Algebra to the Core

Practice Makes Perfect

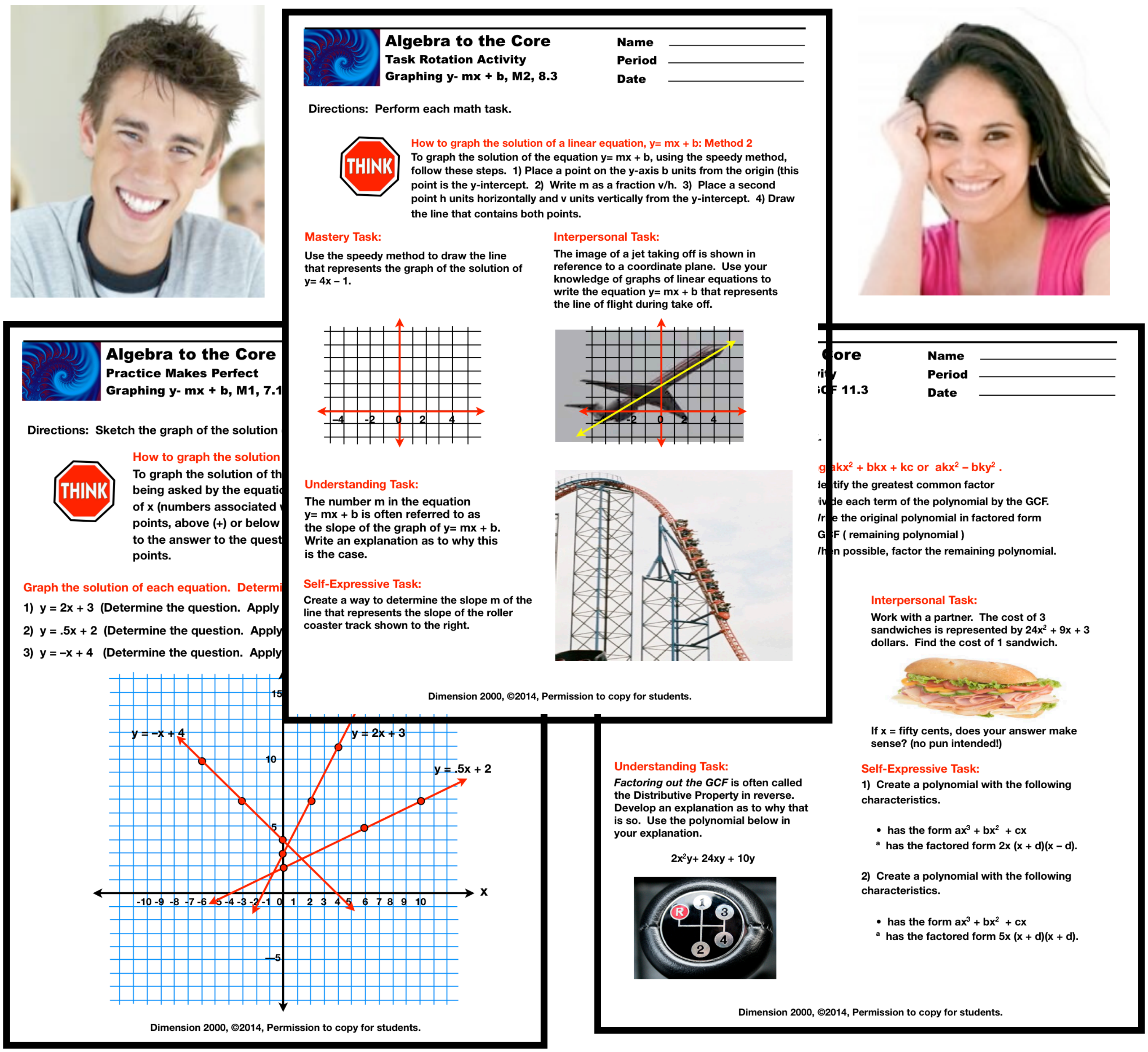
Student Activities

THINK

Algebra to the Core

Student Activity Set

In order to learn math, students must do math (NCTM 1989). So what should we have our students do? The strength of the Algebra to the Core program is the number, variety, and quality of learning experiences provided through the instructional strategies and student activities. The practice and engagement activities provide *thinking notes* for students, plenty of practice for mastery of important skills, problems that address the four learning styles, and solution keys.



Algebra to the Core
Task Rotation Activity
Graphing y- mx + b, M2, 8.3
Name
Period
Date

Directions: Perform each math task.

How to graph the solution of a linear equation, y= mx + b: Method 2
To graph the solution of the equation y= mx + b, using the speedy method, follow these steps. 1) Place a point on the y-axis b units from the origin (this point is the y-intercept. 2) Write m as a fraction v/h. 3) Place a second point h units horizontally and v units vertically from the y-intercept. 4) Draw the line that contains both points.

Mastery Task:
Use the speedy method to draw the line that represents the graph of the solution of y= 4x – 1.

Interpersonal Task:
The image of a jet taking off is shown in reference to a coordinate plane. Use your knowledge of graphs of linear equations to write the equation y= mx + b that represents the line of flight during take off.

Understanding Task:
The number m in the equation y= mx + b is often referred to as the slope of the graph of y= mx + b. Write an explanation as to why this is the case.

Self-Expressive Task:
Create a way to determine the slope m of the line that represents the slope of the roller coaster track shown to the right.

Dimension 2000, ©2014, Permission to copy for students.

Algebra to the Core
Practice Makes Perfect
Graphing y- mx + b, M1, 7.1

Directions: Sketch the graph of the solution

How to graph the solution
To graph the solution of th
being asked by the equatio
of x (numbers associated
points, above (+) or below
to the answer to the quest
points.

Graph the solution of each equation. Determi
1) y = 2x + 3 (Determine the question. Apply
2) y = .5x + 2 (Determine the question. Apply
3) y = –x + 4 (Determine the question. Apply

Dimension 2000, ©2014, Permission to copy for students.

Name
Period
Date

akx² + bkx + kc or akx² – bky².
tify the greatest common factor
de each term of the polynomial by the GCF.
e the original polynomial in factored form
F (remaining polynomial)
n possible, factor the remaining polynomial.

Interpersonal Task:
Work with a partner. The cost of 3 sandwiches is represented by 24x² + 9x + 3 dollars. Find the cost of 1 sandwich.

If x = fifty cents, does your answer make sense? (no pun intended!)

Understanding Task:
Factoring out the GCF is often called the Distributive Property in reverse. Develop an explanation as to why that is so. Use the polynomial below in your explanation.

2x²y+ 24xy + 10y

Self-Expressive Task:
1) Create a polynomial with the following characteristics.
- has the form ax³ + bx² + cx
- has the factored form 2x (x + d)(x – d).

2) Create a polynomial with the following characteristics.
- has the form ax³ + bx² + cx
- has the factored form 5x (x + d)(x + d).

Dimension 2000, ©2014, Permission to copy for students.

Algebra to the Core

Student Activity Set

Table of Contents

Algebra to the Core

Practice Makes Perfect

Numeric Expressions 1.1

Name ____________________

Period ____________________

Date ____________________

Directions: Use the Order of Operations to simplify each numeric expression.

Order of Operations:

Parentheses, (simplify inside symbols of inclusion)
Exponents,
Multiplication and Division, (as they occur left to right)
Addition and Subtraction (as they occur left to right)

Problem Set I

1. ________ $5(25) + 10^2 + 11$
2. ________ $4(20) + 5^2 - 10$
3. ________ $8(6) + 14^2 - 12$
4. ________ $.5(22) + 4^2 + 15$
5. ________ $3(15) + 5 + 6^2$

Problem Set II

1. ________ $2(15 - 10) + 7^2 + 5$
2. ________ $4(10 + 2) + 9^2 - 11$
3. ________ $11(8 - 6) + 12^2 - 10$
4. ________ $.5(15 + 5) + 2^2 + 20$
5. ________ $1.5(14 + 6) + 5^2$

Problem Set III

1. ________ $10(7 - 5) + (8 - 5)^2 - 30$
2. ________ $2(-10) + (10 - 6)^2 - 12$
3. ________ $-(6 - 10) + (5 - 8)^2 + 5$
4. ________ $.5(-10 + 20) + (30 - 28)^2 + 25$
5. ________ $3(-4 + {}^{-}6) + (2.5 + 3.5)^2 - 10$

Algebra to the Core

Practice Makes Perfect

Numeric Expressions 1.1

Solution Key

Directions: Use the Order of Operations to simplify each numeric expression.

Order of Operations:

Parentheses, (simplify inside symbols of inclusion)
Exponents,
Multiplication and Division, (as they occur left to right)
Addition and Subtraction (as they occur left to right)

Problem Set I

1. __________ $5(25) + 10^2 + 11$ **$125 + 100 + 11 = 236$**
2. __________ $4(20) + 5^2 - 10$ **$80 + 25 - 10 = 95$**
3. __________ $8(6) + 14^2 - 12$ **$48 + 196 - 12 = 232$**
4. __________ $.5(22) + 4^2 + 15$ **$11 + 16 + 15 = 42$**
5. __________ $3(15) + 5 + 6^2$ **$45 + 5 + 36 = 86$**

Problem Set II

1. __________ $2(15 - 10) + 7^2 + 5$ **$10 + 49 + 5 = 64$**
2. __________ $4(10 + 2) + 9^2 - 11$ **$48 + 81 - 11 = 118$**
3. __________ $11(8 - 6) + 12^2 - 10$ **$22 + 144 - 10 = 156$**
4. __________ $.5(15 + 5) + 2^2 + 20$ **$10 + 4 + 20 = 34$**
5. __________ $1.5(14 + 6) + 5^2$ **$30 + 25 = 55$**

Problem Set III

1. __________ $10(7 - 5) + (8 - 5)^2 - 30$ **$20 + 9 - 30 = -1$**
2. __________ $2(-10) + (10 - 6)^2 - 12$ **$-20 + 16 - 12 = -16$**
3. __________ $-(6 - 10)^2 + (5 - 8)^2 + 5$ **$-16 + 9 + 5 = -2$**
4. __________ $.5(-10 + 20) + (30 - 28)^2 + 25$ **$5 + 4 + 25 = 34$**
5. __________ $3(-4 + {}^{-}6) + (2.5 + 3.5)^2 - 10$ **$-30 + 36\ -10 = -4$**

Algebra to the Core
Practice Makes Perfect
Numeric Expressions 1.2

Name ____________________
Period ____________________
Date ____________________

Directions: Use the Order of Operations to simplify each numeric expression.

