangle?

A $\left\{\begin{matrix}4y>x+2\\3y<2x-1\\y<8-x\end{matrix}\right\}$

B $\left\{\begin{matrix}4y>x+2\\2y<3x-4\\y<8-x\end{matrix}\right\}$

C $\left\{\begin{matrix}2y>x\\2y<3x-4\\y<8-x\end{matrix}\right\}$

D $\left\{\begin{matrix}2y>x\\3y<2x-1\\y<8-x\end{matrix}\right\}$

Objective 2.2c

42. What is the solution set of this system of equations?

$$\left\{\begin{matrix}x^2+y-1=0\\x-y+1=0\end{matrix}\right\}$$

A $\{(-1,-1),(-1,0)\}$
B $\{(-1,0),(-1,1)\}$
C $\{(-1,0),(0,1)\}$
D $\{(1,0),(1,1)\}$

43. What is the solution set of this system of equations?

$$\left\{\begin{matrix}y-x=3\\x^2-7y+31=0\end{matrix}\right\}$$

A $\{(2,5),(5,2)\}$
B $\{(2,5),(5,8)\}$
C $\{(5,8),(8,5)\}$
D $\{(8,5),(8,8)\}$

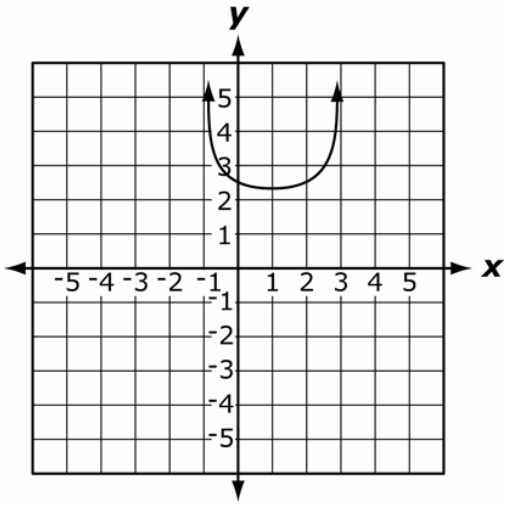
44. What is the solution set of this system of equations?

$$\left\{\begin{array}{l} x^2 - y = -3 \\ 2x^2 - y = -2 \end{array}\right\}$$

A $\{(-1,-4),(-1,4)\}$
B $\{(-1,-4),(1,4)\}$
C $\{(-1,4),(1,-4)\}$
D $\{(-1,4),(1,4)\}$

Objective 2.3a

45. How many real roots does the function given by the graph have?



A 0 real roots
B 1 real root
C 2 real roots
D 4 real roots

46. What number is added to both sides of the equation $x^2 - 8x + 3 = 0$ to solve it by completing the square?
A -16
B 16
C -64
D 64

47. What is the solution of $x^2+5x-3=0$?

A $\frac{-5\pm\sqrt{13}}{2}$

B $\frac{-5\pm\sqrt{37}}{2}$

C $\frac{5\pm\sqrt{13}}{2}$

D $\frac{5\pm\sqrt{37}}{2}$

Objective 2.3b

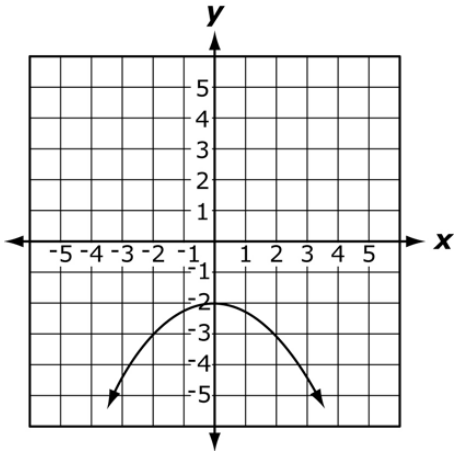
48. What is the y-intercept of $f(x)=3x^2-2x+1$?

A (0, -1)
B (0, 1)
C (-1, 0)
D (1, 0)

49. What are the coordinates at the minimum point of $f(x)=x^2-4x+3$?

A (-1, -2)
B (-1, 2)
C (2, -1)
D (2, 1)

50. Which function represents this graph?



A $f(x)=\frac{-1}{4}x^2-2$

B $f(x)=\frac{1}{4}x^2-2$

C $f(x)=-4x^2-2$

D $f(x)=4x^2-2$

51. Which statement best describes these two functions?

$$f(x) = x^2 - x + 6$$
$$g(x) = -3x^2 + 3x + 5$$

A They have no common points.
B They have the same x-intercepts.
C The maximum of *f(x)* is the same as the minimum of *g(x).*
D The maximum of *g(x)* is the same as the minimum of *f(x).*

52. Which statement best describes these two functions?

$$f(x) = x^2 - x + 4$$
$$g(x) = -3x^2 + 3x + 7$$

A The maximum of *f(x)* is less than the minimum of *g(x).*
B The minimum of *f(x)* is less than the maximum of *g(x).*
C The maximum of *f(x)* is greater than the minimum of *g(x).*
D The minimum of *f(x)* is greater than the maximum of *g(x).*

Objective 2.3c

53. The length of a rectangular swimming pool is 20 feet greater than the width. The surface area of the pool is 1,500 square feet. What are the length and width of the pool?

A length = 20 ft, width =20 ft
B length = 50 ft, width =30 ft
C length = 60 ft, width =40 ft
D length = 150 ft, width =10 ft

54. The profit, *P*, (in dollars) for Ace Car Rental is given by $P = 100x - 0.1x^2$, where *x* is the number of cars rented. How many cars have to be rented for the company to maximize profits?

A 500 cars
B 1,000 cars
C 12,500 cars
D 25,000 cars

55. The revenue, R, at a bowing alley is given by the equation $R = \frac{-1}{800}\left(x^2 - 2,400x\right)$, where x is the number of frames bowled. What is the maximum amount of revenue the bowling alley can generate?

A $800
B $1,200
C $1,800
D $2,400

Objective 2.4

56. Which best describes the graph of $\frac{x^2}{50}+\frac{y^2}{25}=1$?

A circle
B ellipse
C parabola
D hyperbola

57. What is the equation of a circle with center (-4, 2) and diameter 6?

A $(x-4)^2+(y+2)^2=6$

B $(x+4)^2+(y-2)^2=6$

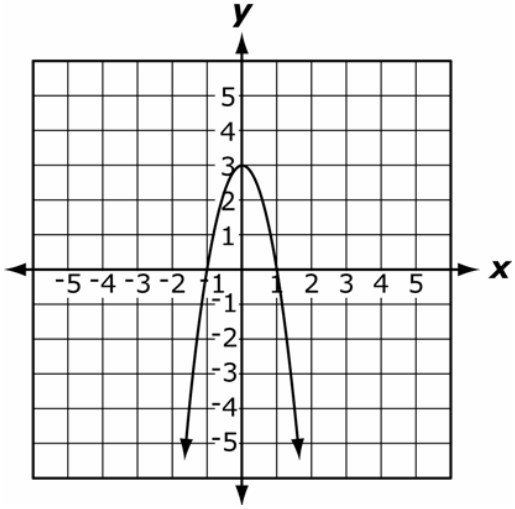
C $(x-4)^2+(y+2)^2=9$

D $(x+4)^2+(y-2)^2=9$

58. Which statement describes the equation $y=-x^2+6x-8$?

A It is a vertical parabola.
B It is a vertical hyperbola.
C It is a horizontal parabola.
D It is a horizontal hyperbola.

59. What is the equation of the given parabola?



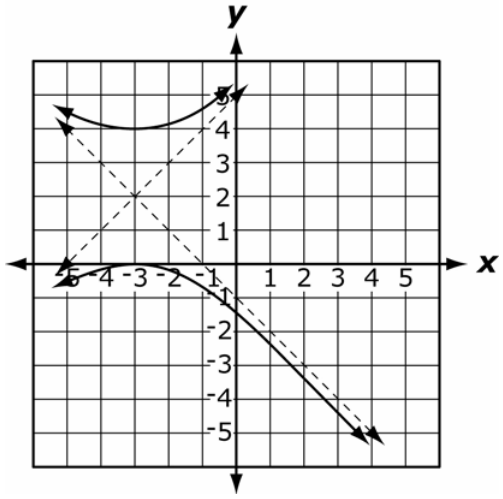
A $y=-x^2+3$

B $y=-3x^2+3$

C $y=-x^2-2x+3$

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

60. What is the equation of the graphed Hyperbola?



A $\frac{(x+3)^2}{4}-\frac{(y-2)^2}{4}=1$

B $\frac{(y+2)^2}{4}-\frac{(x-3)^2}{4}=1$

C $\frac{(y-2)^2}{2}-\frac{(x+3)^2}{2}=1$

D $\frac{(y-2)^2}{4}-\frac{(x+3)^2}{4}=1$

61. What is the vertex of the parabola $y=(x-1)^2-9$?

A (-1, -9)
B (1, -9)
C (-9, -1)
D (-9, 1)

62. What is the equation of the ellipse whose center is at the origin, major axis has length of 10 units along the x-axis, and minor axis has length of 6 units?

$$\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$$

A $\frac{x^2}{25}+\frac{y^2}{9}=1$

B $\frac{x^2}{9}+\frac{y^2}{25}=1$

C $\frac{x^2}{20}+\frac{y^2}{12}=1$

D $\frac{x^2}{100}+\frac{y^2}{36}=1$

Objective 2.5a

63. Which function is best represented by the data in this table?

X	0	1	2	3	4
Y	1	3	9	27	81

A $f(x) = x^3$

B $f(x) = 3^x$

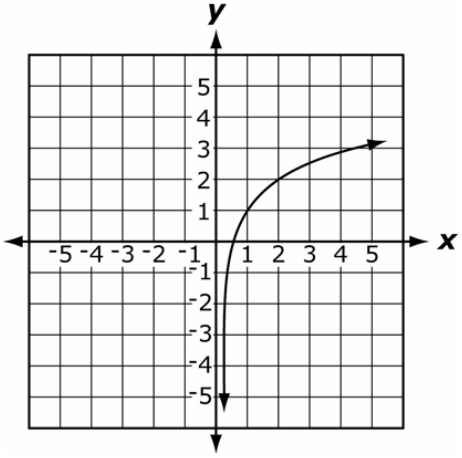
C $f(x) = 3x$

D $f(x) = 3x^2$

64. What are the horizontal asymptote and y-intercept for the graph of this function $f(x) = 2^{-x} + 7$?

A Asymptote: y=7, Intercept: (0, 7)
B Asymptote: y=-7, Intercept: (0, 7)
C Asymptote: y=7, Intercept: (0, 8)
D Asymptote: y=-7, Intercept: (0, 8)

65. Which function is best represented by this graph?



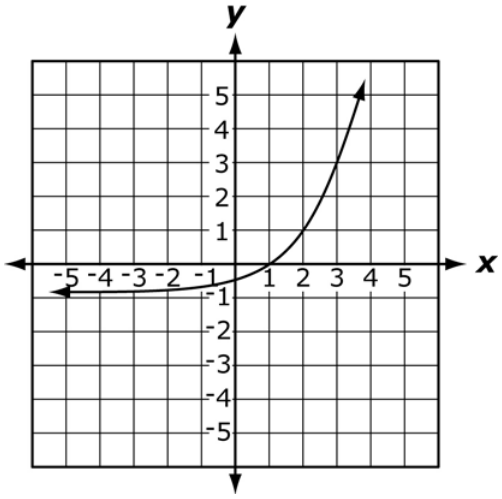
A $f(x) = \log_2 x + 1$

B $f(x) = \log_2 x - 1$

C $f(x) = \log_2 (x + 1)$

D $f(x) = \log_2 (x - 1)$

66. Which function is best represented by this graph?



A $f(x) = 2^{x-1} - 1$

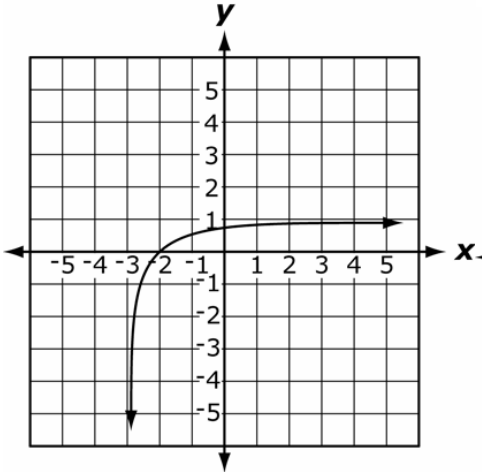
B $f(x) = 2^{x+1} - 1$

C $f(x) = 2^{x} - \frac{1}{2}$

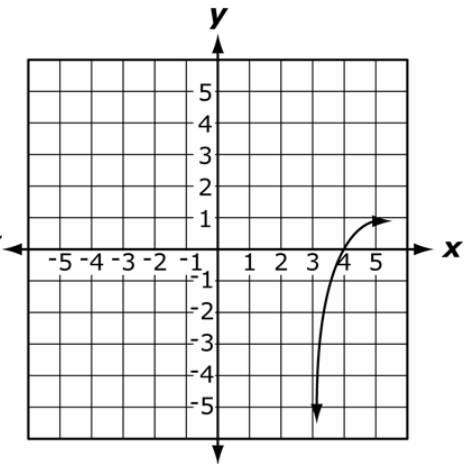
D $f(x) = 2^{x-1}$

67. Which graph represents the function $f(x) = \log(x+3)$?

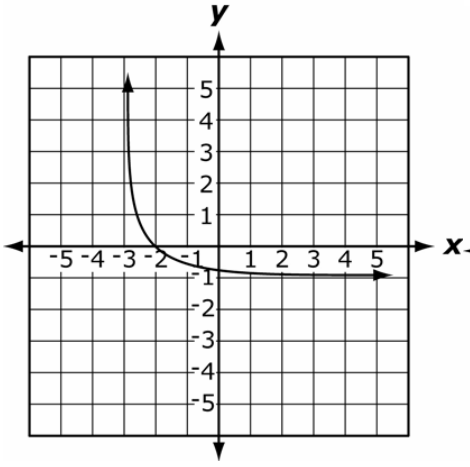
A



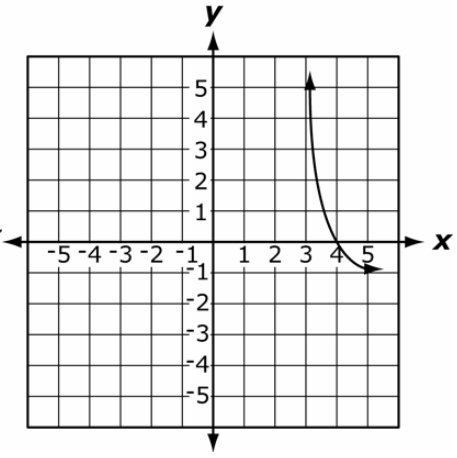
B



C



D



objective 2.5b

68. Which function is the inverse of $f(x) = \log x$?

A $f(x) = e^x$

B $f(x) = 2^x$

C $f(x) = 10^x$

D $f(x) = \dfrac{1}{\log x}$

69. If $3^{\log_3 7} = x$, what is the value of x?

A 7

B 3^7

C $\sqrt[3]{7}$

D $\sqrt[7]{3}$

70. Which equation represents the solution for x in the formula $6^x = 21$?

A $x = \frac{\log 6}{\log 21}$

B $x = \frac{\log 21}{\log 6}$

C $x = \log 21 - \log 6$

D $x = \log 21 + \log 6$

71. What is the value of $\log \sqrt{10}$?

A 0

B ½

C 1

D 10

72. If $\log_{2x} 80 = 2$, what is the value of x?

A 20

B $2\sqrt{5}$

C $5\sqrt{2}$

D $2\sqrt{10}$

73. If $4\left(Log_3 \frac{1}{27} \right) = x$, what is the value of x?

A $\frac{4}{3}$

B $\frac{-4}{3}$

C 12

D -12

Objective: 2.5c

74. If the loudness of fizz in a can of soda pop is represented by $F = 4\log\left(\frac{x}{10^{-5}} \right)$, where x is represented by the intensity of sound, how loud is the fizz if $x = 10^{-3}$?

A 4 decibels

B 8 decibels

C 16 decibels

D 32 decibels

75. The formula, $r = 2^{\frac{1}{x}} - 1$, gives the annual interest rate, *r*, required for your money to double in *x* years. If it takes 18 years for your money to double, what was the approximate annual interest rate?
A 2%
B 4%
C 8%
D 18%

76. The population, *P*, of prairie dogs increases according to the equation $P = 2,250e^{rt}$, where *t* is the number of years, and *r* is the rate of growth. Which equation solves for *r*?

A $r = \dfrac{\ln\left(\dfrac{P}{2,250}\right)}{t}$

B $r = \dfrac{t}{\ln\left(\dfrac{P}{2,250}\right)}$

C $r = \dfrac{\ln\left(\dfrac{2,250}{P}\right)}{t}$

D $r = \dfrac{t}{\ln\left(\dfrac{2,250}{P}\right)}$

77. The mass of a radioactive sample is given by $M(t) = M_0 10^{-kt}$, where *t* is the time in years, M_0 is the initial mass, and *k* is a constant. If 400 grams of this material decays to 40 grams in 10 years, what is the value of *k*?