Order of Operations:
Parentheses, (simplify inside symbols of inclusion)
Exponents,
Multiplication and Division, (as they occur left to right)
Addition and Subtraction (as they occur left to right)

Problem Set I

1. __________ $4(25) + 8^2 + 4$
2. __________ $5(10) + 7^2 - 8$
3. __________ $7(5) + 10^2 - 20$
4. __________ $.5(44) + 5^2 + 5$
5. _________ $2(25) + 25 + 1^2$

Problem Set II

1. __________ $6(19 - 10) + 4^2 + 20$
2. __________ $4(7 + 2) + 6^2 - 10$
3. __________ $4(7 - 2) + 11^2 + 10$
4. __________ $.5(4 + 12) + 10^2 + 6$
5. _________ $1.5(20 + 10) + 7^2$

Problem Set III

1. __________ $3(20 - 5) + (5 - 2)^2 - 10$
2. __________ $2(-50) + (14 - 4)^2 - 10$
3. __________ $-(4 - 8) + (5 - 6)^2 + 15$
4. __________ $.5(-30 + 20) + (50 - 40)^2 + 15$
5. _________ $3(-2 + {}^{-}2) + (2.5 + 7.5)^2 - 10$

Algebra to the Core

Practice Makes Perfect

Numeric Expressions 1.2

Solution Key

Directions: Use the Order of Operations to simplify each numeric expression.

Order of Operations:
Parentheses, (simplify inside symbols of inclusion)
Exponents,
Multiplication and Division, (as they occur left to right)
Addition and Subtraction (as they occur left to right)

Problem Set I

1. __________ $4(25) + 8^2 + 4$ **$100 + 64 + 4 = 168$**
2. __________ $5(10) + 7^2 - 8$ **$50 + 49 - 8 = 91$**
3. __________ $7(5) + 10^2 - 20$ **$35 + 100 - 20 = 115$**
4. __________ $.5(44) + 5^2 + 5$ **$22 + 25 + 5 = 52$**
5. _________ $2(25) + 25 + 1^2$ **$50 + 25 + 1 = 76$**

Problem Set II

1. __________ $6(19 - 10) + 4^2 + 20$ **$54 + 16 + 20 = 90$**
2. __________ $4(7 + 2) + 6^2 - 10$ **$36 + 36 - 10 = 62$**
3. __________ $4(7 - 2) + 11^2 + 10$ **$20 + 121 + 10 = 151$**
4. __________ $.5(4 + 12) + 10^2 + 6$ **$8 + 100 + 6 = 114$**
5. _________ $1.5(20 + 10) + 7^2$ **$45 + 49 = 94$**

Problem Set III

1. __________ $3(20 - 5) + (5 - 2)^2 - 10$ **$45 + 9 - 10 = 44$**
2. __________ $2(-50) + (14 - 4)^2 - 10$ **$-100 + 100 - 10 = -10$**
3. __________ $-(4 - 8) + (5 - 6)^2 + 15$ **$4 + 1 + 15 = 20$**
4. __________ $.5(-30 + 20) + (50 - 40)^2 + 15$ **$-5 + 100 + 15 = 110$**
5. _________ $3(-2 + {}^{-}2) + (2.5 + 7.5)^2 - 10$ **$-12 + 100 \ -10 = 78$**

Algebra to the Core

Task Rotation Activity

Numeric Expressions 1.3

Name ______________________

Period ______________________

Date ______________________

Directions: Use the Order of Operations to perform each task below.

Order of Operations:

Parentheses, (simplify inside symbols of inclusion)
Exponents,
Multiplication and Division, (as they occur left to right)
Addition and Subtraction (as they occur left to right)

Mastery Task:

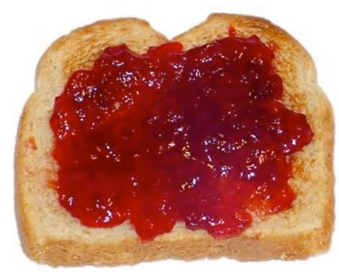
Simplify each numeric expression

1. $3(25) + 5^2 + 144$
2. $5(10 – 6) + 8^2 – 14$
3. $7(5 + 5)^2 + 10^2 – 30$
4. $.5(40 – 30) + 5^2 + 15$
5. $2(25) + 225 + 5^2$

Interpersonal Task:

Choose one of the three topics below. Create a list of steps needed to perform the function. Can the steps be performed in any order? Explain. How does this relate to the Order of Operations in math?

- **Making toast with margarine and jelly**
- **Brushing your teeth**
- **Making a cell phone call**



Understanding Task:

Use the numeric expression below to develop an explanation as to why the Order of Operations is important in mathematics.

$$2 \bullet 3^2 + (5 – 1)^2 – 4 \div 2$$

Self-Expressive Task:

Use the five numbers shown below to create a numeric expression whose value is 50. Each of the five numbers must be used once and only once. No other numbers can be used. Any or all of the operations +, –, • and ÷, including exponents, can be used.

8, 5, 9, 3, 10

Algebra to the Core

Practice Makes Perfect

Algebraic Expressions 2.1

Name ______________________

Period ______________________

Date ______________________

Directions: Use the Order of Operations to simplify each algebraic expression.

Order of Operations:

Parentheses, (simplify inside symbols of inclusion)

Exponents,

Multiplication and Division, (as they occur left to right)

Addition and Subtraction (as they occur left to right)

Problem Set I: Use a= 2, b= 3, and c= 4.

1. __________ $5(a + b) + c^2 + 6$
2. __________ $ab + (c + a)^2 - 2$
3. __________ $2c + (a + b)^2 + 10$
4. __________ $.5(bc) + a^2 + 5$
5. _________ $a^2 + b^2 + c^2$

Problem Set II: Use a= –2, b= 8, and c= 5.

1. __________ $2(b - a) + c^2 + 5$
2. __________ $4(a + b) + (c - 1)^2 - 1$
3. __________ $1(b - c) + (a + 3)^2 - 1$
4. __________ $.5(c + 5) + a^2 - b$
5. _________ $1.5(b + 6) + a^2$

Problem Set III: Use a= –2, b= 4, and c= 10.

1. __________ $10(b - a) + (c - 5)^2 - 6$
2. __________ $a(-10) + (10 - b)^2 - 2c$
3. __________ $-(2a - 6) + (5c - 45)^2 + 5b$
4. __________ $.5(b + 12) + (20 + ab)^2 + 2c$
5. _________ $2.5(b) + (5.5 + 4.5)^2 - ac$

Algebra to the Core
Practice Makes Perfect
Algebraic Expressions 2.1

Solution Key

Directions: Use the Order of Operations to simplify each algebraic expression.

Order of Operations:
Parentheses, (simplify inside symbols of inclusion)
Exponents,
Multiplication and Division, (as they occur left to right)
Addition and Subtraction (as they occur left to right)

Problem Set I: Use a= 2, b= 3, and c= 4.

1.	________	$5(a + b) + c^2 + 6$	**25 + 16 + 6 = 47**
2.	________	$ab + (c + a)^2 – 2$	**6 + 36 – 2 = 40**
3.	________	$2c + (a + b)^2 + 10$	**8 + 25 + 10 = 43**
4.	________	$.5(bc) + a^2 + 5$	**6 + 4 + 5 = 15**
5.	________	$a^2 + b^2 + c^2$	**4 + 9 + 16 = 29**

Problem Set II: Use a= –2, b= 8, and c= 5.

1.	________	$2(b – a) + c^2 + 5$	**20 + 25 + 5 = 50**
2.	________	$4(a + b) + (c – 1)^2 – 1$	**24 + 16 – 1 = 39**
3.	________	$1(b – c) + (a + 3)^2 – 1$	**3 + 1 + – 1 = 3**
4.	________	$.5(c + 5) + a^2 – b$	**5 + 4 – 8 = 1**
5.	________	$1.5(b + 6) + a^2$	**21 + 4 = 25**

Problem Set III: Use a= –2, b= 4, and c= 10.

1.	________	$10(b – a) + (c – 5)^2 – 6$	**60 + 25 – 6 = 79**
2.	________	$a(–10) + (10 – b)^2 – 2c$	**20 + 36 – 20 = 36**
3.	________	$–(2a – 6) + (5c – 45)^2 + 5b$	**10 + 25 + 20 = 55**
4.	________	$.5(b + 12) + (20 + ab)^2 + 2c$	**8 + 144 + 20 = 172**
5.	________	$2.5(b) + (5.5 + 4.5)^2 – ac$	**10 + 100 + 20 = 130**

Algebra to the Core
Practice Makes Perfect
Algebraic Expressions 2.2

Name ______________________

Period ______________________

Date ______________________

Directions: Use the Order of Operations to simplify each algebraic expression.

Order of Operations:
Parentheses, (simplify inside symbols of inclusion)
Exponents,
Multiplication and Division, (as they occur left to right)
Addition and Subtraction (as they occur left to right)

Problem Set I: Use x= 6, y= 2 and z= 5.

1. __________ $5(x + y) + z^2 + 1$
2. __________ $xy + (z + y)^2 - 12$
3. __________ $8x + (z - y)^2 + 2$
4. __________ $.5(xz) + y^2 + 15$
5. __________ $x^2 + y^2 + z^2$

Problem Set II: Use x= –2, y= 4, and z= 3.

1. __________ $4(x - y) + z^2 + 24$
2. __________ $2(x + y) + (z - 1)^2 - 2$
3. __________ $(x + z) + (y - 3)^2 - 1$
4. __________ $.5(y^2) - x + 8z$
5. __________ $1.5(yz) + x^2$

Problem Set III: Use x= –4, y= 8, and z= –1.

1. __________ $2(x - y) + (z - 5)^2 + 6$
2. __________ $x(-5) + (10 - y)^2 - 5z$
3. __________ $-(2x - 8) + (.5y - 12)^2 + 6z$
4. __________ $.5(x + 20) + (10 + yz)^2 + 2x$
5. __________ $2.5(y) + (2.5 + 3.5)^2 - xyz$

Algebra to the Core

Practice Makes Perfect

Algebraic Expressions 2.2

Solution Key

Directions: Use the Order of Operations to simplify each algebraic expression.

Order of Operations:

Parentheses, (simplify inside symbols of inclusion)
Exponents,
Multiplication and Division, (as they occur left to right)
Addition and Subtraction (as they occur left to right)

Problem Set I: Use x= 6, y= 2 and z= 5.

1. __________ $5(x + y) + z^2 + 1$ **40 + 25 + 1 = 66**
2. __________ $xy + (z + y)^2 - 12$ **12 + 49 – 12 = 49**
3. __________ $8x + (z - y)^2 + 2$ **48 + 9 + 2 = 59**
4. __________ $.5(xz) + y^2 + 15$ **15 + 4 + 15 = 34**
5. __________ $x^2 + y^2 + z^2$ **36 + 4 + 25 = 65**

Problem Set II: Use x= –2, y= 4, and z= 3.

1. __________ $4(x - y) + z^2 + 24$ **–24 + 9 + 24 = 9**
2. __________ $2(x + y) + (z - 1)^2 - 2$ **4 + 4 – 2 = 6**
3. __________ $(x + z) + (y - 3)^2 - 1$ **1 + 1 + – 1 = 1**
4. __________ $.5(y^2) - x + 8z$ **8 + 2 + 24 = 34**
5. __________ $1.5(yz) + x^2$ **6 + 4 = 10**

Problem Set III: Use x= –4, y= 8, and z= –1.

1. __________ $2(x - y) + (z - 5)^2 + 6$ **–6 + 36 + 6 = 36**
2. __________ $x(-5) + (10 - y)^2 - 5z$ **20 + 4 + 5 = 29**
3. __________ $-(2x - 8) + (.5y - 12)^2 + 6z$ **16 + 16 – 6 = 26**
4. __________ $.5(x + 20) + (10 + yz)^2 + 2x$ **8 + 4 –2 = 10**
5. __________ $2.5(y) + (2.5 + 3.5)^2 - xyz$ **20 + 36 – 32 = 24**

Algebra to the Core

Task Rotation Activity

Algebraic Expressions 2.3

Name ______________________

Period ______________________

Date ______________________

Directions: Perform each math task.

Order of Operations:

Parentheses, (simplify inside symbols of inclusion)
Exponents,
Multiplication and Division, (as they occur left to right)
Addition and Subtraction (as they occur left to right)

Mastery Task:

Simplify each algebraic expression.

$x = 2$, $y = –3$, and $z = 6$

1. $x(5 + y) + z^2$
2. $2(z – x) + y^2 – 1$
3. $5(x + y)^2 + (y + z)^2 –$
4. $.5(yz) + (x + 2)^2 + 4$
5. $x^2 + y^2 + z^2$

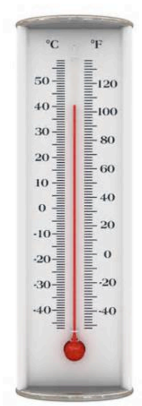
Interpersonal Task:

Work with a partner. Let x= the number associated with the day of the month you celebrate your birthday. Let y= the number formed by the last two digits of your phone number. Evaluate the expression below and determine whose numbers generate the greatest value.

$$(x – 10)^2 – (50 – y) + 2$$

Understanding Task:

The expressions below convert fahrenheit temperatures to celsius and celsius temperatures to fahrenheit. Use the expressions to convert 32º F to C, and 100º C to F.



$$(F° - 32) \times (5 / 9)$$

$$(C° \times 9/5) + 32$$

Self-Expressive Task:

Create an algebraic expression that can be used to rate a friend. For example, the variable n can be used for the number of nice things the friend has done for you. Include other variables for other characteristics. The impact of a given variable x can be controlled by it's coefficient. For example, 2x, 5x, or –2x. Try out your expression on a fictitious friend. Be prepared to share your formula with the class.

Algebra to the Core

Practice Makes Perfect

Combining Polynomials 3.1

Name ______________________

Period ______________________

Date ______________________

Directions: Combine each pair of polynomials.

Combining Like Terms:

$5x^2$ and $3x^2$ are like terms. Note that like terms can have different coefficients (5 and 3 in this example), but must have the same variable structures (x^2 and x^2) in this case. Like terms can be added or subtracted. Note: $5x^2 + 3x^2 = 8x^2$ and $5x^2 - 3x^2 = 2x^2$.

Problem Set I: Add the following polynomials.

1. __________ $(4x^2 + 1) + (2x^2 + 4)$
2. __________ $(3x^2 + 2x + 5) + (4x^2 + x + 1)$
3. __________ $(5x^2 + 3x + 2) + (5x^2 + 6x + 8)$
4. __________ $(8x^2 + 7x + 15) + (3x^2 + x + 5)$
5. __________ $(3a^2 + 5) + (2a^2 + 6)$

Problem Set II: Add or subtract the following polynomials.

1. __________ $(2x^2 + 4x + 8) + (3x^2 - 2x - 3)$
2. __________ $(9x^2 + 7x + 3) + (2x^2 - 3x + 4)$
3. __________ $(6x^2 + 5x + 12) - (3x^2 + x + 4)$
4. __________ $(7a^2 + 6b + 2) - (5a^2 + 4b + 1)$
5. __________ $(6y^2 + 6x + 1) - (4y^2 + 5y + 1)$

Problem Set III: Add or subtract the following polynomials.

1. __________ $(5x^2 - 3x + 2) + (5x^2 - 4x - 3)$
2. __________ $(2x^2 - 5x - 9) + (-3x^2 - x - 5)$
3. __________ $(3x^2 + 2x + 1) - (-3x^2 - 2x - 5)$
4. __________ $(6y^2 + 9y + 3) - (5y^2 - 3y + 3)$
5. __________ $(8a^2 + 4b - 1) + (2a^2 - 5b - 1)$

Algebra to the Core

Practice Makes Perfect

Combining Polynomials 3.1

Solution Key

Directions: Combine each pair of polynomials.

Combining Like Terms:

$5x^2$ and $3x^2$ are like terms. Note that like terms can have different coefficients (5 and 3 in this example), but must have the same variable structures (x^2 and x^2) in this case. Like terms can be added or subtracted. Note:

$5x^2 + 3x^2 = 8x^2$ and $5x^2 - 3x^2 = 2x^2$.

Problem Set I: Add the following polynomials.

1. __________ $(4x^2 + 1) + (2x^2 + 4)$ **$6x^2 + 5$**
2. __________ $(3x^2 + 2x + 5) + (4x^2 + x + 1)$ **$7x^2 + 3x + 6$**
3. __________ $(5x^2 + 3x + 2) + (5x^2 + 6x + 8)$ **$10x^2 + 9x + 10$**
4. __________ $(8x^2 + 7x + 15) + (3x^2 + x + 5)$ **$11x^2 + 8x + 20$**
5. __________ $(3a^2 + 5) + (2a^2 + 6)$ **$5a^2 + 11$**

Problem Set II: Add or subtract the following polynomials.

1. __________ $(2x^2 + 4x + 8) + (3x^2 - 2x - 3)$ **$5x^2 + 2x + 5$**
2. __________ $(9x^2 + 7x + 3) + (2x^2 - 3x + 4)$ **$11x^2 + 4x + 7$**
3. __________ $(6x^2 + 5x + 12) - (3x^2 + x + 4)$ **$3x^2 + 4x + 8$**
4. __________ $(7a^2 + 6b + 2) - (5a^2 + 4b + 1)$ **$2a^2 + 2b + 1$**
5. __________ $(6y^2 + 6x + 1) - (4y^2 + 5y + 1)$ **$2y^2 + y$**

Problem Set III: Add or subtract the following polynomials.

1. __________ $(5x^2 - 3x + 2) + (5x^2 - 4x - 3)$ **$10x^2 - 7x - 1$**
2. __________ $(2x^2 - 5x - 9) + (-3x^2 - x - 5)$ **$-x^2 - 6x - 14$**
3. __________ $(3x^2 + 2x + 1) - (-3x^2 - 2x - 5)$ **$6x^2 + 4x + 6$**
4. __________ $(6y^2 + 9y + 3) - (5y^2 - 3y + 3)$ **$y^2 + 12y$**
5. __________ $(8a^2 + 4b - 1) + (2a^2 - 5b - 1)$ **$10a^2 - b - 2$**

Algebra to the Core

Practice Makes Perfect

Combining Polynomials 3.2

Name __________________

Period __________________

Date __________________

Directions: Combine each pair of polynomials.

Combining Like Terms:

$5x^2$ and $3x^2$ are like terms. Note that like terms can have different coefficients (5 and 3 in this example), but must have the same variable structures (x^2 and x^2) in this case. Like terms can be added or subtracted. Note:
$5x^2 + 3x^2 = 8x^2$ and $5x^2 - 3x^2 = 2x^2$.

Problem Set I: Add the following polynomials.

1. __________ $(2t^2 + 6) + (8t^2 + 4)$
2. __________ $(7m^2 + 3m + 8) + (7m^2 + 3m + 8)$
3. __________ $(8x^2 + 6x + 4) + (2x^2 + 6x + 7)$
4. __________ $(9y^2 + 5y + 6) + (7y^2 + y + 8)$
5. __________ $(8a^2 + 4) + (6a^2 + 4)$

Problem Set II: Add or subtract the following polynomials.

1. __________ $(5x^2 + 5x + 7) + (2x^2 - 2x - 6)$
2. __________ $(7m^2 + 4m + 7) + (5m^2 - 3m + 6)$
3. __________ $(2a^2 + a + 1) - (3a^2 + 2a + 2)$
4. __________ $(9a^3 + 6a^2 + 2a) - (4a^3 + 4a^2 + a)$
5. __________ $(8y^2 + 4y + 5) - (6y^2 + y + 3)$

Problem Set III: Add or subtract the following polynomials.

1. __________ $(9x^2 - 9x + 9) + (4x^2 - 6x - 8)$
2. __________ $(-2x^2 - 4x - 3) + (-2x^2 - 2x - 8)$
3. __________ $(2y^5 + 2y^3 + 9) - (-2y^5 - 4y^3 - 1)$
4. __________ $(10y^2 + y) - (5y^2 - 10y + 3)$
5. __________ $(a^2 + 6b - c) + (6a^2 - 6b - 4d)$

Algebra to the Core

Practice Makes Perfect

Combining Polynomials 3.2

Solution Key

Directions: Combine each pair of polynomials.

Combining Like Terms:

$5x^2$ and $3x^2$ are like terms. Note that like terms can have different coefficients (5 and 3 in this example), but must have the same variable structures (x^2 and x^2) in this case. Like terms can be added or subtracted. Note:
$5x^2 + 3x^2 = 8x^2$ and $5x^2 - 3x^2 = 2x^2$.

Problem Set I: Add the following polynomials.