A 1
B -1
C 0.1
D -0.1

Objective 2.6a
78. Which equation has -1 and 3 as solutions?
A $x^2 - 2x - 3 = 0$
B $x^2 - 2x + 3 = 0$
C $x^2 + 2x - 3 = 0$
D $x^2 + 2x + 3 = 0$

79. Which of these is a root of $f(x)=x^3-3x^2-4x+12$?

A -3
B 3
C 4
D 12

80. Given that $(2x-1)$ and $(x+3)$ are factors of the polynomial, $2x^3+13x^2+17x-12$, what is the third factor?

A x-4
B x+4
C 3-x
D 3+x

81. What is the solution set of $10x^2-x-3=0$?

A $\left\{\frac{-1}{2},\frac{3}{5}\right\}$
B $\left\{\frac{-3}{5},\frac{1}{2}\right\}$
C $\left\{\frac{-3}{2},\frac{1}{5}\right\}$
D $\left\{\frac{-1}{5},\frac{3}{2}\right\}$

82. A rectangular prism has a volume of 120 cubic inches. The length of the prism is 5 inches, the width is (x-2) inches, and the height is (x+3) inches. What are the width and height of the prism?

A width: 3 in., height: 8 in.
B width: 4 in., height: 6 in.
C width: 6 in., height: 4 in.
D width: 8 in., height: 3 in.

83. What is $(3x^5-15x^4+4x^3+11x^2-9x+2)$ divided by (x^2-5x+2)?

A $(3x^3-2x+1)$
B $(3x^3-2x^2+7)$
C $(3x^3-2x^2+7x+26)$
D $(3x^3-30x^2+160x-849)$

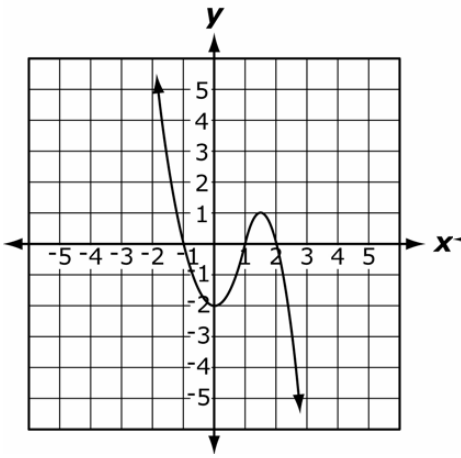
Objective 2.6b

84. In which direction does the graph of the parabola $x = -y^2$ open?

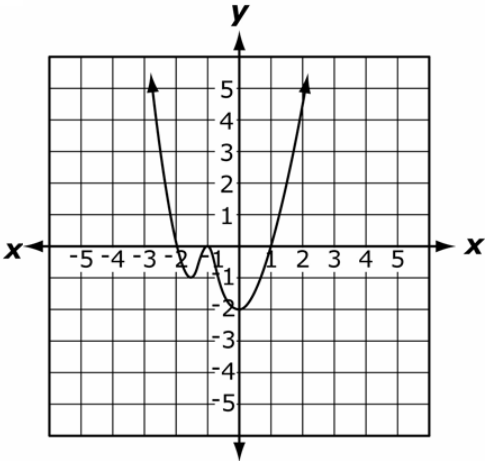
A up
B left
C right
D down

85. What is the graph of the polynomial $y = x^3 + 2x^2 - x - 2$?

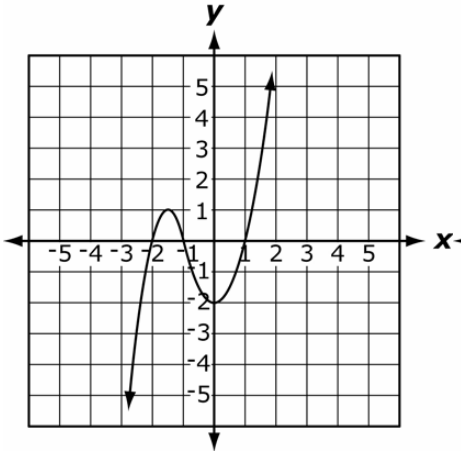
A



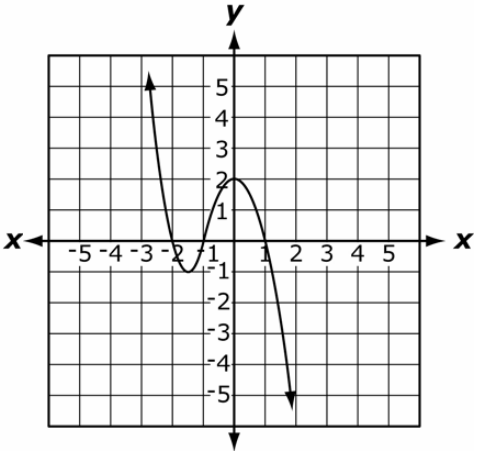
B



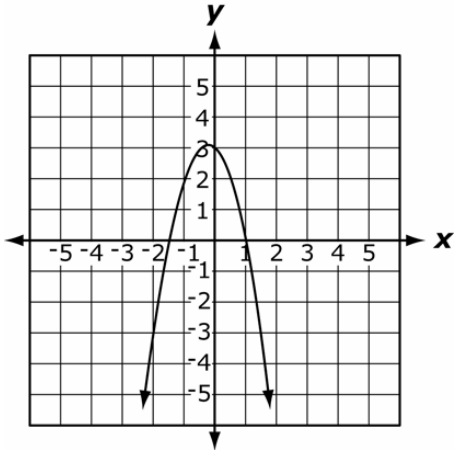
C



D



86. Which function is represented by this graph?



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

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

C $f(x)=2x^2-3x+1$

D $f(x)=-2x^2-3x+1$

87. Which statement describes the characteristics of the graph of $f(x)=-5x^4+3x^2+x-2$?

A The graph primarily increases in the third quadrant and increases in the first quadrant.

B. The graph primarily decreases in the second quadrant and increases in the first quadrant.

C. The graph primarily increases in the third quadrant and decreases in the fourth quadrant.

D. The graph primarily decreases in the second quadrant and decreases in the fourth quadrant.

Objective 2.6c

88. What is the y-intercept of the graph of $y=-4x^2+2x-3$?

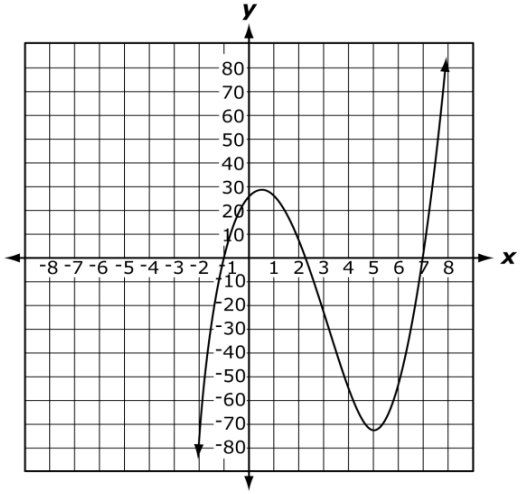
A -3

B 3

C -4

D 4

89. What are the x- and y-intercepts of this graphed function?



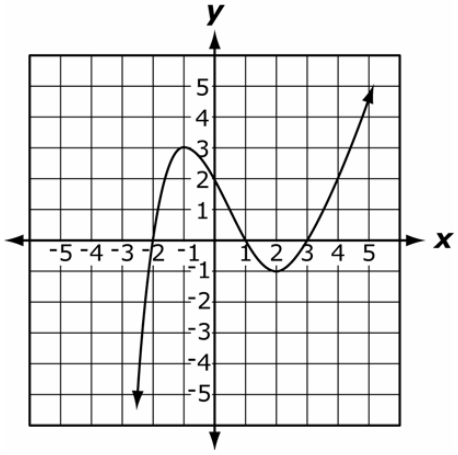
A x-intercepts: (-1, 0), (2.3, 0), (7, 0); y-intercepts: (0, 28)

B x-intercepts: (-0, 28); y-intercepts: (-1, 0), (2.3, 0), (7, 0)

C x-intercepts: (1, 0), (-2.3, 0), (-7, 0); y-intercepts: (0, 28)

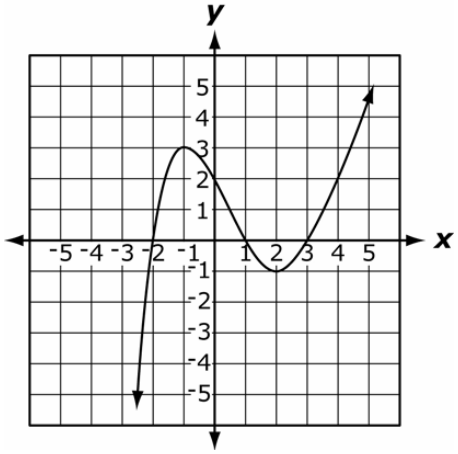
D x-intercepts: (0, 28); y-intercepts: (1, 0), (-2.3, 0), (-7, 0)

90. What is the set of x-intercepts of this graphed function?



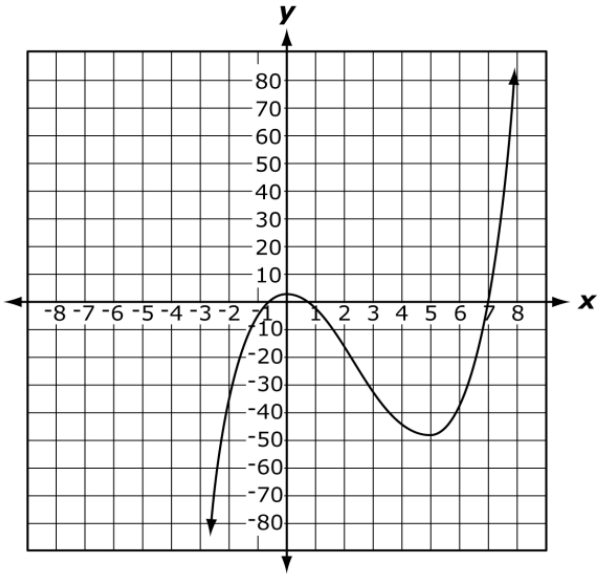
A {2}
B {-1, 2}
C {-1, 3}
D {-2, 1, 3}

91. What is the set of approximate y-values of the relative minimum and maximum of this graphed function?



A {2}
B {-1, 2}
C {-1, 3}
D {-2, 1, 3}

92. What are the properties of the point (0, 3) in this graphed function?



A It is a relative minimum and an x-intercept.
B It is a relative maximum and an x-intercept.
C It is a relative minimum and an y-intercept.
D It is a relative maximum and an y-intercept.

Objective 2.6

93. The intensity, *L*, of light varies inversely with the square of the distance, *r*, from the source of the light. Given that *k* is the constant of proportionality, which equation describes this relationship?

A $L = 2kr$

B $L = \frac{k}{r^2}$

C $L = k\sqrt{r}$

D $L = kr^2$

94. A company is selling an item and determines that the profit from selling the item for a price of *x* dollars is given by the function below.

$$P(x) = \frac{-1}{4}(x-16)^2 + 4$$

Which price will maximize the profit?

A $4

B $12

C $16

D $20

95. The path of a kicked soccer ball can be modeled by the function $f(x) = 26 + 2x - x^2$, where *x* is the horizontal distance (in meters) and $f(x)$ is the height (in meters). If the height is 2 meters, what is the horizontal distance?

A 4 meters

B 6 meters

C 12 meters

D 24 meters

96. A landscape designer has to construct a rectangular flower bed with a perimeter of 100 feet and the maximum possible area. What is the area of the flower bed?

A 25 sq. ft

B 100 sq. ft

C 625 sq. ft

D 2,500 sq. ft

Objective 2.7a

97. What is the value of *x* in this rational equation $\frac{2}{x-1} = \frac{3}{x+1}$?

A 2

B 3

C 4

D 5

98. What is the solution set of this rational equation $\frac{5}{2x-2}-\frac{9}{2x}=\frac{-1}{4}$?

A {6}
B {-3}
C {3, 6}
D {-3, -6}

99. What is the value of x in this rational equation $2x=\frac{4x+5}{3}$?

A -4
B -1
C $\frac{1}{2}$
D $\frac{5}{2}$

100. What is the solution set of this rational equation $\frac{-3}{x^2}+\frac{1}{2}=\frac{1}{2x}$?

A {-3,-2}
B {-3, 2}
C {-2, 3}
D {2, 3}

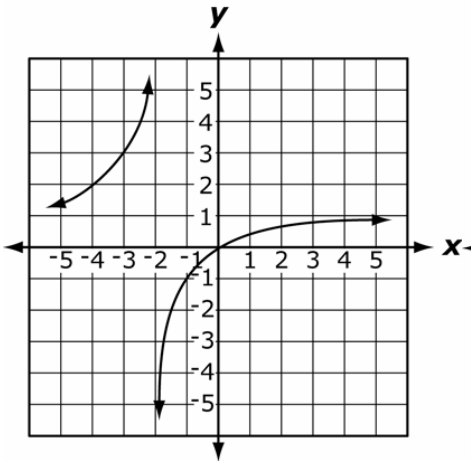
Objective 2.7b

101. What is the vertical asymptote of the graph of $f(x)=\frac{1}{x+4}$?

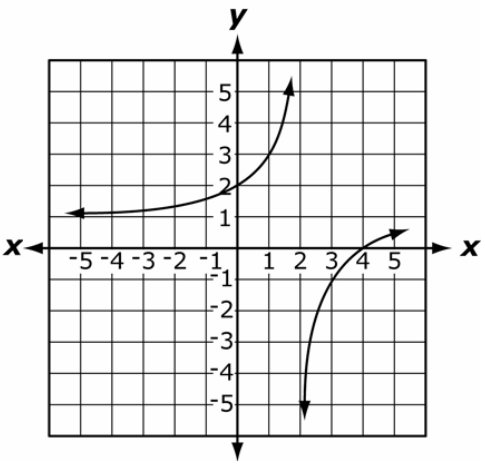
A $x=-4$
B $x=-1$
C $x=1$
D $x=4$

102. What is the graph of the function $f(x)=\frac{x}{x-2}$?

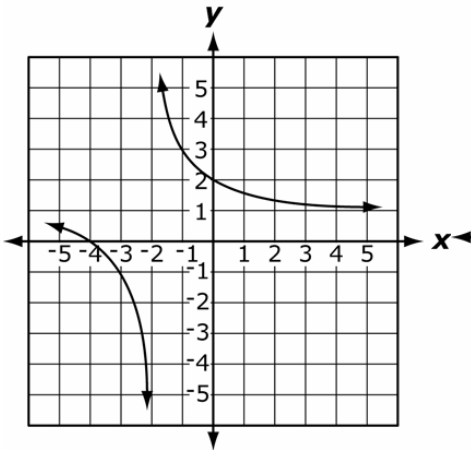
A



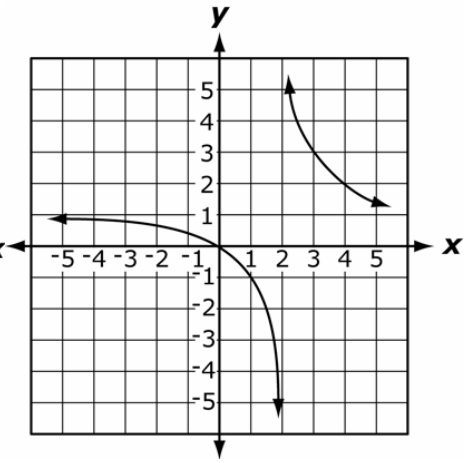
B



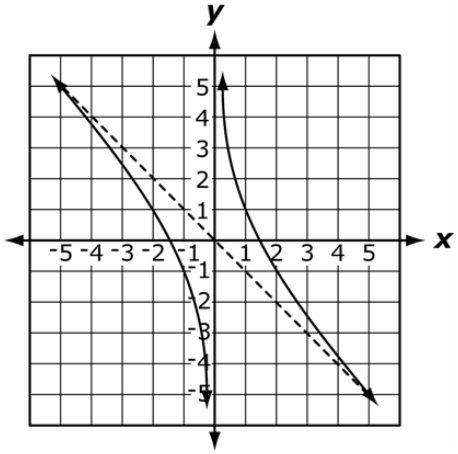
C



D



103. Which function is represented by this graph?



A $f(x)=\frac{-2+x^2}{x}$

B $f(x)=\frac{-2-x^2}{x}$

C $f(x)=\frac{2-x^2}{x}$

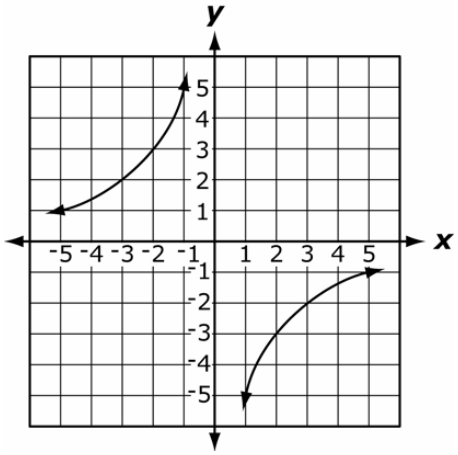
D $f(x)=\frac{2+x^2}{x}$

104. How many vertical asymptotes does the graph of $y=\frac{x-2}{x^2+4}$ have?

A 0 vertical asymptotes
B 1 vertical asymptote
C 2 vertical asymptotes
D 4 vertical asymptotes

0bjective 2.7c

105. What is the horizontal asymptote of this graph?



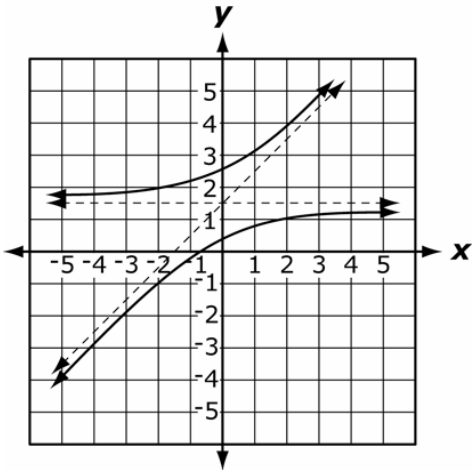
A $x = 0$

B $y = 0$

C $x = 2.5$

D $y = 2.5$

106. Which statement correctly describes the asymptotes of the graph of this rational function?



A The vertical asymptote is $x = \frac{3}{2}$, and there is a negative slant asymptote.

B The vertical asymptote is $y = \frac{3}{2}$, and there is a negative slant asymptote.

C The horizontal asymptote is $x = \frac{3}{2}$, and there is a positive slant asymptote.

D The horizontal asymptote is $y = \frac{3}{2}$, and there is a positive slant asymptote.

107. How many x-intercepts does the graph of $y = \frac{x+1}{x^2-1}$ have?

A 0
B 1
C 2
D 4

108. What are the vertical and horizontal asymptotes of $f(x) = \frac{x^2-9}{16-x^2}$?

A $x = \pm 4, \text{ and } y = -1$
B $y = \pm 4, \text{ and } x = -1$
C $x = \pm 4, \text{ and } y = 1$
D $y = \pm 4, \text{ and } x = 1$

Objective 2.7d

109. If the surface area of a closed cylinder is 25 square inches, which equation represents the height of the cylinder in terms of *r*? $\left(SA = 2\pi rh + 2\pi r^2\right)$

A $h = \frac{25 + 2\pi r^2}{2\pi r}$
B $h = \frac{25 - 2\pi r^2}{2\pi r}$
C $h = 25 + r$
D $h = 25 - r$

110. A homeowner stocked his pond with fish. The number of fish, *F*, increases according to the equation, $F = \frac{19(3+2t)}{1+0.05t}$, where *t* is the time in years. What is the approximate number of fish after 10 years?

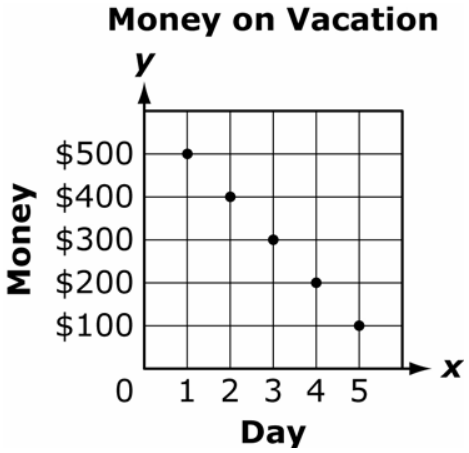
A 49 fish
B 69 fish
C 138 fish
D 291 fish

111. The cost, *C*, in thousands of dollars, to remove *x* percent of the trash left by a tornado is modeled by the equation $C = \frac{450x}{225-x}$. Approximately what percent of trash will be removed if 100 thousand dollars are spent?

A 41%
B 50%
C 59%
D 64%

Objective 3.1a

112. Nancy made a scatter plot of how much money she had left at the end of each day of her vacation.



Which table best represents the data in her scatter plot?

A

Day	1	2	3	4	5
Money	$100	$100	$100	$100	$100

B

Day	1	2	3	4	5
Money	$100	$200	$300	$400	$500

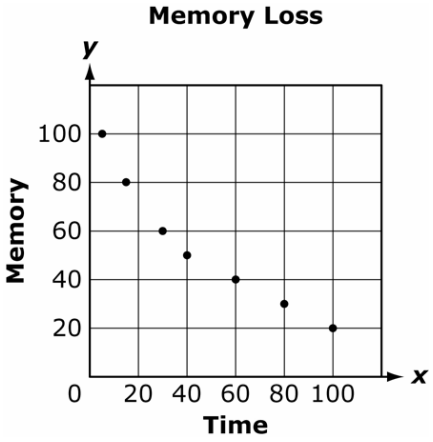
C

Day	1	2	3	4	5
Money	$500	$200	$300	$400	$100

D

Day	1	2	3	4	5
Money	$500	$400	$300	$200	$100

113. Which set of data best represents the data on the scatter plot?



A

Time	10	30	60	80	100
Memory	95	60	40	30	20

B

Time	10	30	60	80	100
Memory	20	30	40	60	95

C

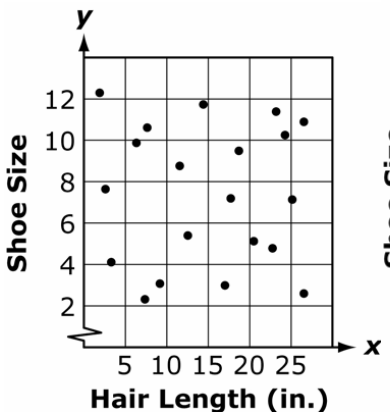
Time	10	30	60	80	100
Memory	100	80	60	40	20

D

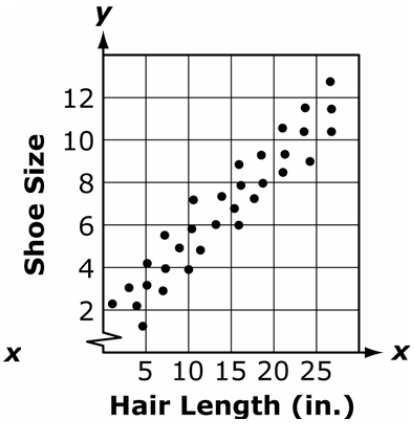
Time	10	30	60	80	100
Memory	85	60	50	40	20

114. Which scatter plot best represents the lack of correlation between shoe size and hair length?

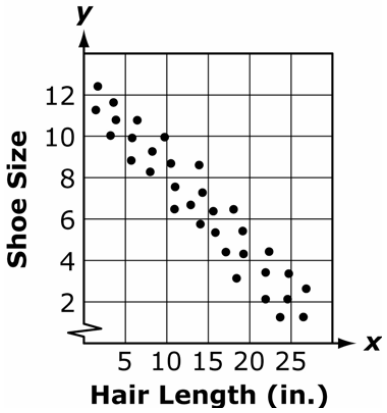
A



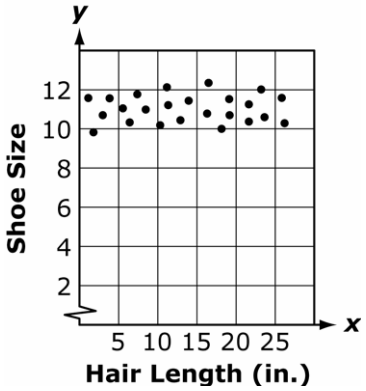
B



C

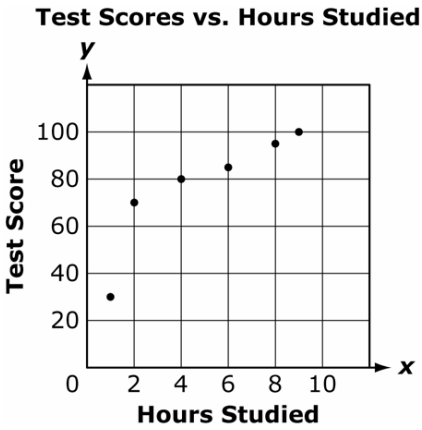


D



objective 3.1b

115. The test scores and hours studied of 6 students were put into a scatter plot.



If another student studies 2 hours, what is the most likely test score based on this data?

A 20
B 60
C 70
D 80

116. Which of these observations would be consistent with an exponential model of population growth?

A The population started out large, decreased in size, then became large again.

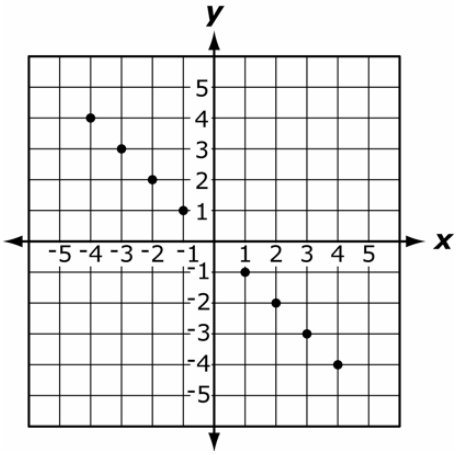
B The population is observed to increase at a faster rate as time passes.

C The population is observed to increase steadily over time.

D The population grew very quickly but then declined.

Objective 3.1c

117. Which equation most closely models the data in the scatter plot?



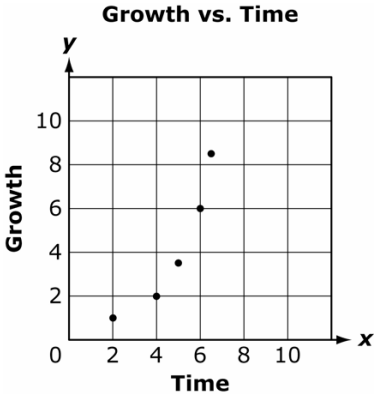
A $y = x$

B $y = -x$

C $y = 2x$

D $y = -2x$

118. Which type of function best models the data in this scatter plot?



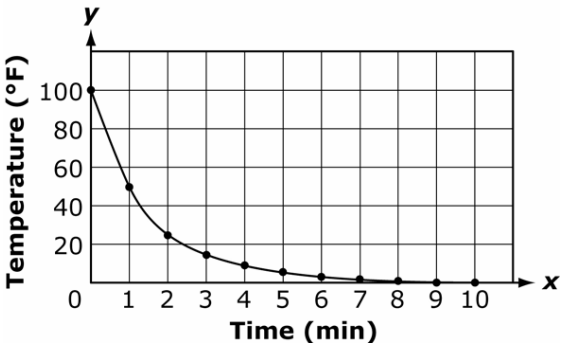
A exponential

B logarithmic

C quadratic

D linear

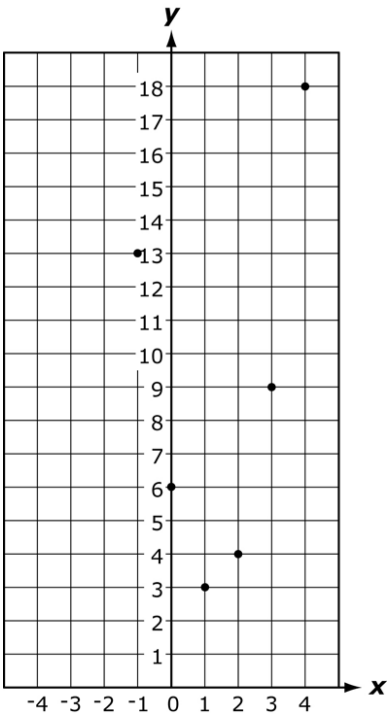
119. Students in a science classroom perform an experiment to find the rate at which a hot liquid cools in a freezer. They plot the temperature over time and obtain the following graph.



Which type of function best models the data in this scatter plot?

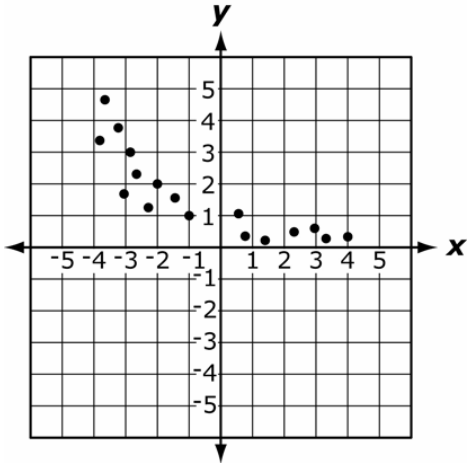
A exponential
B logarithmic
C quadratic
D linear

120. Which equation most closely models the data in the scatter plot?



A $y = x^2 - 4x + 6$
B $y = -x^2 - 2x + 6$
C $y = -2x^2 - x + 6$
D $y = 2x^2 - 5x + 6$

121. Which equation best models the data in this scatter plot?



A $y = 5 \cdot 3^x$

B $y = 0.5 \cdot 3^x$

C $y = 5 \cdot 0.5^x$

D $y = 0.5 \cdot 5^x$

Objective 3.3

122. What is the 12th term in the sequence {1, 3, 5, 7,…}?

Arithmetic Sequences & Series

$n^{th}\ term:\ a_n = a_1 + (n-1)d$

$\text{Sum: } s_n = \frac{n}{2}(a_1 + a_n)$

Geometric Sequences & Series

$n^{th}\ term:\ a_n = a_1 r^{(n-1)}$

$\text{Sum: } s_n = \frac{a_1(1-r^n)}{(1-r)}$

A 22

B 23

C 24

D 25

123. What is the sum of the first 6 terms of the series 2+10+50+…?

Arithmetic Sequences & Series

$n^{th}\ term:\ a_n = a_1 + (n-1)d$

$\text{Sum: } s_n = \frac{n}{2}(a_1 + a_n)$

Geometric Sequences & Series

$n^{th}\ term:\ a_n = a_1 r^{(n-1)}$

$\text{Sum: } s_n = \frac{a_1(1-r^n)}{(1-r)}$

A 3,906
B 7,812
C 15,624
D 31,248

124. A child puts $1.00 into a piggy bank. One week later, he puts $1.25 in the bank. Two weeks later, he puts $1.50 in the bank, and so on. How much money does he put in the bank on the 25th week?

Arithmetic Sequences & Series

$n^{th}\ term:\ a_n = a_1 + (n-1)d$

$\text{Sum: } s_n = \frac{n}{2}(a_1 + a_n)$

Geometric Sequences & Series

$n^{th}\ term:\ a_n = a_1 r^{(n-1)}$

$\text{Sum: } s_n = \frac{a_1(1-r^n)}{(1-r)}$

A $ 6.25
B $7.00
C $93.00
D $100.00

125. What is the value of x in the geometric sequence $\left\{x, -\frac{1}{2}, \frac{1}{8}, \frac{-1}{32}, \ldots\right\}$?

Arithmetic Sequences & Series

$n^{th}\ term:\ a_n = a_1 + (n-1)d$

Sum: $s_n = \frac{n}{2}(a_1 + a_n)$

Geometric Sequences & Series

$n^{th}\ term:\ a_n = a_1 r^{(n-1)}$

Sum: $s_n = \frac{a_1(1-r^n)}{(1-r)}$

A -4
B -2
C 2
D $\frac{9}{2}$

126. Which formula could be used to find the sum of an arithmetic series if the last term is unknown?

Arithmetic Sequences & Series

$n^{th}\ term:\ a_n = a_1 + (n-1)d$

Sum: $s_n = \frac{n}{2}(a_1 + a_n)$

Geometric Sequences & Series

$n^{th}\ term:\ a_n = a_1 r^{(n-1)}$

Sum: $s_n = \frac{a_1(1-r^n)}{(1-r)}$

A $s_n = \frac{n}{2}(2a_1 + (n-1)d)$
B $s_n = \frac{n}{2}(2a_1 + (n+1)d)$
C $s_n = n(2a_1 + (n-1)d)$
D $s_n = n(2a_1 + (n+1)d)$

127. In an arithmetic sequence beginning with 36 and ending with 405, how many integers are divisible by 9?

Arithmetic Sequences & Series

$n^{th}\ term:\ a_n = a_1 + (n-1)d$

$\text{Sum: } s_n = \frac{n}{2}(a_1 + a_n)$

Geometric Sequences & Series

$n^{th}\ term:\ a_n = a_1 r^{(n-1)}$

$\text{Sum: } s_n = \frac{a_1(1-r^n)}{(1-r)}$

A 41 integers
B 42 integers
C 44 integers
D 45 integers

128. How many terms are there in a geometric series if the first term is 3, the common ratio is 4, and the sum of the series is 1,023?

Arithmetic Sequences & Series

$n^{th}\ term:\ a_n = a_1 + (n-1)d$

$\text{Sum: } s_n = \frac{n}{2}(a_1 + a_n)$

Geometric Sequences & Series

$n^{th}\ term:\ a_n = a_1 r^{(n-1)}$

$\text{Sum: } s_n = \frac{a_1(1-r^n)}{(1-r)}$

A 4 terms
B 5 terms
C 6 terms
D 23 terms

Answers

1. D
2. B
3. A
4. A
5. B
6. B
7. B
8. A
9. C
10. A
11. A
12. B
13. D
14. C
15. C
16. D
17. D
18. D
19. C
20. D
21. A
22. B
23. B
24. D
25. A
26. D
27. D
28. D
29. C
30. B
31. D
32. B
33. C
34. B
35. A
36. A
37. C
38. A
39. A
40. B
41. B
42. C
43. B
44. D
45. A
46. B
47. B
48. B
49. C
50. A
51. D
52. B
53. B
54. A
55. C
56. B
57. D
58. A
59. B
60. D
61. B
62. A
63. B
64. C
65. A
66. A
67. A
68. C
69. A
70. B
71. B
72. B
73. D
74. B
75. B
76. A
77. C
78. A
79. B
80. B
81. A
82. A
83. A
84. B
85. C
86. B
87. C
88. A
89. A
90. D
91. C
92. D
93. B
94. C
95. B
96. C
97. D
98. C
99. D
100. C
101. A
102. D
103. C
104. A
105. B
106. D
107. A
108. A
109. B
110. D
111. A
112. D
113. A
114. A
115. C
116. B
117. B
118. A
119. A
120. D
121. C
122. B
123. B
124. B
125. C
126. A
127. A
128. B

Name: _____ Date: _____

COMPLETING THE SQUARE
COMMON CORE ALGEBRA I

The turning point of a parabola and its general shape are relatively easy to determine if the quadratic function is written in its **shifted or vertex form**. Review this in the first exercise.

***Exercise* #1:** Given the function $y=(x-3)^2+2$ do the following.

(a) Give the coordinates of the turning point.

(b) Determine the range by drawing a rough sketch.

The question then is how we take a quadratic of the form $y=ax^2+bx+c$ and put it into its shifted form. This procedure is known as **Completing the Square**. But, it needs some additional review.