1. __________ $(2t^2 + 6) + (8t^2 + 4)$ **$10t^2 + 10$**
2. __________ $(7m^2 + 3m + 8) + (7m^2 + 3m + 8)$ **$14m^2 + 6m + 16$**
3. __________ $(8x^2 + 6x + 4) + (2x^2 + 6x + 7)$ **$10x^2 + 12x + 11$**
4. __________ $(9y^2 + 5y + 6) + (7y^2 + y + 8)$ **$16y^2 + 6y + 14$**
5. __________ $(8a^2 + 4) + (6a^2 + 4)$ **$14a^2 + 8$**

Problem Set II: Add or subtract the following polynomials.

1. __________ $(5x^2 + 5x + 7) + (2x^2 - 2x - 6)$ **$7x^2 + 3x + 1$**
2. __________ $(7m^2 + 4m + 7) + (5m^2 - 3m + 6)$ **$12m^2 + m + 13$**
3. __________ $(2a^2 + a + 1) - (3a^2 + 2a + 2)$ **$-a^2 - a - 1$**
4. __________ $(9a^3 + 6a^2 + 2a) - (4a^3 + 4a^2 + a)$ **$5a^3 + 2a^2 + a$**
5. __________ $(8y^2 + 4y + 5) - (6y^2 + y + 3)$ **$2y^2 + 3y + 2$**

Problem Set III: Add or subtract the following polynomials.

1. __________ $(9x^2 - 9x + 9) + (4x^2 - 6x - 8)$ **$13x^2 - 15x + 1$**
2. __________ $(-2x^2 - 4x - 3) + (-2x^2 - 2x - 8)$ **$-4x^2 - 6x - 11$**
3. __________ $(2y^5 + 2y^3 + 9) - (-2y^5 - 4y^3 - 1)$ **$4y^5 + 6y^3 + 10$**
4. __________ $(10y^2 + y) - (5y^2 - 10y + 3)$ **$5y^2 + 11y - 3$**
5. __________ $(a^2 + 6b - c) + (6a^2 - 6b - 4d)$ **$7a^2 - 12b - c - 4d$**

Algebra to the Core

Task Rotation Activity

Combining Polynomials 3.3

Name ______________________

Period ______________________

Date ______________________

Directions: Perform each math task.

Combining Like Terms:

$5x^2$ and $3x^2$ are like terms. Note that like terms can have different coefficients (5 and 3 in this example), but must have the same variable structures (x^2 and x^2) in this case. Like terms can be added or subtracted. Note: $5x^2 + 3x^2 = 8x^2$ and $5x^2 – 3x^2 = 2x^2$.

Mastery Task:

Combine the polynomials.

1. $(4t^2 + 8) + (2t^2 – 10)$
2. $(4x^2 + 2x + 1) + (x^2 + 2x + 4)$
3. $(3a^2 + b) + (2a^2 + b)$
4. $(6m^2 + 2m + 1) + (5m^2 – 2m + 1)$
5. $(5x^2 + y^2 + z^2) – (6x^2 + y^2 – z^2)$

Interpersonal Task:

Work with a partner. Study the progression of polynomials below. Identify and use the pattern to determine the next two polynomials. Find the sum of all five polynomials.

$2x^2 – 5x + 4$

$5x^2 + 11x + 9$

$11x^2 – 23x + 19$

Understanding Task:

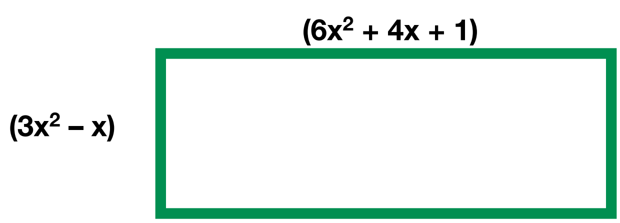
Explain how the rules for combining polynomials is similar to the rules for adding and subtracting fractions. Use the examples below in your argument.

$(2/3) + (3/5) + (4/3) – (1/5)$

$(2x^2 + 3x + 2) + (4x^2 – 1x + 6)$

Self-Expressive Task:

Assume that the length and width of a rectangle are represented by $(6x^2 + 4x + 1)$ and $(3x^2 – x)$. Compute the perimeter of the rectangle. Assume that x=1. What are the numeric values of the length and width of the rectangle? Does the numeric value of the perimeter equal the polynomial value of the perimeter? How can you verify that both answers are the same?



Algebra to the Core

Practice Makes Perfect

Solving Equations 4.1

Name ____________________

Period ____________________

Date ____________________

Directions: Solve each equation for x. Check your answer by substituting and evaluating both sides of the equation.

Solving an Equation by Inspection

Step 1: Identify and hide the variable term.

Step 2. Determine what number is needed to balance the equation.

Step 3: Reveal the variable expression and determine the value of x needed to solve the equation.

Step 4: Substitute and check your answer.

Problem Set I

1. __________ $6x + 6 = 18$
2. __________ $5x + 11 = 46$
3. __________ $2x + 5 = 25$
4. __________ $.5x + 10 = 14$
5. __________ $x^2 + 11 = 20$

Problem Set II

1. __________ $3x - 5 = 10$
2. __________ $2(x + 1) + 2 = 14$
3. __________ $2x^2 + 9 = 59$
4. __________ $.5x - 4 = -6$
5. __________ $x^2 + 1 = 50$

Problem Set III

1. __________ $2.5x + 5 = 20$
2. __________ $2(x + 5) + 10 = 28$
3. __________ $4x^2 + 6 = 60$
4. __________ $.5x - 2 = 10$
5. __________ $x^2 - 25 = 75$

Algebra to the Core

Practice Makes Perfect

Solving Equations 4.1

Solution Key

Directions: Solve each equation for x. Check your answer by substituting and evaluating both sides of the equation.

Solving an Equation by Inspection

Step 1: Identify and hide the variable term.

Step 2. Determine what number is needed to balance the equation.

Step 3: Reveal the variable expression and determine the value of x needed to solve the equation.

Step 4: Substitute and check your answer.

Problem Set I

1. ________ $6x + 6 = 18$ **$x = 2$**
2. ________ $5x + 11 = 46$ **$x = 7$**
3. ________ $2x + 5 = 25$ **$x = 10$**
4. ________ $.5x + 10 = 14$ **$x = 8$**
5. ________ $x^2 + 11 = 20$ **$x = +3$ or -3**

Problem Set II

1. ________ $3x - 5 = 10$ **$x = 5$**
2. ________ $2(x + 1) + 2 = 14$ **$x = 5$**
3. ________ $2x^2 + 9 = 59$ **$x = 5$ or -5**
4. ________ $.5x - 4 = -6$ **$x = -4$**
5. ________ $x^2 + 1 = 50$ **$x = 7$ or -7**

Problem Set III

1. ________ $2.5x + 5 = 20$ **$x = 6$**
2. ________ $2(x + 5) + 10 = 28$ **$x = 4$**
3. ________ $4x^2 + 6 = 60$ **$x = 4$ or $x = -4$**
4. ________ $.5x - 2 = 10$ **$x = 24$**
5. ________ $x^2 - 25 = 75$ **$x = 10$ or -10**

Algebra to the Core

Practice Makes Perfect

Solving Equations 4.2

Name ____________________

Period ____________________

Date ____________________

Directions: Solve each equation for x. Check your answer by substituting and evaluating both sides of the equation.

Solving an Equation by Inspection

Step 1: Identify and hide the variable term.

Step 2. Determine what number is needed to balance the equation.

Step 3: Reveal the variable expression and determine the value of x needed to solve the equation.

Step 4: Substitute and check your answer.

Problem Set I

1. __________ $7x + 6 = 48$
2. __________ $11x + 2 = 35$
3. __________ $2x + 28 = 30$
4. __________ $.5x + 16 = 20$
5. _________ $x^2 + 50 = 150$

Problem Set II

1. __________ $8x - 4 = 20$
2. __________ $2(x + 5) + 2 = 20$
3. __________ $2x^2 + 12 = 30$
4. __________ $.5x - 3 = 0$
5. _________ $x^2 + 16 = 20$

Problem Set III

1. __________ $2.5x + 5 = 30$
2. __________ $2(x + 3) + 10 = 26$
3. __________ $7x^2 + 7 = 70$
4. __________ $.5x + 3 = 10$
5. _________ $x^2 - 11 = 70$

Algebra to the Core

Practice Makes Perfect

Solving Equations 4.2

Solution Key

Directions: Solve each equation for x. Check your answer by substituting and evaluating both sides of the equation.

Solving an Equation by Inspection

Step 1: Identify and hide the variable term.

Step 2. Determine what number is needed to balance the equation.

Step 3: Reveal the variable expression and determine the value of x needed to solve the equation.

Step 4: Substitute and check your answer.

Problem Set I

1. ________ $7x + 6 = 48$ **$x = 6$**
2. ________ $11x + 2 = 35$ **$x = 3$**
3. ________ $2x + 28 = 30$ **$x = 1$**
4. ________ $.5x + 16 = 20$ **$x = 8$**
5. ________ $x^2 + 50 = 150$ **$x = +10$ or -10**

Problem Set II

1. ________ $8x - 4 = 20$ **$x = 3$**
2. ________ $2(x + 5) + 2 = 20$ **$x = 4$**
3. ________ $2x^2 + 12 = 30$ **$x = 3$ or -3**
4. ________ $.5x - 3 = 0$ **$x = 6$**
5. ________ $x^2 + 16 = 20$ **$x = 2$ or -2**

Problem Set III

1. ________ $2.5x + 5 = 30$ **$x = 10$**
2. ________ $2(x + 3) + 10 = 26$ **$x = 5$**
3. ________ $7x^2 + 7 = 70$ **$x = 3$ or $x = -3$**
4. ________ $.5x + 3 = 10$ **$x = 14$**
5. ________ $x^2 - 11 = 70$ **$x = 9$ or -9**

Algebra to the Core

Task Rotation Activity

Solving Equations 4.3

Name ______________________

Period ______________________

Date ______________________

Directions: Perform each math task.

Solving an Equation by Inspection

Step 1: Identify and hide the variable term.

Step 2. Determine what number is needed to balance the equation.

Step 3: Reveal the variable expression and determine the value of x needed to solve the equation.

Step 4: Substitute and check your answer.

Mastery Task:

Solve by Inspection.

1. $4t^2 + 8 = 44$
2. $8x + 4 = 60$
3. $5(x - 1) = 45$
4. $.5x + 18 = 22$
5. $5x^2 + 4 = 40$

Interpersonal Task:

Work with a partner. Create an equation of the form ax + b = c so the solution x equals the number of the month you were born (1, 2, 3, . . . 12). Check to make sure your equation works and swap equations with a partner and solve each others' equation.

Understanding Task:

Explain how the process of solving an equation by inspection can be used to solve an equation with fraction, like the two below.

$$2x + 4\frac{1}{2} = 5$$

$$3x + 6\frac{1}{4} = 7$$

Self-Expressive Task:

Create five equations of the form

$$ax + b = c,$$
$$a(x + b) + c = d, \text{ and / or}$$
$$ax^2 + b = c.$$

The solutions of your equations should be five different prime numbers. Solve and check your equations to be sure they work. Be prepared to share your equations with the class.

Algebra to the Core

Practice Makes Perfect

Understanding Functions 5.1

Name ________________________

Period ________________________

Date ________________________

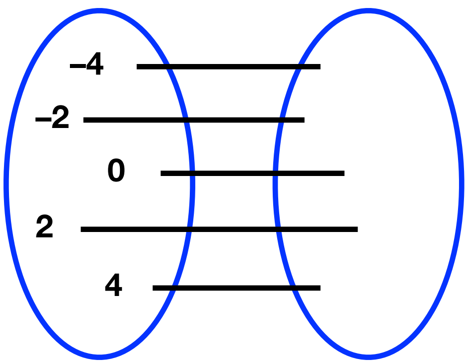
Directions: Read and answer each question.

What is a function?

A function is a specified or non-specified relationship between the elements of a domain and the corresponding elements of a range. For a function to occur, each element of the domain must correspond to one and only one element in the range.

Complete the function diagram.

function rule: double and add five



T- tables

Use y = 5x + 1 to complete the T-table.

x	y
0	
1	
2	
3	
4	
5	

Each relation represents a function. Discover the rule and complete each relation.

A: { (–3, –6), (–2, –4), (–1, –2), (0, 0), (1, 2), (2,), (3,), (4,), (5,), (x,) }

B: { (–3, –1), (–2, 0), (–1, 1), (0, 2), (1, 3), (2,), (3,), (4,), (5,), (x,) }

C: { (–3, 9), (–2, 4), (–1, 1), (0, 0), (1, 1), (2,), (3,), (4,), (5,), (x,) }

D: { (–3, –5), (–2, –4), (–1, –3), (0, –2), (1, –1), (2,), (3,), (4,), (5,), (x,) }

Representations of functions: **Use the rule 'Take half and add one', along with the domain elements –4, –2, 0, 2, 4, 6, and create and complete a function diagram, a relation, and a T-table.**

Algebra to the Core
Practice Makes Perfect
Understanding Functions 5.1

Solution Key

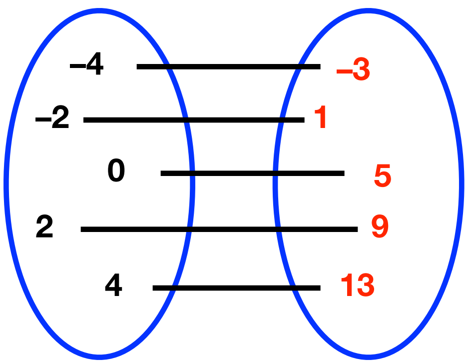
Directions: Read and answer each question.

What is a function?

A function is a specified or non-specified relationship between the elements of a domain and the corresponding elements of a range. For a function to occur, each element of the domain must correspond to one and only one element in the range.

Complete the function diagram.

function rule: double and add five



T- tables

Use y = 5x + 1 to complete the T-table.

x	y
0	1
1	6
2	11
3	16
4	21
5	26

Each relation represents a function. Discover the rule and complete each relation.

A: { (–3, –6), (–2, –4), (–1, –2), (0, 0), (1, 2), (2, 4), (3, 6), (4, 8), (5, 10), (x, 2x) }

B: { (–3, –1), (–2, 0), (–1, 1), (0, 2), (1, 3), (2, 4), (3, 5), (4, 6), (5, 7), (x, x + 2) }

C: { (–3, 9), (–2, 4), (–1, 1), (0, 0), (1, 1), (2, 4), (3, 9), (4, 16), (5, 25), (x, x^2) }

D: { (–3, –5), (–2, –4), (–1, –3), (0, –2), (1, –1), (2, 0), (3, 1), (4, 2), (5, 3), (x, x – 2) }

Representations of functions: Use the rule 'Take half and add one', along with the domain elements –4, –2, 0, 2, 4, 6, and create and complete a function diagram, a relation, and a T-table. Answers should reflect the ordered pairs (–4, –1), (–2, 0), (0, 1), (2, 2), (4, 3), and (6,4).

Algebra to the Core

Practice Makes Perfect

Understanding Functions 5.2

Name ____________________

Period ____________________

Date ____________________

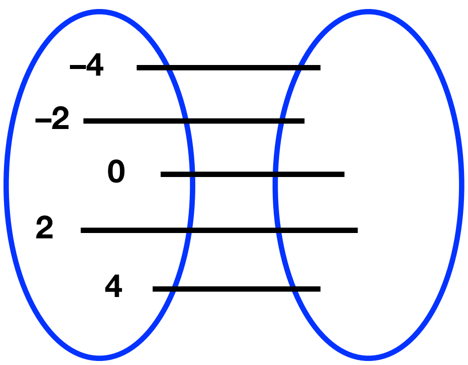
Directions: Read and answer each question.

What is a function?

A function is a specified or non-specified relationship between the elements of a domain and the corresponding elements of a range. For a function to occur, each element of the domain must correspond to one and only one element in the range.

Complete the function diagram.

function rule: triple and add one



T- tables

Use y = 2x – 1 to complete the T-table.

x	y
0	
1	
2	
3	
4	
5	

Each relation represents a function. Discover the rule and complete each relation.

A: { (–3, –12), (–2, –8), (–1, –4), (0, 0), (1, 4), (2,), (3,), (4,), (5,), (x,) }

B: { (–3, –6), (–2, –5), (–1, –4), (0, –3), (1, –2), (2,), (3,), (4,), (5,), (x,) }

C: { (–3, –27), (–2, –8), (–1, –1), (0, 0), (1, 1), (2,), (3,), (4,), (5,), (x,) }

D: { (–3, 7), (–2, 8), (–1, 9), (0, 10), (1, 11), (2,), (3,), (4,), (5,), (x,) }

Representations of functions: **Use the rule 'Take 25% and add two', along with the domain elements –8, –4, 0, 4, 8, 12, and create and complete a function diagram, a relation, and a T-table.**

Algebra to the Core

Practice Makes Perfect

Understanding Functions 5.2

Solution Key

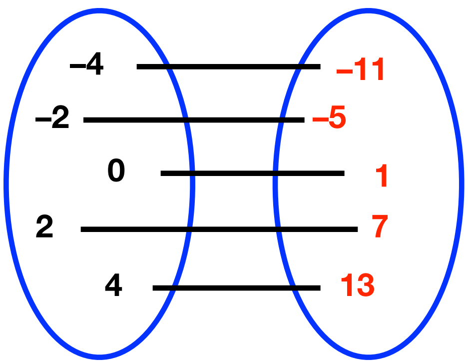
Directions: Read and answer each question.

What is a function?

A function is a specified or non-specified relationship between the elements of a domain and the corresponding elements of a range. For a function to occur, each element of the domain must correspond to one and only one element in the range.

Complete the function diagram.

function rule: triple and add one



T- tables

Use y = 2x – 1 to complete the T-table.

x	y
0	–1
1	1
2	3
3	5
4	7
5	9

Each relation represents a function. Discover the rule and complete each relation.

A: { (–3, –12), (–2, –8), (–1, –4), (0, 0), (1, 4), (2, 8), (3, 12), (4, 16), (5, 20), (x, 4x) }

B: { (–3, –6), (–2, –5), (–1, –4), (0, –3), (1, –2), (2, –1), (3, 0), (4, 1), (5, 2), (x, x – 3) }

C: { (–3, –27), (–2, –8), (–1, –1), (0, 0), (1, 1), (2, 8), (3, 27), (4, 64), (5, 125), (x, x^3) }

D: { (–3, 7), (–2, 8), (–1, 9), (0, 10), (1, 11), (2, 12), (3, 13), (4, 14), (5, 15), (x, x + 10) }

Representations of functions: Use the rule 'Take 25% and add two', along with the domain elements –8, –4, 0, 4, 8, 12, and create and complete a function diagram, a relation, and a T-table. Answers should reflect the ordered pairs (–8, 0), (–4, 1), (0, 2), (4, 3), (8, 4), and (12,5).

Algebra to the Core

Task Rotation Activity

Understanding Functions 5.3

Name ____________________

Period ____________________

Date ____________________

Directions: Perform each math task.

What is a function?

A function is a specified or non-specified relationship between the elements of a domain and the corresponding elements of a range. For a function to occur, each element of the domain must correspond to one and only one element in the range.

Mastery Task:

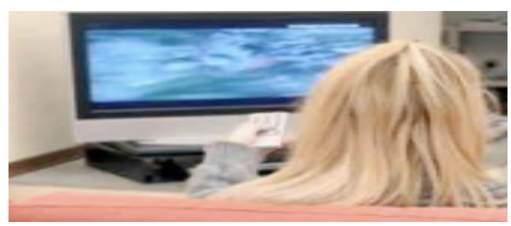
Use y= 2x + 10 to complete the relation and T-table

{(0,), (1,), (2,), (3,), (4,), (5,)}

x	y
–1	
–2	
–3	
–4	
–5	

Interpersonal Task:

Work with a partner. Assume that the students in your class constitute a domain. Assume that each student was asked to report the number of hours (rounded to the nearest 1/2 hour) of television he or she watched the day before. Would the data constitute a function? Why or why not?



Understanding Task:

Does the following constitute a function? Why or why not?

C → S
I → Q
R → U
C → A
L → R
E → E

Self-Expressive Task:

The relation {(0,4), (1,3), (2,3), (3,5), (4,4), (5,4), ... } is a function. Explain why. Can you guess the rule? At first glance, most people can't.

Function Rule

Create a similar function defined by an 'out of the box' rule. Provide the data to a friend. Challenge the friend to determine your function rule.

Algebra to the Core

Practice Makes Perfect

Graphing a Function 6.1

Name ____________________

Period ____________________

Date ____________________

Directions: Read and answer each question.