***Exercise* #2:** Write each of the following as an equivalent trinomial.

(a) $(x+5)^2$ (b) $(x-1)^2$ (c) $(x+4)^2$

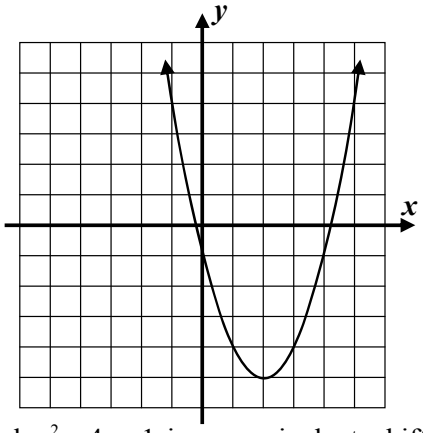
***Exercise* #3:** Given each trinomial in Exercise #2 of the form x^2+bx+c, what is true about the relationship between the value of *b* and the value of *c*? Illustrate.

***Exercise* #4:** Each of the following trinomials is a perfect square. Write it in factored (or perfect square) form.

(a) $x^2+20x+100$ (b) x^2-6x+9 (c) x^2+2x+1

We are finally ready to learn the method of **Completing the Square**. This method has many uses, but the one we will work with today is to manipulate equations of quadratics from their **standard form** to their **vertex form**.

***Exercise* #5:** The quadratic $y = x^2 - 4x - 1$ is shown graphed below.



(a) Consider only the binomial $x^2 - 4x$. What would you need to add on to it to create a perfect square trinomial? (See Exercise #3).

(b) In order to add zero to the binomial $x^2 - 4x$, what should we subtract to offset adding 4 to make it a perfect square?

(c) Use the Method of Competing the Square now to rewrite the trinomial $x^2 - 4x - 1$ in an equivalent, shifted form. According to this form, what are the coordinates of the vertex? Verify by examining the graph.

This procedure is what is known as an **algorithm**. In other words, we follow a recipe. Here it is:

COMPLETING THE SQUARE

For the quadratic $y = x^2 + bx + c$ (note that $a = 1$).

1. Find half of the value of b, i.e. $\frac{b}{2}$ 2. Square it, i.e. $\left(\frac{b}{2}\right)^2$ 3. Add and subtract it

There is nothing like practice on these.

***Exercise* #6:** Write each quadratic in vertex form by Completing the Square. Then, identify the quadratic's turning point. The last two problems will involve fractions. Stick with it!

(a) $y = x^2 + 6x - 2$ (b) $y = x^2 - 2x + 11$ (c) $y = x^2 - 10x + 27$

(d) $y = x^2 + 8x$ (e) $y = x^2 + 5x + 4$ (f) $y = x^2 - 9x - 2$

Name: _____ Date: _____

COMPLETING THE SQUARE
COMMON CORE ALGEBRA I HOMEWORK

FLUENCY

1. Find each of the following products in standard form.

   (a) $(x+4)^2$ (b) $(x-1)^2$ (c) $(x+8)^2$

   (d) $(x-7)^2$ (e) $(x+2)^2$ (f) $(x-10)^2$

2. Each of the following trinomials is a perfect square. Write it in factored form, i.e. $(x+a)^2$ or $(x-a)^2$.

   (a) x^2+6x+9 (b) $x^2-22x+121$ (c) $x^2+10x+25$

   (d) $x^2+30x+225$ (e) x^2-2x+1 (f) $x^2-18x+81$

3. Place each of the following quadratic functions, written in standard form, into vertex form by completing the square. Then, identify the coordinates of its turning point.

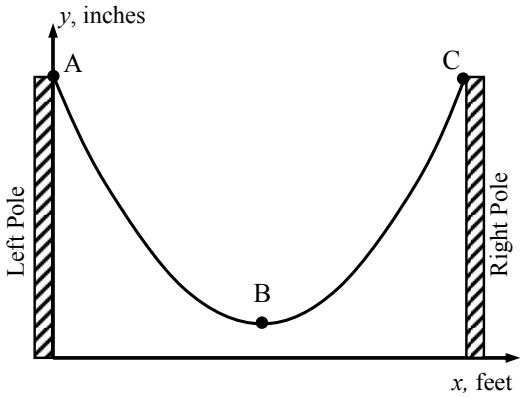
   (a) $y=x^2-12x+40$ (b) $y=x^2+4x+14$ (c) $y=x^2-24x+146$

APPLICATIONS

4. A cable is attached at the same height from two poles and hangs between them such that its height above the ground, y, in inches, can be modeled using the equation:

$$y = x^2 - 16x + 67$$

where x represents the horizontal distance from the left pole, in feet.



(a) What height is point A above the ground? Show your work and use proper units.

(b) Write the equation in vertex form.

(c) What is the difference in the heights of points A and B? Show your analysis and include units.

(d) What is the horizontal distance that separates points A and C? Explain your reasoning.

REASONING

5. Use the vertex form of each of the following quadratic functions to determine which has the lowest y-value.

$$y = x^2 - 8x + 6 \qquad\qquad y = x^2 + 6x + 1$$

6. Two quadratic functions are shown below, $f(x)$ and $g(x)$. Determine which has the lower minimum value. Explain how you arrived at your answer.

$$f(x) = x^2 + 10x$$

x	3	4	5	6	7	8	9
$g(x)$	–9	–14	–17	–18	–17	–14	–9

Equations for Horizontal and Vertical Lines

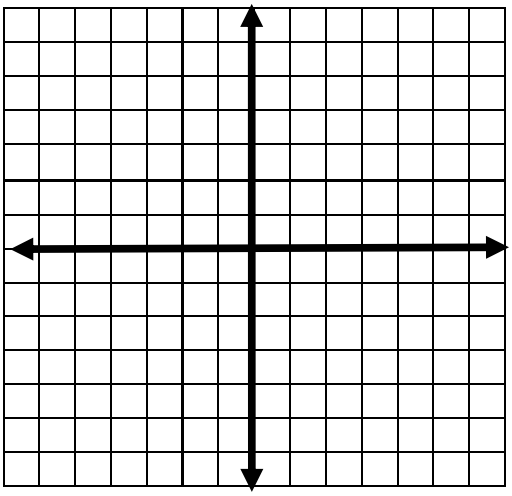
~

Student Practice Worksheet

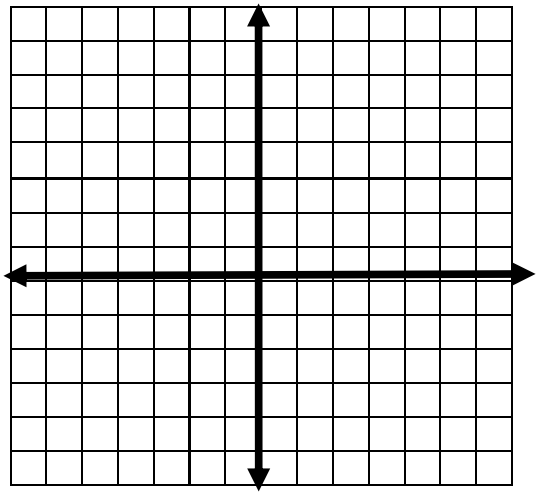
Name_____Date_____Grade_____

If not given, state whether the line has a slope of Zero or Undefined. Also, state whether it is a Horizontal or a Vertical Line. Graph the line.

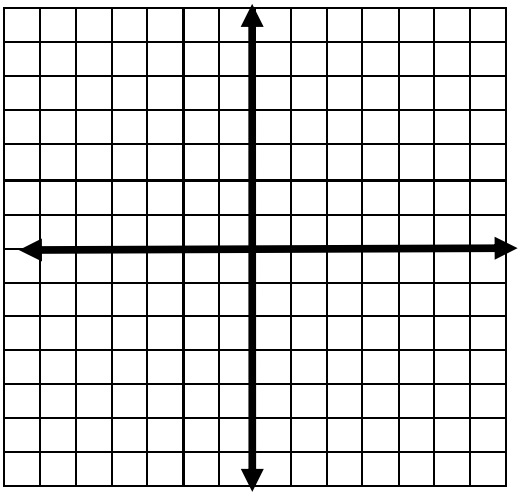
1. (7, 8), (1, 8)



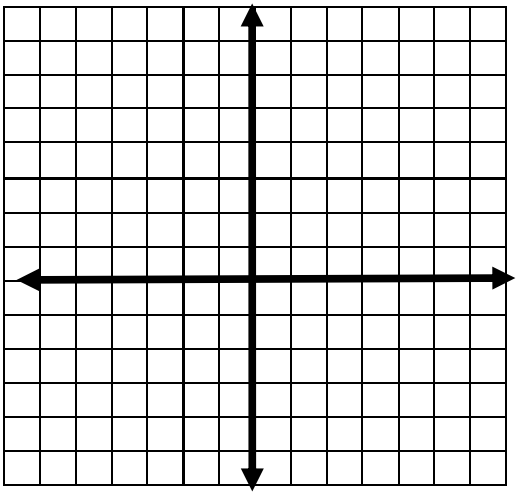
2. (4, -1.5), (4, 4.5)



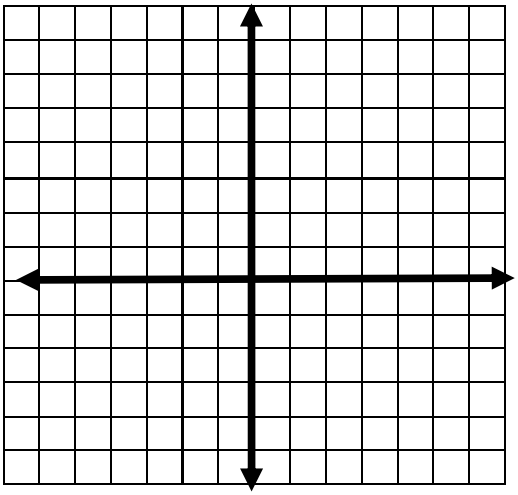
3. (6, 2), m = 0



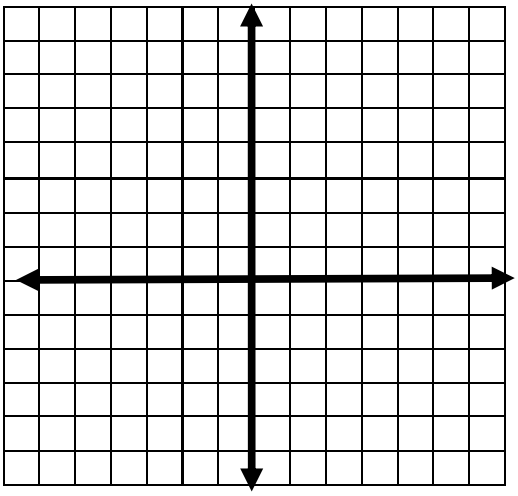
4. (-2, -3), undefined



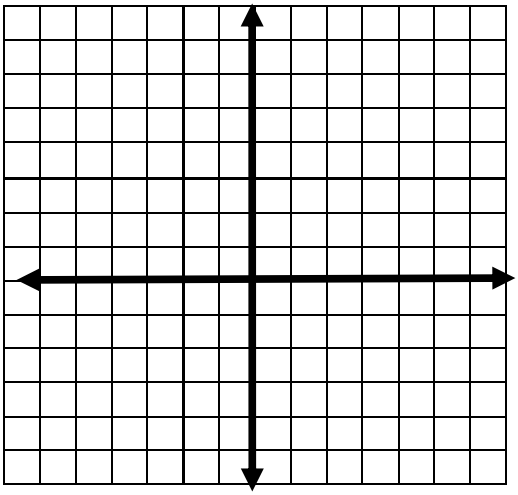
5. (6, 4), (3, 4)



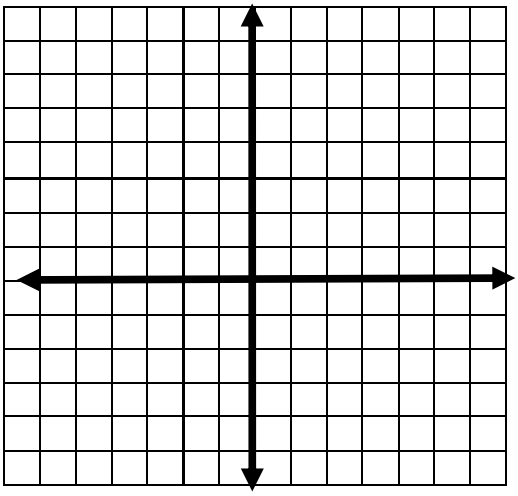
6. (-2, -5), slope = 0



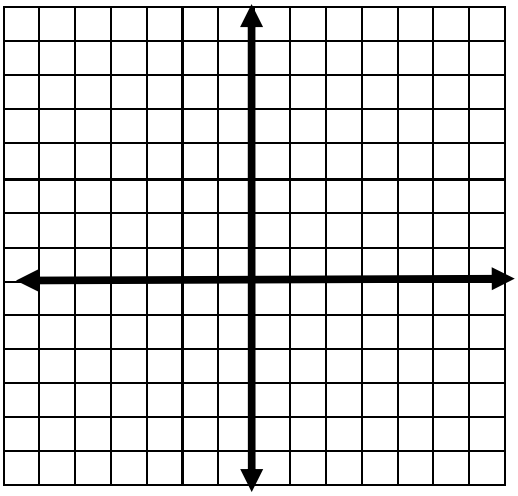
7. (-5, 6), (-5, -9)



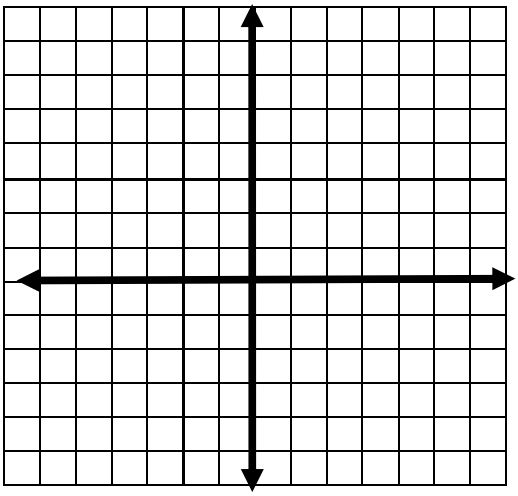
8. (-4, 5), (4, 5)



9. (2, 5), m = undefined



10. (2, 5), m = 0



Equations for Horizontal and Vertical Lines

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Student Practice Worksheet

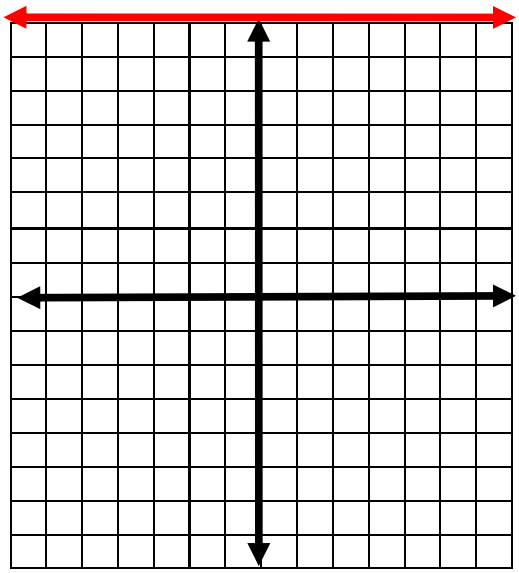
Answer Key

Name_____ Date_____ Grade_____

If not given, state whether the line has a slope of Zero or Undefined. Also, state whether it is a Horizontal or a Vertical Line. Graph the line.