How to graph the solution of a function:

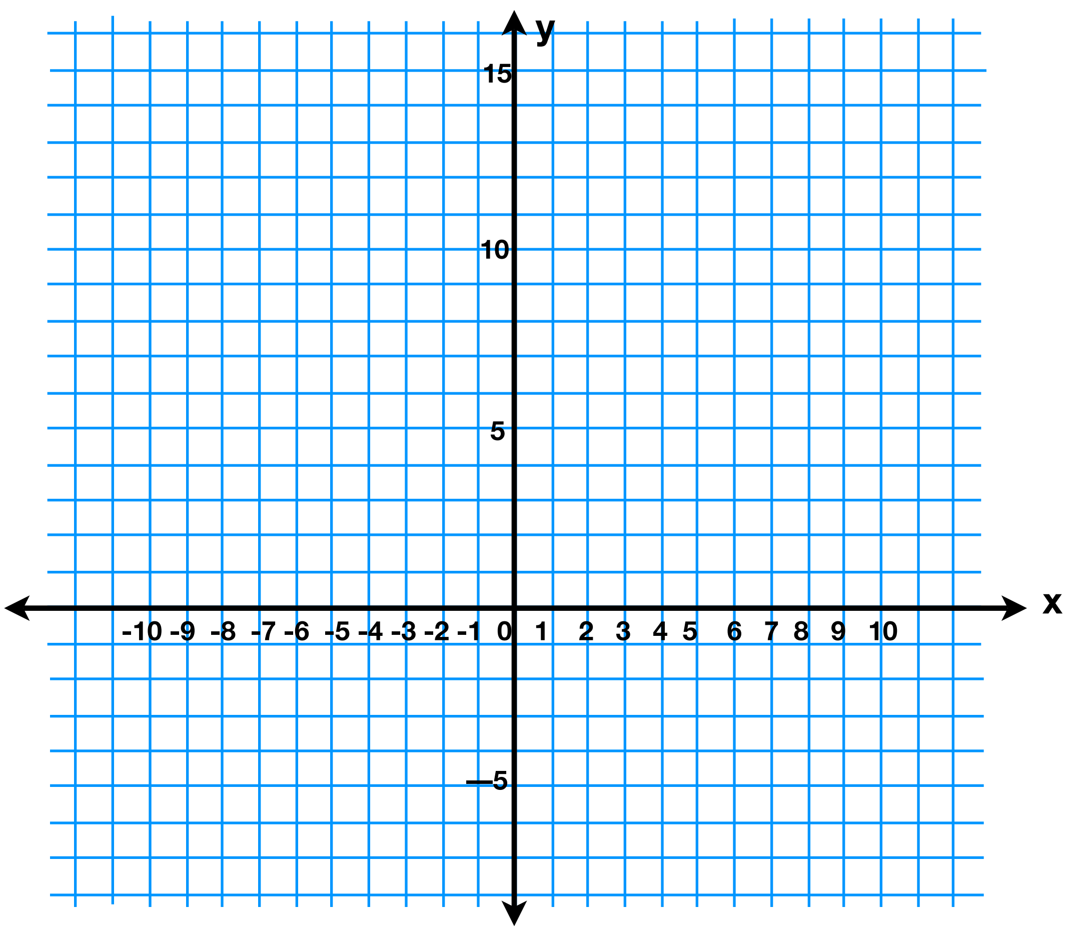
To graph the solution of the equation y= 2x + 1, identify the question being asked by the equation: 'What is one more than twice the value of x?'. Apply the question to arbitrary values of x (numbers associated with the x-axis of a coordinate plane). Plot points, above (+) or below (–) each x number, a number of units equal to the answer to the question. Draw the line that contains the plotted points.

Graph the solution of each equation. The associated question is provided.

1) $y = 2x + 5$ (What is 5 more than twice the value of x?; Apply to x= 0, 1, 2, and 3.)

2) $y = .5x + 10$ (What is 10 more than half the value of x?; Apply to x= 0, 2, 4, and 6.)

3) $y = x^2$ (What is the square of x?; Apply to x= -4, -3. -2, -1, 0, 1, 2, 3, and 4.)



Algebra to the Core
Practice Makes Perfect
Graphing a Function 6.1

Solution Key

Directions: Sketch the graph of the solution of each equation.

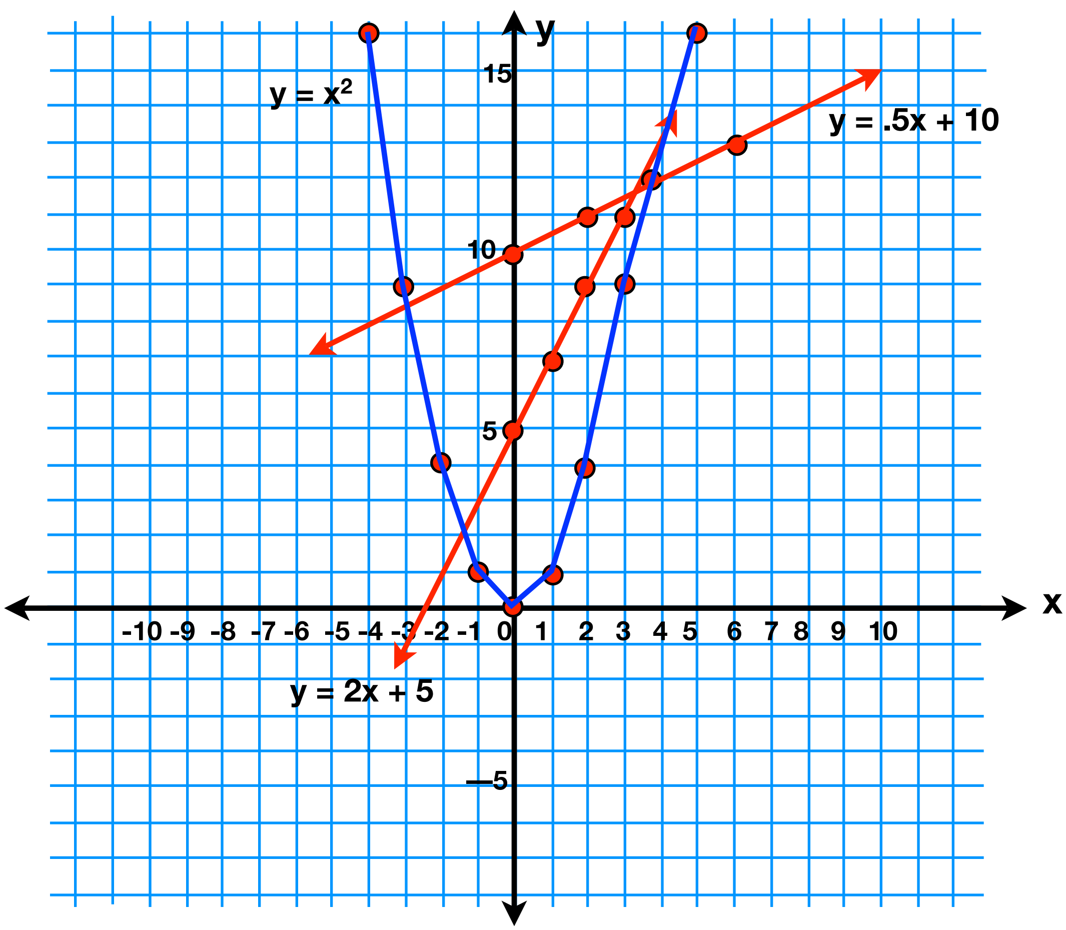
How to graph the solution of a function:
To graph the solution of the equation y= 2x + 1, identify the question being asked by the equation: 'What is one more than twice the value of x?'. Apply the question to arbitrary values of x (numbers associated with the x-axis of a coordinate plane). Plot points, above (+) or below (–) each x number, a number of units equal to the answer to the question. Draw the line that contains the plotted points.

Graph the solution of each equation. The associated question is provided.

1) $y = 2x + 5$ (What is 5 more than twice the value of x?; Apply to x= 0, 1, 2, and 3.)

2) $y = .5x + 10$ (What is 10 more than half the value of x?; Apply to x= 0, 2, 4, and 6.)

3) $y = x^2$ (What is the square of x?; Apply to x= -4, -3. -2, -1, 0, 1, 2, 3, and 4.)



Algebra to the Core

Practice Makes Perfect

Graphing a Function 6.2

Name ______________________

Period ______________________

Date ______________________

Directions: Sketch the graph of the solution of each equation.

How to graph the solution of a function:

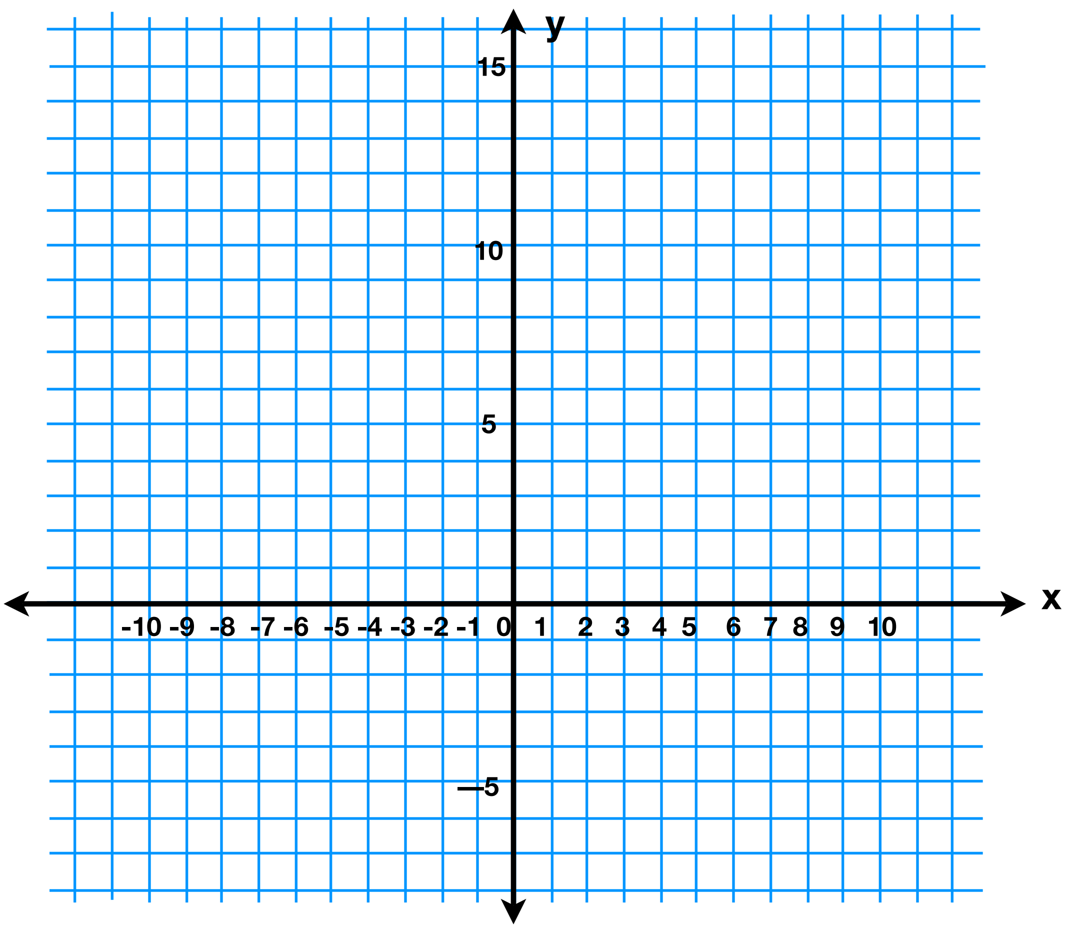
To graph the solution of the equation y= 2x + 1, identify the question being asked by the equation: 'What is one more than twice the value of x?'. Apply the question to arbitrary values of x (numbers associated with the x-axis of a coordinate plane). Plot points, above (+) or below (–) each x number, a number of units equal to the answer to the question. Draw the line that contains the plotted points.

Graph the solution of each equation. The associated question is provided.

1) $y = -x + 5$ (What is 5 more than the opposite of x?; Apply to x= 0, -3, -5, and -8.)

2) $y = .5x - 3$ (What is 3 less than half the value of x?; Apply to x= 0, 4, 6, and 10.)

3) $y = x^2 - 5$ (What is 5 less than the square of x?; Apply to x= -4, -3. -2, -1, 0, 1, 2, 3, and 4.)



Algebra to the Core

Practice Makes Perfect

Graphing a Function 6.2

Solution Key

Directions: Sketch the graph of the solution of each equation.

How to graph the solution of a function:

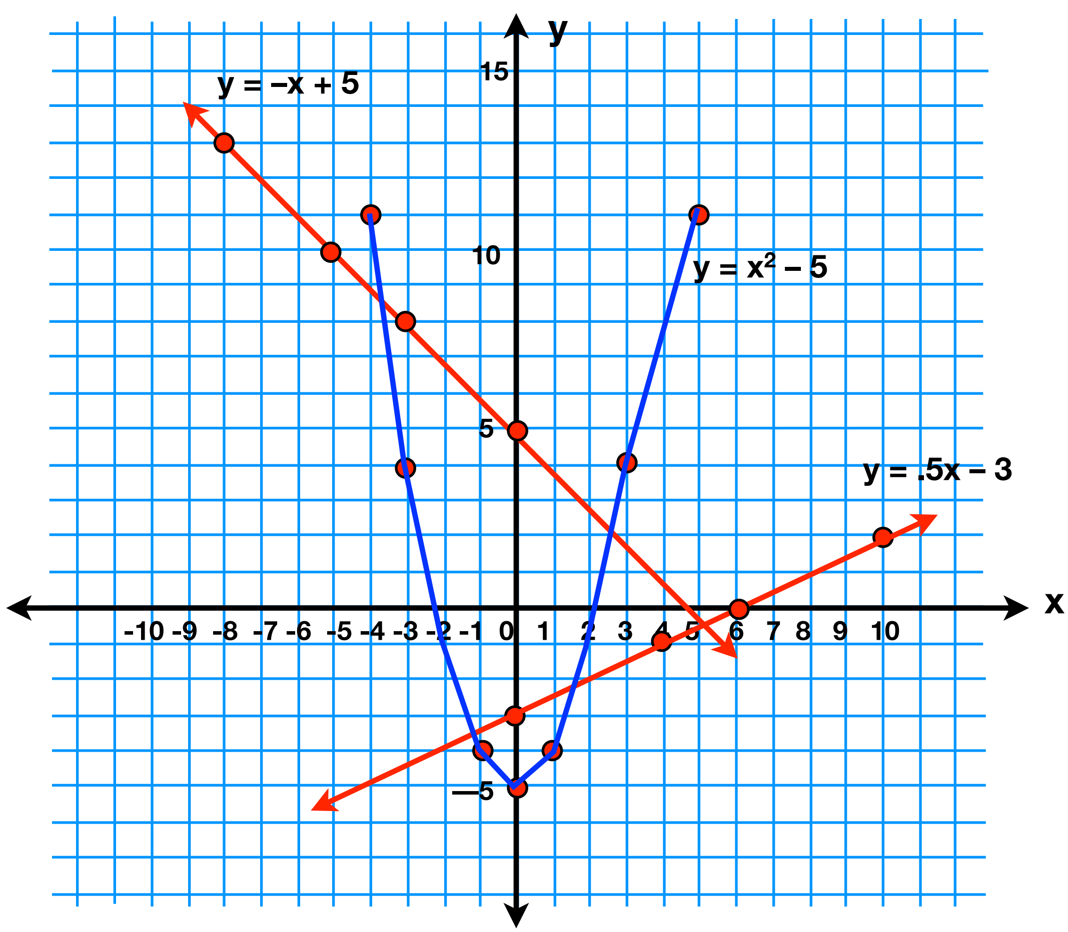
To graph the solution of the equation y= 2x + 1, identify the question being asked by the equation: 'What is one more than twice the value of x?'. Apply the question to arbitrary values of x (numbers associated with the x-axis of a coordinate plane). Plot points, above (+) or below (–) each x number, a number of units equal to the answer to the question. Draw the line that contains the plotted points.

Graph the solution of each equation. The associated question is provided.

1) $y = -x + 5$ (What is 5 more than the opposite of x?; Apply to x= 0, -3, -5, and -8.)

2) $y = .5x - 3$ (What is 3 less than half the value of x?; Apply to x= 0, 4, 6, and 10.)

3) $y = x^2 - 5$ (What is 5 less than the square of x?; Apply to x= -4, -3. -2, -1, 0, 1, 2, 3, and 4.)



Algebra to the Core

Task Rotation Activity

Graphing Functions 6.3

Name ______________________

Period ______________________

Date ______________________

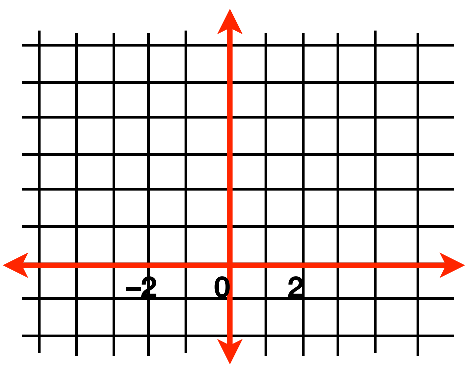
Directions: Perform each math task.

How to graph the solution of a function:

To graph the solution of the equation y= 2x + 1, identify the question being asked by the equation: 'What is one more than twice the value of x?'. Apply the question to arbitrary values of x (numbers associated with the x-axis of a coordinate plane). Plot points, above (+) or below (–) each x number, a number of units equal to the answer to the question. Draw the line that contains the plotted points.

Mastery Task:

Write the question associated with the equation y = x + 4. Apply the question to the numbers x= –2, 0, and 2, and plot the resulting points. Draw the line that contains the points. This is the graph of the solution of y= x + 4.



Understanding Task:

Use a coordinate plane to sketch the graphs of the solutions of the equations $y = x^2 + 4$ and $y = -x^2 + 4$. Describe the similarities and differences between the two graphs. What conjectures can you make regarding the negative sign (–) in front of the x, and the constant (+4) at the end of each equation?

Interpersonal Task:

The equation y = 2x + 5 is an example of an equation of the form y = (an expression of x). Virtually all equations of that form can be interpreted as a question or rule applied to various and arbitrary values of x. The question associated with y = 2x + 5 is 'What is five more than twice the value of x?'. Write the questions associated with the equations below. Share your questions with a partner. Discuss and resolve any differences that occur.

1. $y = 5x + 1$
2. $y = .5x - 1$
3. $y = 2x^2 + 3$

Self-Expressive Task:

Write the question associated with the equation $y = \pm\sqrt{x}$. Apply the question to the numbers x= 0, 4, 9, 16, 25 and sketch the resulting graph. Use the graph to create an argument as to why the equation and graph is a function, or why the equation and graph is not a function.

Algebra to the Core

Practice Makes Perfect

Graphing y- mx + b, M1, 7.1.1

Name ____________________

Period ____________________

Date ____________________

Directions: Read and answer each question.

How to graph the solution of a linear equation, y= mx + b: Method 1

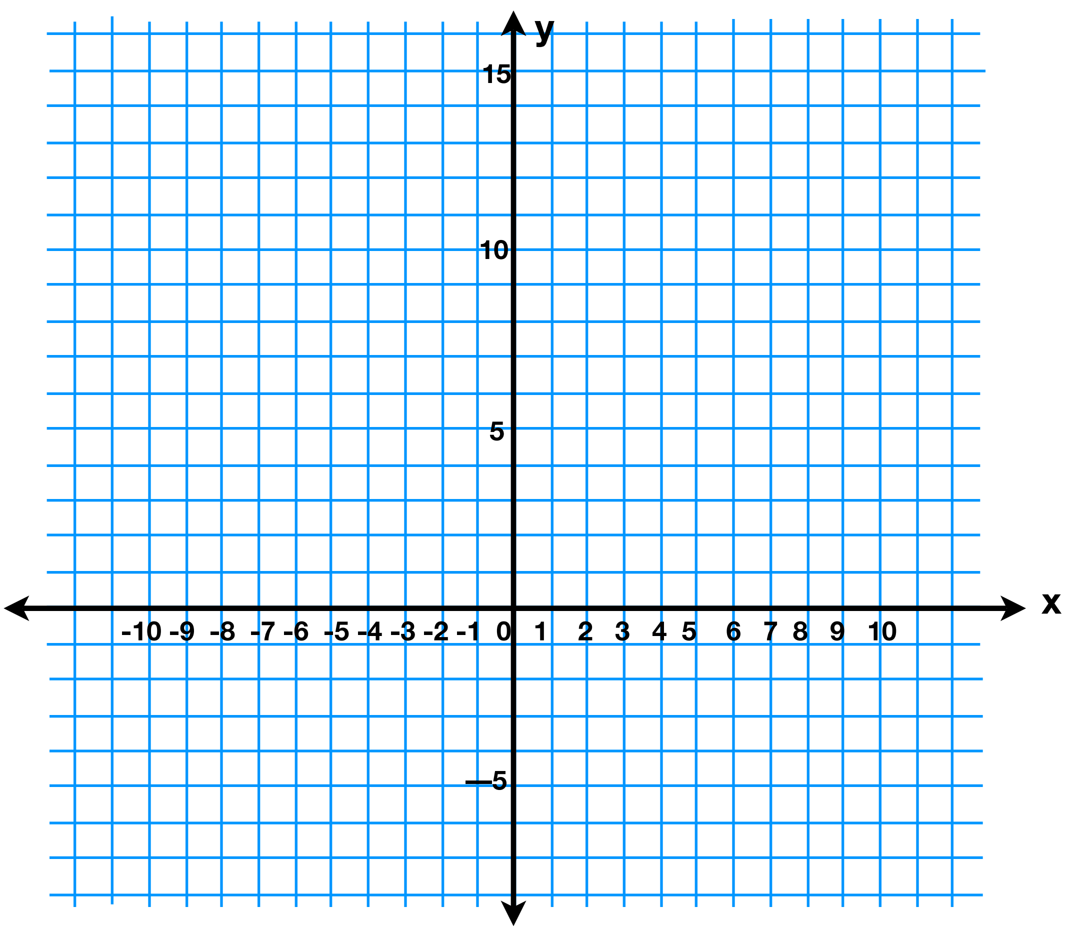
To graph the solution of the equation y= mx + b, identify the question being asked by the equation. Apply the question to arbitrary values of x (numbers associated with the x-axis of a coordinate plane). Plot points, above (+) or below (–) each x number, a number of units equal to the answer to the question. Draw the line that contains the plotted points.