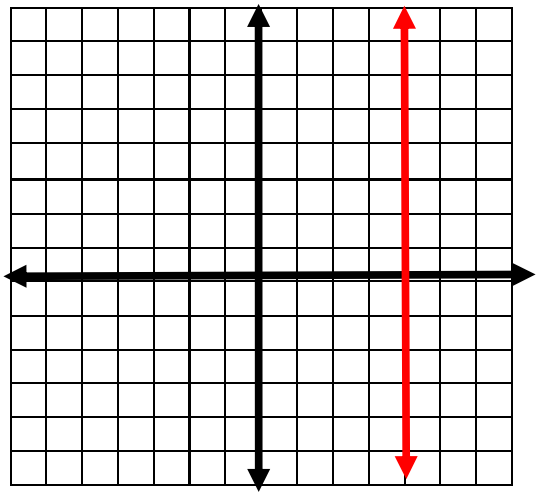
1. (7, 8), (1, 8)

Slope = 0, Horizontal Line



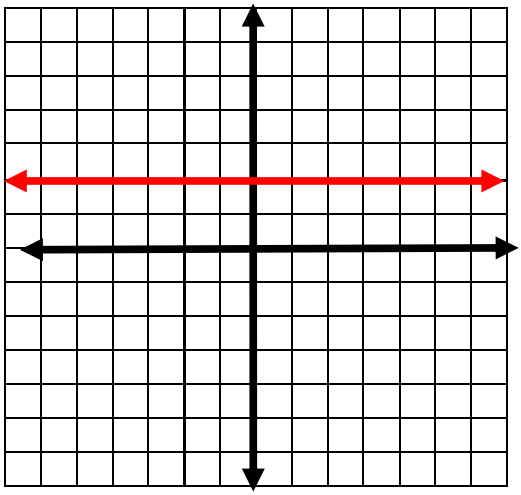
2. (4, -1.5), (4, 4.5)

Slope = undefined, Vertical Line



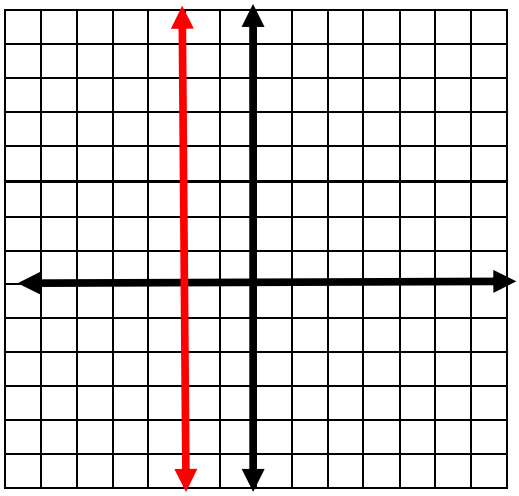
3. (6, 2), m = 0

Horizontal Line



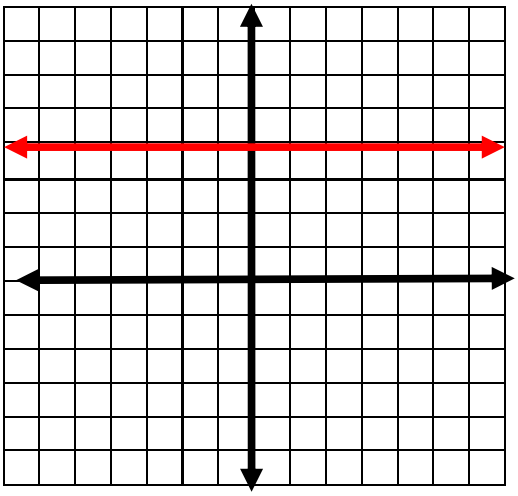
4. (-2, -3), undefined

Vertical Line



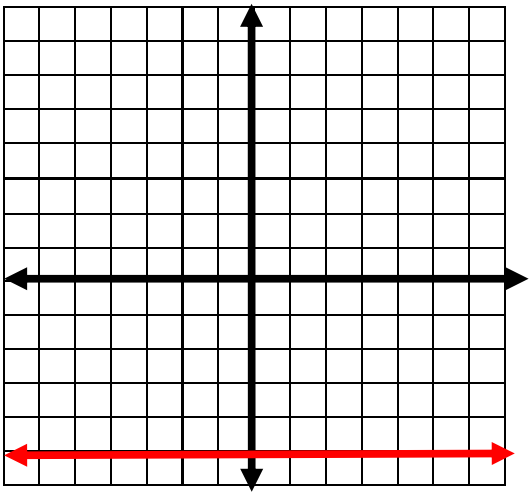
5. (6, 4), (3, 4)

Slope = Zero, Horizontal Line



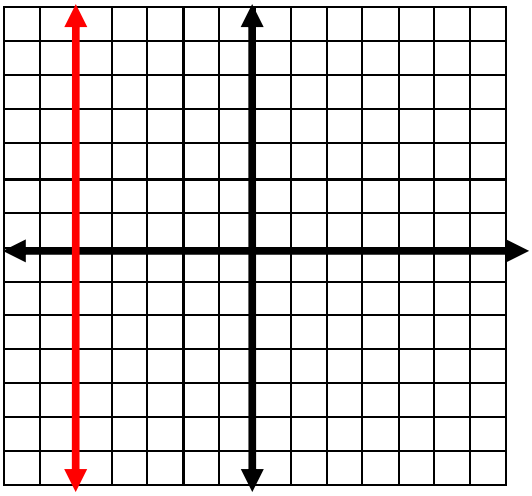
6. (-2, -5), slope = 0

Horizontal Line



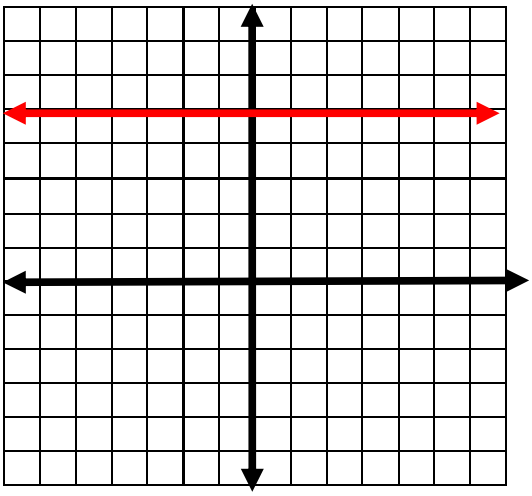
7. (-5, 6), (-5, -9)

Slope = Undefined, Horizontal Line



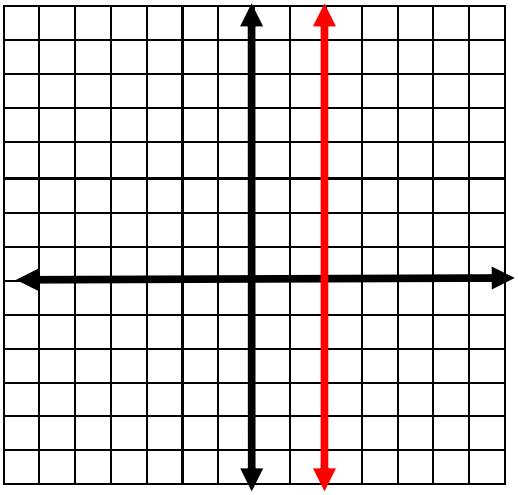
8. (-4, 5), (4, 5)

Slope = Zero, Horizontal Line



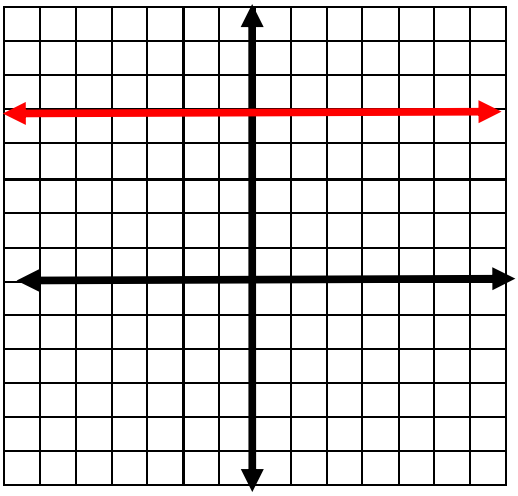
9. (2, 5), m = undefined

Vertical Line



10. (2, 5), m = 0

Horizontal Line



Equations for Horizontal and Vertical Lines

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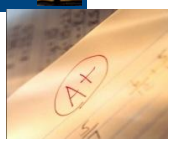
Student Practice Worksheet

Rubric

Criteria					
	4	3	2	1	0
Mechanics	No math errors	No major math errors or serious flaws in reasoning.	May be some serious math error or flaws in reasoning.	Major math errors or serious flaws in reasoning.	Blank answers

Quiz Grading Rubric:

Problem	Total points of Correct Answer		Problem	Total points of Correct Answer	
1.			11.		
2.			12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		



Equations for Horizontal and Vertical Lines

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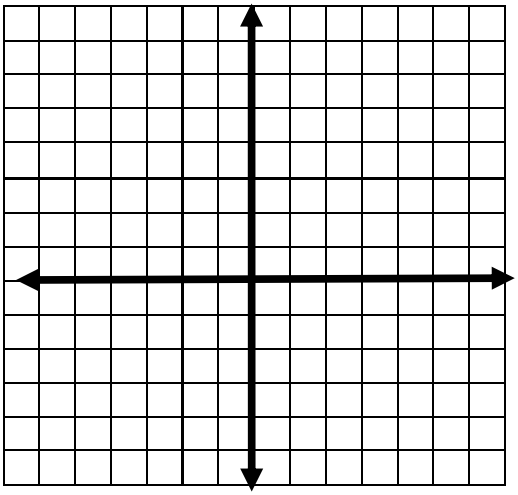
Quiz

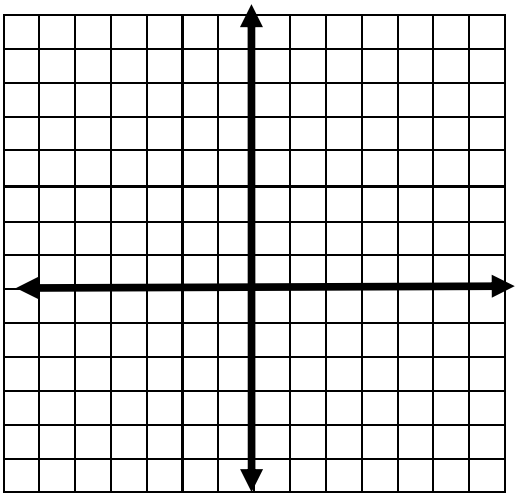
Name_____Date_____Grade_____

If not given, state whether the line has a slope of Zero or Undefined. Also, state whether it is a Horizontal or a Vertical Line. Graph the line.

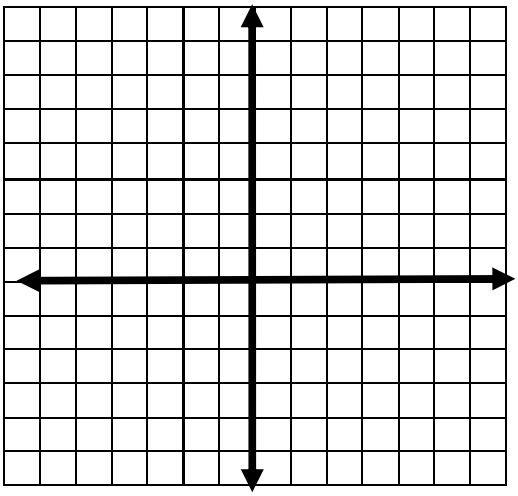
1. (3, -1), (3, -4)



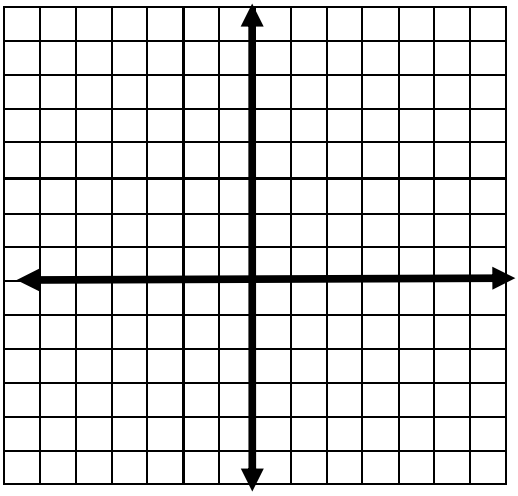
2. (5, 8), (-2, 8)



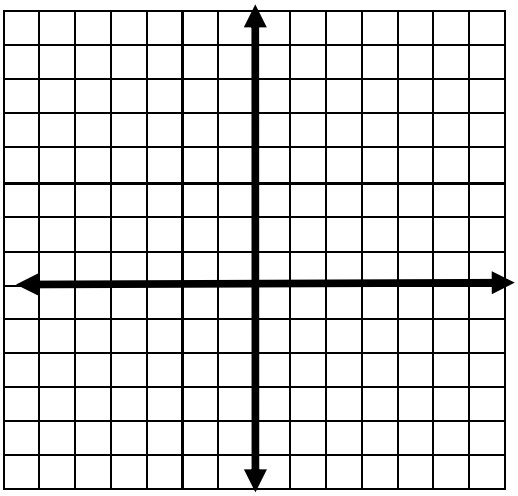
3. (5, -3), Slope = Zero

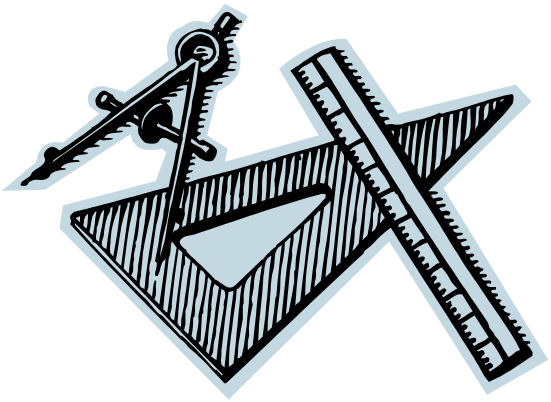


4. (-6, -6), Undefined



5. (2, -6), (2, 5)





Equations for Horizontal and Vertical Lines

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Quiz

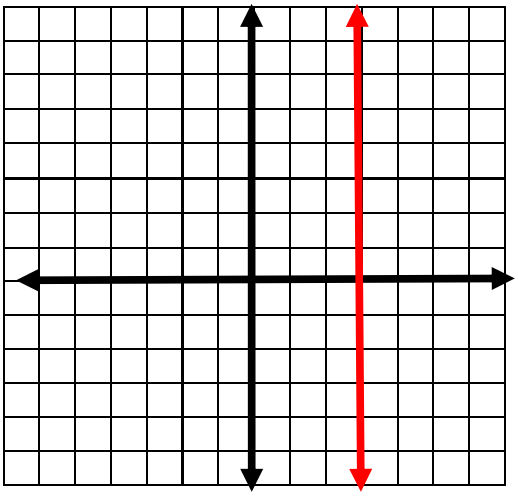
Answer Key

Name_____Date_____Grade_____

If not given, state whether the line has a slope of Zero or Undefined. Also, state whether it is a Horizontal or a Vertical Line. Graph the line.

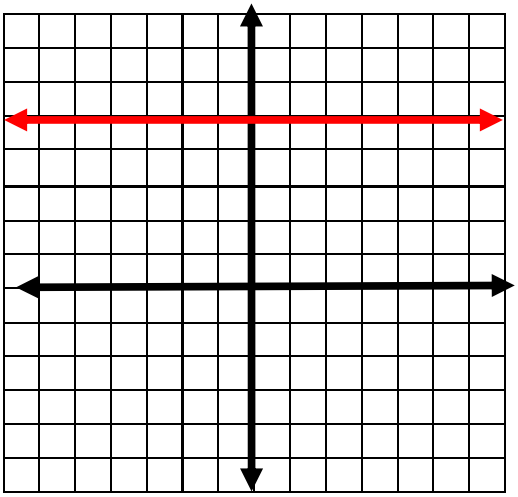
1. (3, -1), (3, -4)

Slope = Undefined, Vertical Line



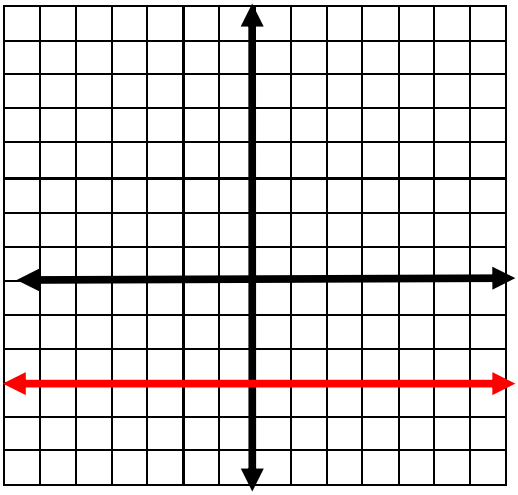
2. (5, 5), (-2, 5)

Slope = Zero, Horizontal Line



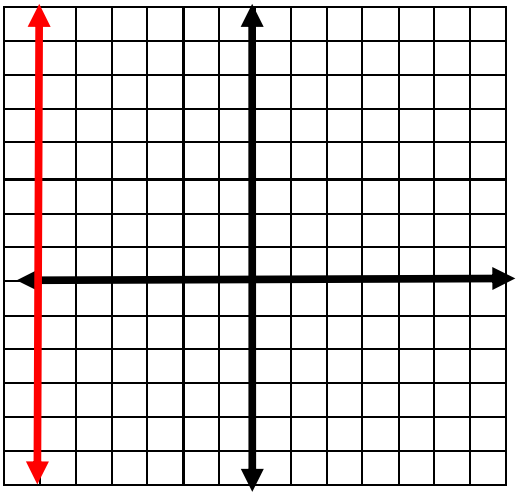
3. (5, -3), Slope = Zero

Horizontal Line



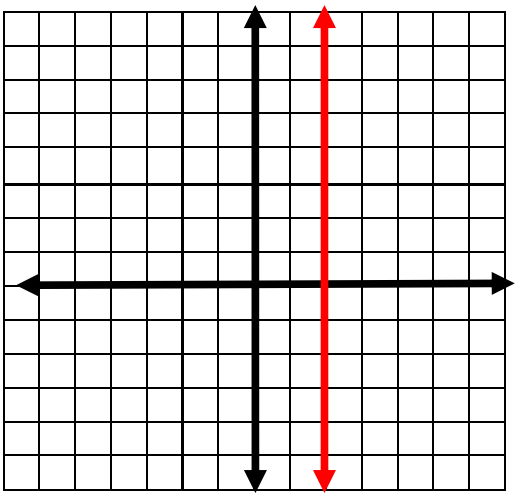
4. (-6, -6), Undefined

Vertical Line



5. (2, -6), (2, 5)

Slope = Undefined, Vertical Line



Factoring Practice

I. Greatest Common Factor (GCF)

Find the GCF of the numbers.

18, 30
$18 = 2 \cdot 3 \cdot 3$
$30 = 2 \cdot 3 \cdot 5$
$2 \cdot 3 = 6$
6 = GCF

1. 12, 18
2. 10, 35
3. 8, 30
4. 16, 24
5. 28, 49
6. 27, 63
7. 30, 45
8. 48, 72

II. Greatest Common Monomial Factor

Factor, write prime if prime.

$$12a^3b + 15ab^3 = 3ab(4a^2 + 5b^2)$$

1. $6x + 3$
2. $24x^2 - 8x$
3. $6x - 12$
4. $2x^2 + 8x$
5. $4x + 10$
6. $10x^2 + 35x$
7. $10x^2y - 15xy^2$
8. $12x^2 - 9x + 15$
9. $3n^3 - 12n^2 - 30n$
10. $9m^2 - 4n + 12$
11. $2x^3 - 3x^2 + 5x$
12. $13m + 26m^2 - 39m^3$
13. $17x^2 + 34x + 51$
14. $18m^2n^4 - 12m^2n^3 + 24m^2n^2$

III. Factoring the Difference of Two Squares

$$a^2 - 36 = (a + 6)(a - 6)$$
$$3x^2 - 48 = 3(x^2 - 16) = 3(x + 4)(x - 4)$$

Factor, write prime if prime.

1. $x^2 - 1$
2. $x^2 - 9$
3. $x^2 + 4$
4. $x^2 - 25$
5. $9y^2 - 16$
6. $4x^2 - 25$
7. $9x^2 - 1$
8. $a^2 - x^2$
9. $25 - m^2$
10. $x^2 - 16y^2$
11. $25m^2 - n^2$
12. $-x^2 + 16$
13. $36m^2 - 121$
14. $2x^2 - 8$
15. $25 + 4x^2$
16. $4a^2 - 81b^2$
17. $12x^2 - 75$
18. $a^2b - b^3$
19. $-98 + 2x^2$
20. $5x^2 - 45y^2$
21. $9x^4 - 4$
22. $16x^4 - y^2$

IV. Factoring Perfect Square Trinomials

$$\mathbf{x^2 - 14x + 49 = (x - 7)^2}$$

Factor, write prime if prime.

1. $x^2 + 8x + 16$
2. $x^2 - 16x + 64$
3. $y^2 + 12y + 36$
4. $a^2 - 10a + 25$
5. $16y^2 + 8y + 1$
11. $25a^2 + 60a + 36$
12. $16 + 40x + 25x^2$
13. $16x^2 + 24x + 9$
14. $49x^2 - 14x + 1$
15. $9y^2 - 30y + 25$
6. $9x^2 - 6x + 1$
7. $25x^2 + 10x + 1$
8. $n^2 - 14n + 49$
9. $81x^2 - 90x + 25$
10. $4y^2 - 20y + 25$
16. $n^2 + 2n + 4$
17. $b^2 + 2b + 1$
18. $36x^2 + 84x + 49$
19. $81 - 18x + x^2$
20. $4 - 12y + 9y^2$

V. Special Factoring – Challenge

Factor, write prime if prime.

1. $a^2 - 36$
2. $9x^2 - 49$
3. $169m^2 - 4u^2$
4. $x^2y^2 - 9z^4$
5. $\frac{1}{4}x^2 - 25y^2$
6. $\frac{1}{9}x^2 - 16$
7. $64 - a^4b^4$
8. $y^6 - 100$
9. $\frac{4}{9}x^2y^2 - \frac{25}{36}z^2$
10. $y^8 - 81$
11. $1 - 8u + 16u^2$
12. $a^2b^2 + 6ab + 9$
13. $x^2 + 2xy + y^2$
14. $4x^2 + 12xy + 9y^2$
15. $100h^2 + 20h + 1$
16. $9a^2 - 24a + 16$
17. $4a^3 + 8a^2 + 4a$
18. $5c + 20c^2 + 20c^3$
19. $(x + 4)^2 - (y + 1)^2$
20. $(x - 1)^2 - 10(x - 1) + 25$

VI. Factoring Trinomials: $x^2 + bx + c$

$$\mathbf{x^2 + 7x + 10 = (x)^2 + (2 + 5)x + (2)(5) = (x + 2)(x + 5)}$$

Factor, write prime if prime.

1. $x^2 + 6x + 8$
2. $c^2 + 5c + 6$
3. $y^2 - 9y + 14$
4. $x^2 - 10x + 16$
5. $a^2 + 12a + 27$
6. $x^2 - 14x + 24$
7. $x^2 - 15x + 36$
8. $y^2 + 21y + 54$
9. $m^2 + 13m - 36$
10. $x^2 - 8x + 15$
11. $y^2 - 4y - 32$
12. $x^2 - x - 6$
13. $y^2 + 3y - 18$
14. $b^2 + 7b - 18$
15. $a^2 + a - 56$
16. $c^2 - 4c - 12$
17. $x^2 - 9x - 36$
18. $y^2 + 4y - 21$
19. $x^2 - 22x - 75$
20. $x^2 - 3x - 40$
21. $45 + 14y + y^2$
22. $x^2 - 13x + 36$

VII. …More Factoring Trinomials: $x^2 + bx + c$

$$\mathbf{k^2 - k - 20 = (k)^2 + (4 + -5)k + (4)(-5) = (k + 4)(k - 5)}$$

Factor, write prime if prime.

1. $x^2 + 7x + 12$
2. $m^2 + 10m + 21$
3. $y^2 - 7y - 8$
4. $x^2 - 6x + 5$
5. $x^2 + 4x - 32$
6. $x^2 - 2x - 15$
7. $x^2 - 6x + 8$
8. $y^2 + 9y + 18$
9. $3 - 4t + t^2$
10. $v^2 + 12v + 20$
11. $51 - 20k + k^2$
12. $a^2 - 14ab + 24b^2$
13. $y^2 + 6y - 72$
14. $x^2 - 11xy - 60y^2$
15. $15r^2 + 2rs - s^2$
16. $3x^2 + 21xy - 54y^2$ (Hint: Check for GCF)
17. $x^2 - 5xy - 6y^2$
18. $x^2 + 8xy + 12y^2$
19. $y^2 - 7xy + 10x^2$
20. $a^2 - 11ab - 60b^2$

VIII. Factoring Trinomials: $ax^2 + bx + c$

$$\mathbf{2x^2 - 5x - 3 = (2x + 1)(x - 3)}$$

Factor, write prime if prime.

1. $2x^2 - 5x - 3$
2. $3x^2 + 10x - 8$
3. $2y^2 + 15y + 7$
4. $7a^2 - 11a + 4$
5. $5n^2 + 17n + 6$
6. $4y^2 + 8y + 3$
7. $3x^2 + 4x - 7$
8. $2x^2 + 13x + 15$
9. $9y^2 + 6y - 8$
10. $6x^2 - 7x - 20$
11. $2n^2 - 3n - 14$
12. $5n^2 + 2n + 7$
13. $10x^2 + 13x - 30$
14. $12y^2 + 7y + 1$
15. $2n^2 + 9n - 5$
16. $2x^2 + 7x + 6$
17. $5a^2 - 42a - 27$
18. $15x^2 - 28x - 32$
19. $8a^2 - 10a + 3$
20. $2y^2 - 3y - 20$

IX. …More Factoring Trinomials: $ax^2 + bx + c$

Factor, write prime if prime.

1. $3x^2 + 4x + x$
2. $5z^2 + 7z + 2$
3. $2n^2 - 11n + 5$
4. $3z^2 + z - 2$
5. $5h^2 - 2h - 7$
6. $8s^2 - 10st + 3t^2$
7. $6x^2 + 19x + 15$
8. $28a^2 + 5ab - 12b^2$
9. $2a^2 + 7ab - 15b^2$
10. $12x^2 + 17x + 6$
11. $4a^2 - 4ab - 5b^2$
12. $56y^2 + 15y - 56$
13. $12x^2 - 29xy + 14y^2$
14. $64x^2 + 32xy - 21y^2$
15. $16x^2 + 56xy + 49y^2$
16. $18x^2 - 57x + 35$

X. Factoring: Putting It All Together

$$\mathbf{5x^2 + 20x - 60 = 5\left(x^2 + 4x - 12\right) = 5(x + 6)(x - 2)}$$

Factor Completely, write prime if prime.

1. $2x^2 - 8$
2. $2x^2 + 8x + 6$
3. $3n^2 + 9n - 30$
4. $6x^2 - 26x - 20$
5. $2x^2 + 12x - 80$
6. $5t^2 + 15t + 10$
7. $8n^2 - 18$
8. $14x^2 + 7x - 21$
9. $4x^2 + 16x + 16$
10. $18x + 12x^2 + 2x^3$
11. $2x - 2xy^2$
12. $3t^3 - 27t$
13. $24a^2 - 30a + 9$
14. $10x^2 + 15x - 10$
15. $3x^2 - 42x + 147$
16. $4x^4 - 4x^2$

XI. …More Factoring: Putting It All Together

1. $16x^2 - 40x - 24$
2. $27x^2 - 36x + 12$
3. $5x^2 - 60x - 140$
4. $6m^3 + 54m^2 - 6m$
5. $5k^4 + 8k^3 - 4k^2$
6. $x^2y^4 - x^6$
7. $y^4 - 6y^2 - 16$
8. $x^4 - 3x^2 - 4$
9. $h^2 - (a^2 - 6a + 9)$
10. $81x^4 - 16y^4$
11. $4mn^2 - 4m^2n^2 + m^3n^2$
12. $(2a + 3)^2 - (a - 1)^2$
13. $16d^8 - 8d^4 + 1$
14. $x^2(x^2 - 4) + 4x(x^2 - 4) + 4(x^2 - 4)$

XII. Extra: Factoring by Grouping

$$\begin{aligned}\mathbf{6ax - 2b - 3a + 4bx} &= \mathbf{6ax - 3a + 4bx - 2b} \\ &= \mathbf{3a(2x - 1) + 2b(2x - 1)} \\ &= \mathbf{(2x - 1)(3a + 2b)}\end{aligned}$$

1. $x^2 + 2x + xy + 2y$
2. $3a^2 - 2b - 6a + ab$
3. $t^3 - t^2 + t - 1$ Hint: $t - 1 = 1(t - 1)$
4. $10 + 2t - 5s - st$
5. $\frac{2}{3}bc - \frac{14}{3}b + c - 7$
6. $4u^2 + v + 2uv + 2u$
7. $ad + 3a - d^2 - 3d$
8. $n^2 + 2n + 3mn + 6m$
9. $2ax^2 + bx^2 - 2ay^2 - by^2$
10. $yz^2 - y^3 + z^3 - y^2z$
11. $y^3 - y^2 - 4y + 4$
12. $x^2a + x^2b - 16a - 16b$
13. $x^3 + x^2 - x - 1$
14. $a^3 - a^2 - 8a + 8$

Factoring Practice Key

I. Greatest Common Factor

1. 6
2. 5
3. 2
4. 8
5. 7
6. 9
7. 15
8. 24

II. Greatest Common Monomial Factor

1. $3(2x+1)$
2. $8x(3x-1)$
3. $6(x-2)$
4. $2x(x+4)$
5. $2(2x+5)$
6. $5x(2x+7)$
7. $5xy(2x-3y)$
8. $3(4x^2-3x+5)$
9. $3n(n^2-4n-10)$
10. prime
11. $x(2x^2-3x+5)$
12. $13m(1+2m-3m^2)$
13. $17(x^2+2x+3)$
14. $6m^2n^2(3n^2-2n+4)$

III. Factoring the Difference of Two Squares

1. $(x+1)(x-1)$
2. $(x+3)(x-3)$
3. prime
4. $(x+5)(x-5)$
5. $(3y+4)(3y-4)$
6. $(2x+5)(2x-5)$
7. $(3x+1)(3x-1)$
8. $(a+x)(a-x)$
9. $(5+m)(5-m)$
10. $(x+4y)(x-4y)$
11. $(5m+n)(5m-n)$
12. $(4+x)(4-x)$
13. $(6m+11)(6m-11)$
14. $2(x+2)(x-2)$
15. prime
16. $(2a+9b)(2a-9b)$
17. $3(2x+5)(2x-5)$
18. $b(a+b)(a-b)$
19. $-2(7+x)(7-x)$ *or* $2(x+7)(x-7)$
20. $5(x+3y)(x-3y)$
21. $(3x^2+2)(3x^2-2)$
22. $(4x^2+y)(4x^2-y)$

IV. Factoring Perfect Square Trinomials

1. $(x+4)^2$
2. $(x-8)^2$
3. $(y+6)^2$
4. $(a-5)^2$
5. $(4y+1)^2$
6. $(3x-1)^2$
7. $(5x+1)^2$
8. $(n-7)^2$
9. $(9x-5)^2$
10. $(2y-5)^2$
11. $(5a+6)^2$
12. $(4+5x)^2$
13. $(4x+3)^2$
14. $(7x-1)^2$
15. $(3y-5)^2$
16. prime
17. $(b+1)^2$
18. $(6x+7)^2$
19. $(x-9)^2$
20. $(3y-2)^2$

V. Special Factoring – Challenge

1. $(a+6)(a-6)$
2. $(3x+7)(3x-7)$
3. $(13m+2u)(13m-2u)$
4. $(xy+3z^2)(xy-3z^2)$
5. $\left(\frac{1}{2}x+5y\right)\left(\frac{1}{2}x-5y\right)$
6. $\left(\frac{1}{3}x+4\right)\left(\frac{1}{3}x-4\right)$
7. $(8+a^2b^2)(8-a^2b^2)$
8. $(y^3+10)(y^3-10)$
9. $\left(\frac{2}{3}xy+\frac{5}{6}z\right)\left(\frac{2}{3}xy-\frac{5}{6}z\right)$
10. $(y^4+9)(y^2+3)(y^2-3)$
11. $(1-4u)^2$ *or* $(4u-1)^2$
12. $(ab+3)^2$
13. $(x+y)^2$
14. $(2x+3y)^2$
15. $(10h+1)^2$
16. $(3a-4)^2$
17. $4a(a+1)^2$
18. $5c(2c+1)^2$
19. $[(x+4)+(y+1)][(x+4)-(y+1)]$ *or* $(x+y+5)(x-y+3)$
20. $[(x-1)-5]^2$ *or* $(x-6)^2$

VI. Factoring Trinomials: $x^2 + bx + c$

1. $(x+4)(x+2)$
2. $(c+2)(c+3)$
3. $(y-7)(y-2)$
4. $(x-8)(x-2)$
5. $(a+9)(a+3)$
6. $(x-12)(x-2)$
7. $(x-12)(x-3)$
8. $(y+18)(y+3)$
9. prime
10. $(x-5)(x-3)$
11. $(y-8)(y+4)$
12. $(x-3)(x+2)$
13. $(y+6)(y-3)$
14. $(b+9)(b-2)$
15. $(a+8)(a-7)$
16. $(c-6)(c+2)$
17. $(x-12)(x+3)$
18. $(y+7)(y-3)$
19. $(x-25)(x+3)$
20. $(x-8)(x+5)$

21. $(y+9)(y+5)$
22. $(x-9)(x-4)$

VII. …More Factoring Trinomials: $x^2 + bx + c$

1. $(x+4)(x+3)$
2. $(m+3)(m+7)$
3. $(y-8)(y+1)$
4. $(x-1)(x-5)$
5. $(x+8)(x-4)$
6. $(x-5)(x+3)$
7. $(x-2)(x-4)$
8. $(y+3)(y+6)$
9. $(t-1)(t-3)$
10. $(v+2)(v+10)$
11. $(3-k)(17-k)$ *or* $(k-3)(k-17)$
12. $(a-2b)(a-12b)$
13. $(y-6)(y+12)$
14. $(x-15y)(x+4y)$
15. $(5r-s)(3r+s)$
16. $3(x-2y)(x+9y)$
17. $(x-6y)(x+y)$
18. $(x+6y)(x+2y)$
19. $(y-5x)(y-2x)$
20. $(a-15b)(a+4b)$

VIII. Factoring Trinomials: $ax^2 + bx + c$

1. $(2x+1)(x-3)$
2. $(3x-2)(x+4)$
3. $(2y+1)(y+7)$
4. $(7a-4)(a-1)$
5. $(5n+2)(n+3)$
6. $(2y+3)(2y+1)$
7. $(3x+7)(x-1)$
8. $(2x+3)(x+5)$
9. $(3y-2)(3y+4)$
10. $(3x+4)(2x-5)$
11. $(2n-7)(n+2)$
12. prime
13. $(2x+5)(5x-6)$
14. $(3y+1)(4y+1)$
15. $(2n-1)(n+5)$
16. $(2x+3)(x+2)$
17. $(5a+3)(a-9)$
18. $(3x-8)(5x+4)$
19. $(2a-1)(4a-3)$
20. $(2y+5)(y-4)$

IX. …More Factoring Trinomials: $ax^2 + bx + c$

1. $(3x+1)(x+1)$
2. $(5z+2)(z+1)$
3. $(2n-1)(n-5)$
4. $(3z-2)(z+1)$
5. $(5h-7)(h+1)$
6. $(4s-3t)(2s-t)$
7. $(2x+3)(3x+5)$
8. $(7a-4b)(4a+3b)$
9. $(2a-3b)(a+5b)$
10. $(3x+2)(4x+3)$
11. prime
12. $(7y+8)(8y-7)$
13. $(4x-7y)(3x-2y)$
14. $(8x+7y)(8x-3y)$
15. $(4x+7y)^2$
16. $(6x-5)(3x-7)$

X. Factoring: Putting It All Together

1. $2(x+2)(x-2)$
2. $2(x+3)(x+1)$
3. $3(n+5)(n-2)$
4. $2(3x+2)(x-5)$
5. $2(x+10)(x-4)$
6. $5(t+1)(t+2)$
7. $2(2n+3)(2n-3)$
8. $7(2x+3)(x-1)$
9. $4(x+2)^2$
10. $2x(3+x)^2$ *or* $2x(x+3)^2$
11. $2x(1+y)(1-y)$
12. $3t(t+3)(t-3)$
13. $3(2a-1)(4a-3)$
14. $5(2x-1)(x+2)$
15. $3(x-7)^2$
16. $4x^2(x+1)(x-1)$

XI. …More Factoring: Putting It All Together

1. $8(2x+1)(x-3)$
2. $3(3x-2)^2$
3. $5(x-14)(x+2)$
4. $6m(m^2+9m-1)$
5. $k^2(5k-2)(k+2)$
6. $x^2(y^2+x^2)(y+x)(y-x)$
7. $(y^2-8)(y^2+2)$
8. $(x^2+1)(x+2)(x-2)$
9. $[h+(a-3)][h-(a-3)]$ *or* $(h+a-3)(h-a+3)$
10. $(9x^2+4y^2)(3x+2y)(3x-2y)$
11. $mn^2(2-m)^2$ *or* $mn^2(m-2)^2$
12. $[(2a+3)+(a-1)][(2a+3)-(a-1)]$ *or* $(3a+2)(a+4)$
13. $(2d^2+1)^2(2d^2-1)^2$
14. $(x+2)^3(x-2)$

XII. Extra: Factoring by Grouping

1. $(x+2)(x+y)$
2. $(a-2)(3a+b)$
3. $(t-1)(t^2+2)$
4. $(5+t)(2-s)$
5. $(c+7)\left(\frac{2}{3}b+1\right)$
6. $(2u+1)(2u+v)$
7. $(d+3)(a-d)$
8. $(n+2)(n+3m)$
9. $(x-y)(x+y)(2a+b)$
10. $(z-y)(z+y)^2$
11. $(y-1)(y+2)(y-2)$
12. $(a+b)(x+4)(x-4)$
13. $(x+1)^2(x-1)$
14. $(a-1)(a^2-8)$

Algebra Worksheet – Section 10.5 Name _____
Factoring Polynomials of the form Block ____

$x^2 + bx + c$

Factor

1. $x^2 + 3x + 2$

2. $x^2 - x - 2$

3. $x^2 + x - 6$

4. $a^2 + a - 12$

5. $a^2 - 2a - 35$

6. $b^2 + 8b + 16$

7. $b^2 + 7b - 8$

8. $y^2 - y - 6$

9. $x^2 - 4x - 45$

10. $y^2 - 8y + 15$

11. $p^2 + 12p + 27$

12. $b^2 + 9b + 20$

13. $b^2 + 3b - 40$

14. $a^2 - 15a + 36$

15. $c^2 + 11c + 18$

16. $x^2 + 21x + 100$

Solve each equation by factoring

17. $x^2 + 5x + 6 = 0$

18. $b^2 - b - 20 = 0$

19. $y^2 - y - 72 = 0$

20. $x^2 - 12x = -11$

Algebra Worksheet – Section 10.5
Factoring Polynomials of the form $x^2 + bx + c$ with GCFs

Name _____
Block ____

Factor Completely

1. $2x^2 + 6x + 4$

2. $4a^2 - 12a + 8$

3. $10a^2 + 10 - 20$

4. $7a^2 - 14a - 21$

5. $3y^2 - 15y + 18$

6. $a^3 - 5a^2 + 4a$

7. $x^4 - 15x^3 + 56x^2$

8. $b^4 - 3b^3 - 10b^2$

9. $2a^3 + 8a^2 - 64a$

10. $3a^3 - 9a^2 - 54a$

11. $9p^2 - 54p + 72$

12. $4y^3 - 4y^2 - 24y$

13. $3x^4 - 21x^3 + 10x^2$

14. $5x^4 - 10x^3 - 75x^2$

Solve each equation by factoring

15. $3x^2 + 15x + 18 = 0$

16. $2x^2 + 16x + 24 = 0$

17. $5x^2 - 35x + 60 = 0$

18. $x^3 + 11x^2 - 12x = 0$

19. $2y^2 + 10y = 28$

20. $6y^2 + 36 = 30y$

Algebra Worksheet – Section 10.5
Factoring Polynomials of the form
$x^2 + bx + c$

Name Key
Block ____

Factor

1. $x^2 + 3x + 2$
$(x+2)(x+1)$

2. $x^2 - x - 2$
$(x-2)(x+1)$

3. $x^2 + x - 6$
$(x+3)(x-2)$

4. $a^2 + a - 12$
$(a+4)(a-3)$

5. $a^2 - 2a - 35$
$(a-7)(a+5)$

6. $b^2 + 8b + 16$
$(b+4)^2$ or $(b+4)(b+4)$

7. $b^2 + 7b - 8$
$(b+8)(b-1)$

8. $y^2 - y - 6$
$(y-3)(y+2)$

9. $x^2 - 4x - 45$
$(x-9)(x+5)$

10. $y^2 - 8y + 15$
$(y-5)(y-3)$

11. $p^2 + 12p + 27$
$(p+9)(p+3)$

12. $b^2 + 9b + 20$
$(b+5)(b+4)$

13. $b^2 + 3b - 40$
$(b+8)(b-5)$

14. $a^2 - 15a + 36$
$(a-3)(a-12)$

15. $c^2 + 11c + 18$
$(c+9)(c+2)$

16. $x^2 + 21x + 100$
~~(x~~ prime

Solve each equation by factoring

17. $x^2 + 5x + 6 = 0$
$(-5, -1)$

18. $b^2 - b - 20 = 0$
$(5, -4)$

19. $y^2 - y - 72 = 0$
$(9, -8)$

20. $x^2 - 12x = -11$
$x^2 - 12x + 11 = 0$
$(1, 11)$

Algebra Worksheet – Section 10.5
Factoring Polynomials of the form $x^2 + bx + c$ with GCFs

Name _____
Block ____

Factor Completely

1. $2x^2 + 6x + 4$
$2(x+2)(x+1)$

2. $4a^2 - 12a + 8$
$4(a-2)(a-1)$

3. $10a^2 + 10 - 20$
$10(a+2)(a-1)$

4. $7a^2 - 14a - 21$
$7(a-3)(a+1)$

5. $3y^2 - 15y + 18$
$3(y-2)(y-3)$

6. $a^3 - 5a^2 + 4a$
$a(a-4)(a-1)$

7. $x^4 - 15x^3 + 56x^2$
$x^2(x-7)(x-8)$

8. $b^4 - 3b^3 - 10b^2$
$b^2(b-5)(b+2)$

9. $2a^3 + 8a^2 - 64a$
$2a(a+8)(a-4)$

10. $3a^3 - 9a^2 - 54a$
$3a(a-6)(a+3)$

11. $9p^2 - 54p + 72$
$9(p-4)(p-2)$

12. $4y^3 - 4y^2 - 24y$
$4y(y-3)(y+2)$

13. $3x^4 - 21x^3 + 10x^2$
$x^2(3x^2 - 21x + 10)$

14. $5x^4 - 10x^3 - 75x^2$
$5x^2(x^2+3)(x-5)$

Solve each equation by factoring

15. $3x^2 + 15x + 18 = 0$
$(-3,-2)$

16. $2x^2 + 16x + 24 = 0$
$(-6,-2)$

17. $5x^2 - 35x + 60 = 0$
$(4,3)$

18. $x^3 + 11x^2 - 12x = 0$
$(0,-12,1)$

19. $2y^2 + 10y = 28$
$(-7,2)$

20. $6y^2 + 36 = 30y$
$(2,3)$

Kuta Software - Infinite Algebra 1 Name_____

Factoring Trinomials (a = 1)

Date_____ Period____

Factor each completely.

1) $b^2 + 8b + 7$

2) $n^2 - 11n + 10$

3) $m^2 + m - 90$

4) $n^2 + 4n - 12$

5) $n^2 - 10n + 9$

6) $b^2 + 16b + 64$

7) $m^2 + 2m - 24$

8) $x^2 - 4x + 24$

9) $k^2 - 13k + 40$

10) $a^2 + 11a + 18$

11) $n^2 - n - 56$

12) $n^2 - 5n + 6$

13) $b^2 - 6b + 8$

14) $n^2 + 6n + 8$

15) $2n^2 + 6n - 108$

16) $5n^2 + 10n + 20$

17) $2k^2 + 22k + 60$

18) $a^2 - a - 90$

19) $p^2 + 11p + 10$

20) $5v^2 - 30v + 40$

21) $2p^2 + 2p - 4$

22) $4v^2 - 4v - 8$

23) $x^2 - 15x + 50$

24) $v^2 - 7v + 10$

25) $p^2 + 3p - 18$

26) $6v^2 + 66v + 60$

Kuta Software - Infinite Algebra 1 Name_____

Factoring Trinomials (a = 1)

Date_____ Period____

Factor each completely.

1) $b^2 + 8b + 7$

$(b + 7)(b + 1)$

2) $n^2 - 11n + 10$

$(n - 10)(n - 1)$

3) $m^2 + m - 90$

$(m - 9)(m + 10)$

4) $n^2 + 4n - 12$

$(n - 2)(n + 6)$

5) $n^2 - 10n + 9$

$(n - 1)(n - 9)$

6) $b^2 + 16b + 64$

$(b + 8)^2$

7) $m^2 + 2m - 24$

$(m + 6)(m - 4)$

8) $x^2 - 4x + 24$

Not factorable

9) $k^2 - 13k + 40$

$(k - 5)(k - 8)$

10) $a^2 + 11a + 18$

$(a + 2)(a + 9)$

11) $n^2 - n - 56$

$(n + 7)(n - 8)$

12) $n^2 - 5n + 6$

$(n - 2)(n - 3)$

13) $b^2 - 6b + 8$

$(b - 4)(b - 2)$

14) $n^2 + 6n + 8$

$(n + 2)(n + 4)$

15) $2n^2 + 6n - 108$

$2(n + 9)(n - 6)$

16) $5n^2 + 10n + 20$

$5(n^2 + 2n + 4)$

17) $2k^2 + 22k + 60$

$2(k + 5)(k + 6)$

18) $a^2 - a - 90$

$(a - 10)(a + 9)$

19) $p^2 + 11p + 10$

$(p + 10)(p + 1)$

20) $5v^2 - 30v + 40$

$5(v - 2)(v - 4)$

21) $2p^2 + 2p - 4$

$2(p - 1)(p + 2)$

22) $4v^2 - 4v - 8$

$4(v + 1)(v - 2)$

23) $x^2 - 15x + 50$

$(x - 10)(x - 5)$

24) $v^2 - 7v + 10$

$(v - 5)(v - 2)$

25) $p^2 + 3p - 18$

$(p - 3)(p + 6)$

26) $6v^2 + 66v + 60$

$6(v + 10)(v + 1)$

Name: _____ Date: _____ Block: _____

Worksheet Factoring Trinomials

Factor the following completely. Look for a GCF first.

1. $x^2+13x-30$

2. $x^2-5x-24$

3. $x^2+5x-36$

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

5. $x^2+15x+54$

6. $x^2-8x-20$

7. $x^2+4x-32$

8. x^2-x-20

9. $x^2+11x+30$

10. $x^2+14x+49$

11. $x^2+10x+16$

12. x^2+3x+2

13. $x^2+15x+44$

15. x^2+6x+5

16. $2x^2+20x+32$

18. $3x^2-15x+18$

19. $2x^2+8x-24$

20. $2x^2+16x-32$

No GCF? a≠1? Use grouping to factor.

Name: _____ Date: _____ Block: _____

21. $3x^2+7x+2$

22. $2x^2+5x+3$

23. $3x^2-16x+5$

24. $7x^2-9x+2$

25. $6x^2+5x+1$

26. $8x^2-9x+1$

27. $10x^2+17x+3$

28. $9x^2-9x+2$

29. $5x^2+11x+6$

30. $3x^2+2x-1$

31. $5x^2-4x-1$

32. $2x^2+5x-3$

33. $7x^2-13x-2$

34. $3x^2+14x-5$

35. $4x^2-11x+7$

Name: _____ Date: _____ Block: _____

Worksheet Factoring Trinomials

Factor the following completely. Look for a GCF first.

1. $x^2+13x-30$

(x-10)(x-3)

2. $x^2-5x-24$

(x-8)(x+3)

3. $x^2+5x-36$

(x+9)(x-4)

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

(x+7)(x+8)

5. $x^2+15x+54$

(x+9)(x+6)

6. $x^2-8x-20$

(x-10)(x+2)

7. $x^2+4x-32$

(x-4)(x+8)

8. x^2-x-20

(x+4)(x-5)

9. $x^2+11x+30$

(x+5)(x+6)

10. $x^2+14x+49$

(x+7)(x+7)
(x+7)^2

11. $x^2+10x+16$

(x+2)(x+8)

12. x^2+3x+2

(x+2)(x+1)

13. $x^2+15x+44$

(x+4)(x+11)

15. x^2+6x+5

(x+1)(x+5)

16. $2x^2+20x+32$

2(x^2+10x+16)
2(x+2)(x+8)

18. $3x^2-15x+18$

3(x^2-5x+6)
3(x-1)(x+6)

19. $2x^2+8x-24$

2(x^2+4x-12)
2(x+6)(x-2)

20. $2x^2+16x-32$

2(x^2+8x-16)

No GCF? a≠1? Use grouping to factor.

Name: _____ Date: _____ Block: _____

21. $3x^2+7x+2$

(3x^2+x+6x+2)
(3x^2+6x)+(x+2)
3x(x+2)+1(x+2)
(3x+1)(x+2)

22. $2x^2+5x+3$

(2x^2+2x+3x+3)
(2x^2+2x)+(3x+3)
2x(x+1)+3(x+1)
(2x+3)(x+1)

23. $3x^2-16x+5$

(3x^2-x-15x+5)
(3x^2-x)+(-15x+5)
x(3x-1)-5(3x-1)
(3x-1)(x-5)

24. $7x^2-9x+2$

(7x^2-2x-7x+2)
(7x^2-7x)+(-2x+2)
7x(x-1)-2(x-1)
(7x-2)(x-1)

25. $6x^2+5x+1$

(6x^2+2x+3x+1)
(6x^2+3x)+(2x+1)
3x(2x+1)+1(2x+1)
(3x+1)(2x+1)

26. $8x^2-9x+1$

8x^2-x-8x+1
(8x^2-8x)+(-x+1)
8x(x-1)-1(x-1)
(8x-1)(x-1)

27. $10x^2+17x+3$

(10x^2+2x+15x+3)
(10x^2+15x)+(2x+3)
5x(2x+3)+1(2x+3)
(5x+1)(2x+3)

28. $9x^2-9x+2$

(9x^2-3x-6x+2)
(9x^2-3x)+(-6x+2)
3x(3x-1)-2(3x-1)
(3x-2)(3x-1)

29. $5x^2+11x+6$

(5x^2+5x+6x+6)
(5x^2+5x)+(6x+6)
5x(x+1)+6(x+1)
(5x+6)(x+1)

30. $3x^2+2x-1$

(3x^2+3x-1x-1)
(3x^2+3x)+(-1x-1)
3x(x+1)-1(x+1)
(3x-1)(x+1)

31. $5x^2-4x-1$

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

32. $2x^2+5x-3$

(2x^2+6x-1x-3)
(2x^2+6x)+(-1x-3)
2x(x+3)-1(x+3)
(2x-1)(x+3)

33. $7x^2-13x-2$

(7x^2-14x+x-2)
(7x^2-14x)+(x-2)
7x(x-2)+1(x-2)
(7x+1)(x-2)

34. $3x^2+14x-5$

(3x^2+15x-1x-5)
(3x^2+15x)+(-1x-5)
3x(x+5)-1(x+5)
(3x-1)(x+5)

35. $4x^2-11x+7$

(4x^2-4x-7x+7)
(4x^2-4x)+(-7x+7)
4x(x-1)-7(x-1)
(4x-7)(x-1)

$4b^2 + 8b + 7 = 4$

$-4 \quad -4$

$4b^2 + 8b + 3 = 0$

$a = 4 \quad b = 8 \quad c = 3$

$$\frac{-8 \pm \sqrt{8^2 - 4(4)(3)}}{2(4)}$$

$$\frac{-8 \pm \sqrt{64 - 48}}{8}$$

$$\frac{-8 \pm \sqrt{16}}{8} = \frac{-8 \pm 4}{8}$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \qquad ax^2 + bx + c = 0$$

$$\frac{-8 + 4}{8} \qquad \frac{-8 - 4}{8}$$

$$\frac{-4}{8} = -\frac{1}{2} \qquad \frac{-12}{8} = -\frac{3}{2}$$

$$\left\{-\frac{1}{2}, -\frac{3}{2}\right\}$$

Elementary Algebra Skill

Solving Quadratic Equations Using the Quadratic Formula

Solve each equation with the quadratic formula.

1) $3n^2 - 5n - 8 = 0$

2) $x^2 + 10x + 21 = 0$

3) $10x^2 - 9x + 6 = 0$

4) $p^2 - 9 = 0$

5) $6x^2 - 12x + 1 = 0$

6) $6n^2 - 11 = 0$

7) $2n^2 + 5n - 9 = 0$

8) $3x^2 - 6x - 23 = 0$

9) $6k^2 + 12k - 15 = -10$

10) $8x^2 - 14 = -11$

11) $6k^2 + 2k + 9 = -3$

12) $12p^2 + 9p - 30 = -10$

13) $3x^2 = -7x + 136$

14) $3n^2 = -n + 14$

15) $6v^2 + 3 = -2v$

16) $9p^2 - 7 = 9p$

17) $11k^2 + 4k - 52 = 10k^2 - 7$

18) $-4a^2 + 18a - 15 = -7a^2 + 9a$

19) $-4n(n - 2) = 6(n + 3) - 11n^2$

20) $x(x - 3) = -7 - 10x$

Answers to Solving Quadratic Equations Using the Quadratic Formula

1) $\left\{2\frac{2}{3}, -1\right\}$

2) $\{-3, -7\}$

3) No solution.

4) $\{3, -3\}$

5) $\left\{\frac{6+\sqrt{30}}{6}, \frac{6-\sqrt{30}}{6}\right\}$

6) $\left\{\frac{\sqrt{66}}{6}, -\frac{\sqrt{66}}{6}\right\}$

7) $\left\{\frac{-5+\sqrt{97}}{4}, \frac{-5-\sqrt{97}}{4}\right\}$

8) $\left\{\frac{3+\sqrt{78}}{3}, \frac{3-\sqrt{78}}{3}\right\}$

9) $\left\{\frac{-6+\sqrt{66}}{6}, \frac{-6-\sqrt{66}}{6}\right\}$

10) $\left\{\frac{\sqrt{6}}{4}, -\frac{\sqrt{6}}{4}\right\}$

11) No solution.

12) $\left\{\frac{-9+\sqrt{1041}}{24}, \frac{-9-\sqrt{1041}}{24}\right\}$

13) $\left\{5\frac{2}{3}, -8\right\}$

14) $\left\{2, -2\frac{1}{3}\right\}$

15) No solution.

16) $\left\{\frac{3+\sqrt{37}}{6}, \frac{3-\sqrt{37}}{6}\right\}$

17) $\{5, -9\}$

18) $\left\{\frac{-3+\sqrt{29}}{2}, \frac{-3-\sqrt{29}}{2}\right\}$

19) $\{\frac{-1+\sqrt{127}}{7}, \frac{-1-\sqrt{127}}{7}\}$

20) $\{\frac{-7+\sqrt{21}}{2}, \frac{-7-\sqrt{21}}{2}\}$

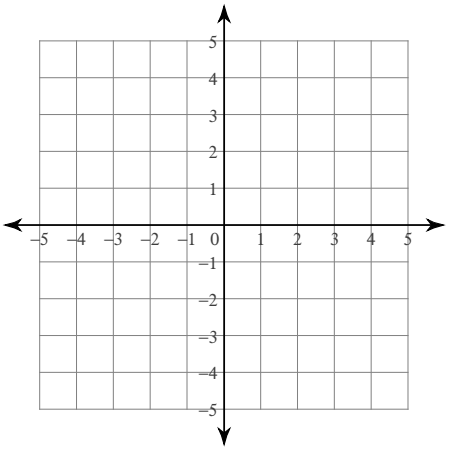
Kuta Software - Infinite Algebra 2 Name_____

Systems of Two Equations

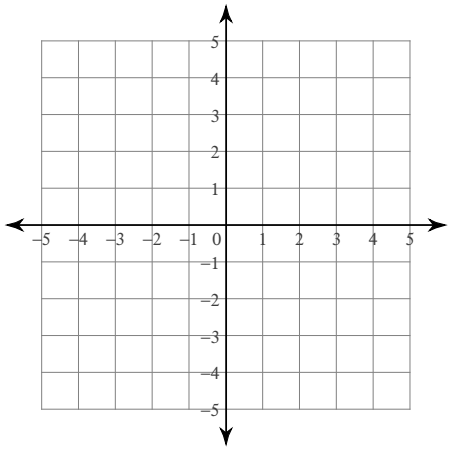
Date_____ Period____

Solve each system by graphing.

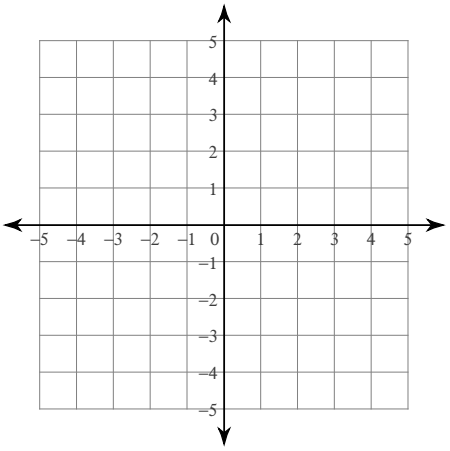
1) $y = -3x + 4$
$y = 3x - 2$



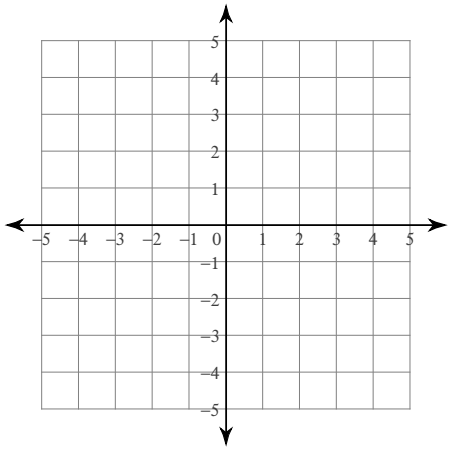
2) $y = x + 2$
$x = -3$



3) $x - y = 3$
$7x - y = -3$



4) $4x + y = 2$
$x - y = 3$



Solve each system by substitution.

5) $y = 4x - 9$
$y = x - 3$

6) $4x + 2y = 10$
$x - y = 13$

7) $y = -5$
$5x + 4y = -20$

8) $x + 7y = 0$
$2x - 8y = 22$

9) $6x + 8y = -22$
$y = -5$

10) $-7x + 2y = 18$
$6x + 6y = 0$

11) $7x + 2y = -19$
$-x + 2y = 21$

12) $3x - 5y = 17$
$y = -7$

13) $-7x + 4y = 24$
$4x - 4y = 0$

14) $4x - y = 20$
$-2x - 2y = 10$

Solve each system by elimination.

15) $8x - 6y = -20$
$-16x + 7y = 30$

16) $6x - 12y = 24$
$-x - 6y = 4$

17) $-8x - 10y = 24$
$6x + 5y = 2$

18) $-24 - 8x = 12y$
$1 + \frac{5}{9}y = -\frac{7}{18}x$

19) $-4y - 11x = 36$
$20 = -10x - 10y$

20) $-9 + 5y = -4x$
$-11x = -20 + 9y$

21) $0 = -2y + 10 - 6x$
$14 - 22y = 18x$

22) $-16y = 22 + 6x$
$-11y - 4x = 15$

23) $-16 + 20x - 8y = 0$
$36 = -18y - 22x$

24) $-\frac{5}{7} - \frac{11}{7}x = -y$
$2y = 7 + 5x$

Critical thinking questions:

25) Write a system of equations with the solution $(4, -3)$.

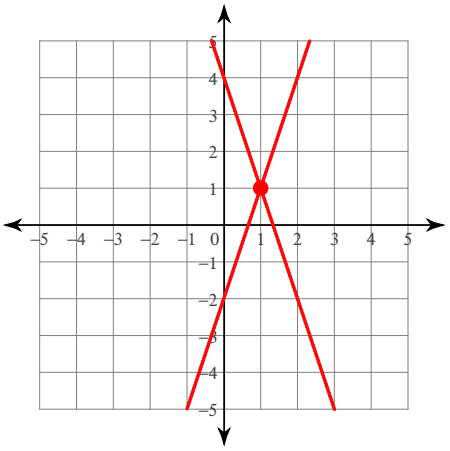
Kuta Software - Infinite Algebra 2 Name_____

Systems of Two Equations

Date_____ Period____

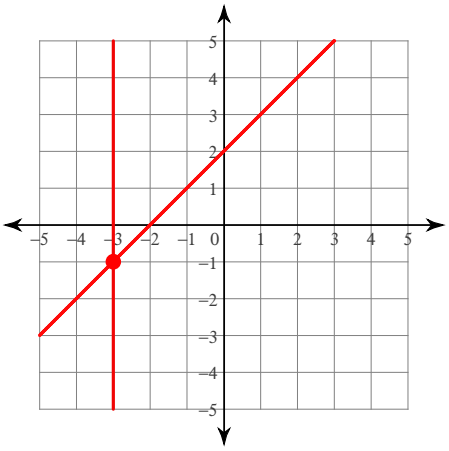
Solve each system by graphing.

1) $y = -3x + 4$
$y = 3x - 2$



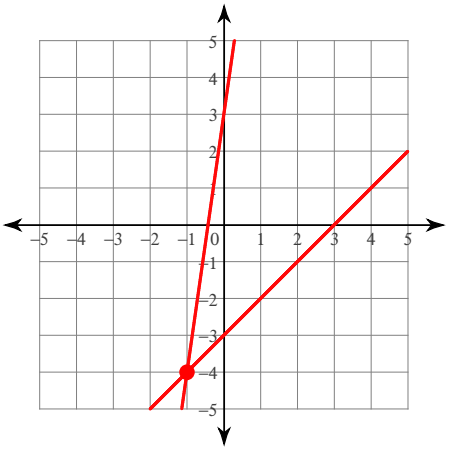
(1, 1)

2) $y = x + 2$
$x = -3$



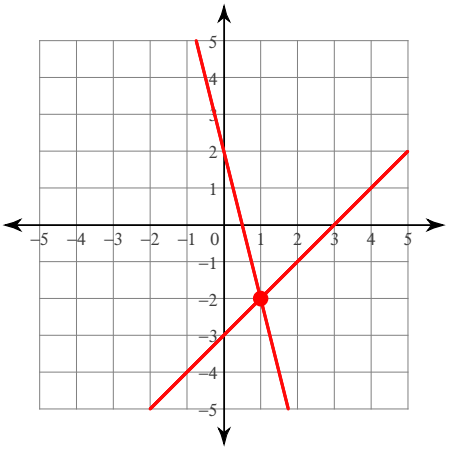
(–3, –1)

3) $x - y = 3$
$7x - y = -3$



(–1, –4)

4) $4x + y = 2$
$x - y = 3$



(1, –2)

Solve each system by substitution.

5) $y = 4x - 9$
$y = x - 3$

(2, –1)

6) $4x + 2y = 10$
$x - y = 13$

(6, –7)

7) $y = -5$
$5x + 4y = -20$

(0, –5)

8) $x + 7y = 0$
$2x - 8y = 22$

(7, –1)

9) $6x + 8y = -22$
$y = -5$
$(3, -5)$

10) $-7x + 2y = 18$
$6x + 6y = 0$
$(-2, 2)$

11) $7x + 2y = -19$
$-x + 2y = 21$
$(-5, 8)$

12) $3x - 5y = 17$
$y = -7$
$(-6, -7)$

13) $-7x + 4y = 24$
$4x - 4y = 0$
$(-8, -8)$

14) $4x - y = 20$
$-2x - 2y = 10$
$(3, -8)$

Solve each system by elimination.

15) $8x - 6y = -20$
$-16x + 7y = 30$
$(-1, 2)$

16) $6x - 12y = 24$
$-x - 6y = 4$
$(2, -1)$

17) $-8x - 10y = 24$
$6x + 5y = 2$
$(7, -8)$

18) $-24 - 8x = 12y$
$1 + \frac{5}{9}y = -\frac{7}{18}x$
$(6, -6)$

19) $-4y - 11x = 36$
$20 = -10x - 10y$
$(-4, 2)$

20) $-9 + 5y = -4x$
$-11x = -20 + 9y$
$(1, 1)$

21) $0 = -2y + 10 - 6x$
$14 - 22y = 18x$
$(2, -1)$

22) $-16y = 22 + 6x$
$-11y - 4x = 15$
$(-1, -1)$

23) $-16 + 20x - 8y = 0$
$36 = -18y - 22x$
$(0, -2)$

24) $-\frac{5}{7} - \frac{11}{7}x = -y$
$2y = 7 + 5x$
$(-3, -4)$

Critical thinking questions:

25) Write a system of equations with the solution $(4, -3)$.

Many answers. Ex: $x + y = 1$, $2x + y = 5$

Writing Equations of Lines Review for Quiz

Period____

A. Write the slope-intercept form of the equation of each line given the slope and y-intercept.

1) Slope = 5, y-intercept = –3

2) Slope = $-\frac{1}{3}$, y-intercept = 5

3) Slope = 0, y-intercept = 2

4) Slope = –1, y-intercept = 5

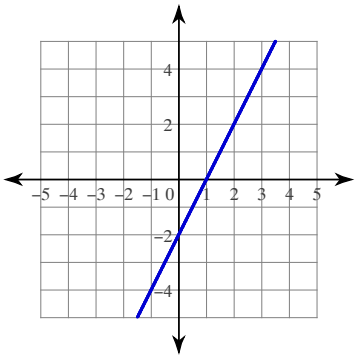
B. Write the point-slope form of the equation of the line through the given point with the given slope.

5) through: $(5, 3)$, slope = $\frac{4}{5}$

6) through: $(-3, -2)$, slope = $-\frac{2}{3}$

C. Write the slope-intercept form of the equation of each line.

7)



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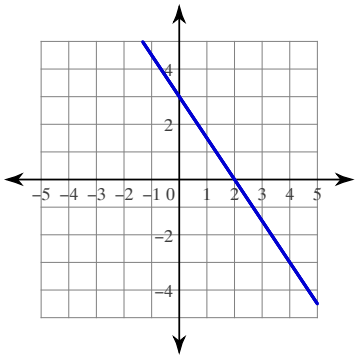


D. Write the point-slope form of the equation of the line through the given points.

9) through: $(-5, -5)$ and $(1, -3)$

10) through: $(4, 3)$ and $(1, 2)$

E. Write the point-slope form of the equation of the line described.

11) through: $(-5, -1)$, parallel to $y = x + 5$

12) through: $(4, -5)$, parallel to $y = -\frac{5}{2}x + 5$

13) through: $(-3, 0)$, perp. to $y = -\frac{3}{5}x - 2$

14) through: $(4, -3)$, perp. to $y = -\frac{5}{2}x - 1$

F. Write the slope-intercept form of the equation of each line.

15) $y - 5 = -10(x - 4)$

16) $y + 3 = \frac{5}{3}(x + 3)$

K. Write the slope-intercept form of the equation of the line through the given point with the given slope.

17) through: $(4, -4)$, slope = 2

18) through: $(5, -1)$, slope = $\frac{2}{7}$

19) through: $(0, 2)$, slope = 0

20) through: $(-5, 1)$, slope = undefined

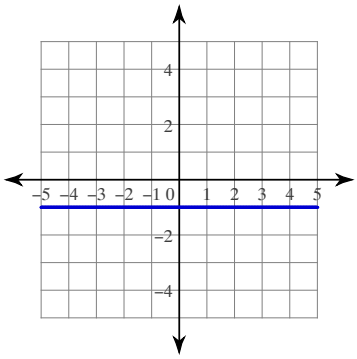
L. Write the slope-intercept form of the equation of the line through the given points.

21) through: $(3, -3)$ and $(4, 0)$

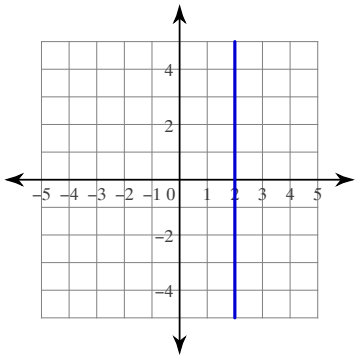
22) through: $(3, 5)$ and $(0, 1)$

M. Write the equation of each line.

23)



24)



N. Write the slope-intercept form of the equation of the line described.

25) through: $(1, -1)$, parallel to $y = -6x + 1$

26) through: $(4, 5)$, parallel to $y = \frac{1}{2}x + 3$

27) through: $(-2, -2)$, perp. to $y = -\frac{2}{7}x + 3$

28) through: $(-2, 5)$, perp. to $y = 2x - 5$

U. Write the standard form of the equation of each line given the slope and y-intercept.

29) Slope = -2, y-intercept = -2

30) Slope = $-\frac{1}{5}$, y-intercept = -4

V. Write the standard form of the equation of the line through the given point with the given slope.

31) through: $(-4, 4)$, slope = $-\frac{7}{4}$

32) through: $(1, 2)$, slope = 6

X. Write the standard form of the equation of the line through the given points.

33) through: $(0, -1)$ and $(1, -4)$

34) through: $(2, 4)$ and $(2, 1)$

Y. Write the standard form of the equation of the line described.

35) through: $(-1, 1)$, parallel to $y = -x + 2$

36) through: $(-4, -5)$, parallel to $y = x - 4$

37) through: $(2, -4)$, perp. to $y = \frac{1}{2}x + 1$

38) through: $(3, -1)$, perp. to $y = \frac{3}{2}x - 5$

HORIZONTAL & VERTICAL LINES: Write the equation of the line through the given points.

39) through: $(-3, 4)$ and $(1, 4)$

40) through: $(2, 4)$ and $(2, 3)$

HORIZONTAL & VERTICAL LINES: Write the equation of the line.

41) through: $(-3, 3)$, parallel to $y = 0$

42) through: $(-4, 0)$, parallel to $x = 0$

43) through: $(5, -2)$, perp. to $x = 0$

44) through: $(-1, 1)$, perp. to $y = -5$

Answers to Writing Equations of Lines Review for Quiz

1) $y = 5x - 3$

2) $y = -\frac{1}{3}x + 5$

3) $y = 2$

4) $y = -x + 5$

5) $y - 3 = \frac{4}{5}(x - 5)$

6) $y + 2 = -\frac{2}{3}(x + 3)$

7) $y = 2x - 2$

8) $y = -\frac{3}{2}x + 3$

9) $y + 5 = \frac{1}{3}(x + 5)$

10) $y - 3 = \frac{1}{3}(x - 4)$

11) $y + 1 = x + 5$

12) $y + 5 = -\frac{5}{2}(x - 4)$

13) $y = \frac{5}{3}(x + 3)$

14) $y + 3 = \frac{2}{5}(x - 4)$

15) $y = -10x + 45$

16) $y = \frac{5}{3}x + 2$

17) $y = 2x - 12$

18) $y = \frac{2}{7}x - \frac{17}{7}$

19) $y = 2$

20) $x = -5$

21) $y = 3x - 12$

22) $y = \frac{4}{3}x + 1$

23) $y = -1$

24) $x = 2$

25) $y = -6x + 5$

26) $y = \frac{1}{2}x + 3$

27) $y = \frac{7}{2}x + 5$

28) $y = -\frac{1}{2}x + 4$

29) $2x + y = -2$

30) $x + 5y = -20$

31) $7x + 4y = -12$

32) $6x - y = 4$

33) $3x + y = -1$

34) $x = 2$

35) $x + y = 0$

36) $x - y = 1$

37) $2x + y = 0$

38) $2x + 3y = 3$

39) $y = 4$

40) $x = 2$

41) $y = 3$

42) $x = -4$

43) $y = -2$

44) $x = -1$