Graph the solution of each equation. Determine the question being asked.

1) $y = 2x + 3$ (Determine the question. Apply the question to x= 0, 2, and 4.)

2) $y = .5x + 2$ (Determine the question. Apply the question to x= 0, 6, and 10.)

3) $y = -x + 4$ (Determine the question. Apply the question to x= –6, –3, and 0.)



Algebra to the Core

Practice Makes Perfect

Graphing y- mx + b, M1, 7.1.1

Solution Key

Directions: Sketch the graph of the solution of each equation.

How to graph the solution of a linear equation, y= mx + b: Method 1

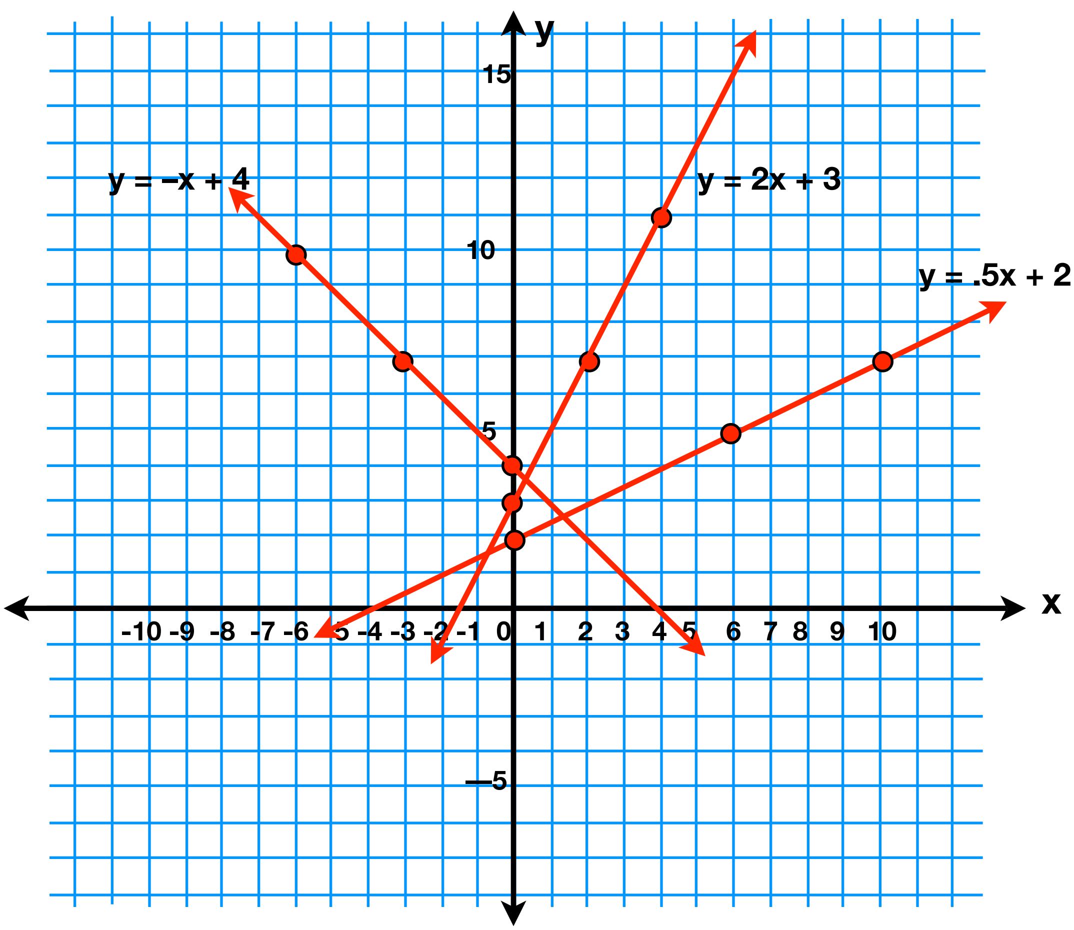
To graph the solution of the equation y= mx + b, identify the question being asked by the equation. Apply the question to arbitrary values of x (numbers associated with the x-axis of a coordinate plane). Plot points, above (+) or below (–) each x number, a number of units equal to the answer to the question. Draw the line that contains the plotted points.

Graph the solution of each equation. Determine the question being asked.

1) y = 2x + 3 (Determine the question. Apply the question to x= 0, 2, and 4.)

2) y = .5x + 2 (Determine the question. Apply the question to x= 0, 6, and 10.)

3) y = –x + 4 (Determine the question. Apply the question to x= –6, –3, and 0.)



Algebra to the Core

Practice Makes Perfect

Graphing y- mx + b, M1, 7.1.2

Name ____________________

Period ____________________

Date ____________________

Directions: Read and answer each question.

How to graph the solution of a linear equation, y= mx + b: Method 1

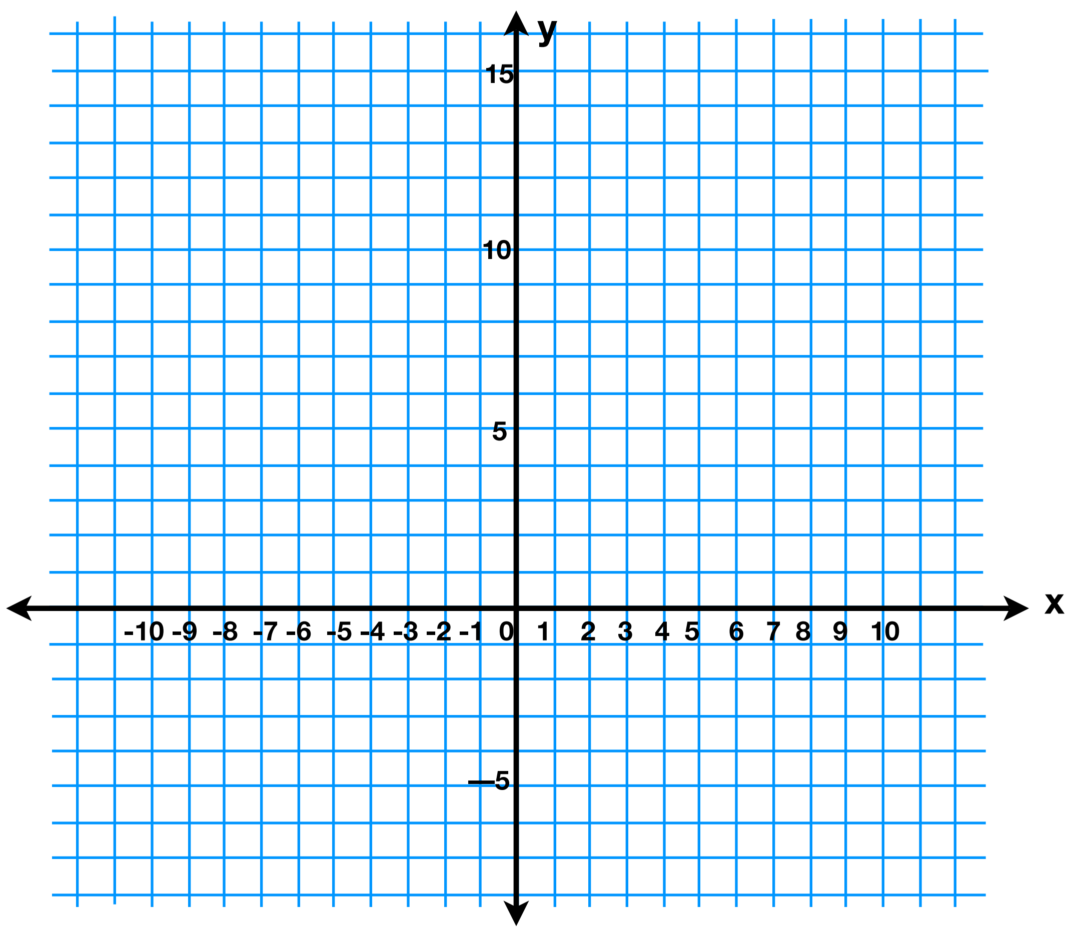
To graph the solution of the equation y= mx + b, identify the question being asked by the equation. Apply the question to arbitrary values of x (numbers associated with the x-axis of a coordinate plane). Plot points, above (+) or below (–) each x number, a number of units equal to the answer to the question. Draw the line that contains the plotted points.

Graph the solution of each equation. Determine the question being asked.

1) $y = 3x - 2$ (Determine the question. Apply the question to x= 0, 2, and 4.)

2) $y = .5x - 1$ (Determine the question. Apply the question to x= 0, 6, and 10.)

3) $y = -x + 6$ (Determine the question. Apply the question to x= –6, –3, and 0.)



Algebra to the Core

Practice Makes Perfect

Graphing y- mx + b, M1, 7.1.2

Solution Key

Directions: Sketch the graph of the solution of each equation.

How to graph the solution of a linear equation, y= mx + b: Method 1

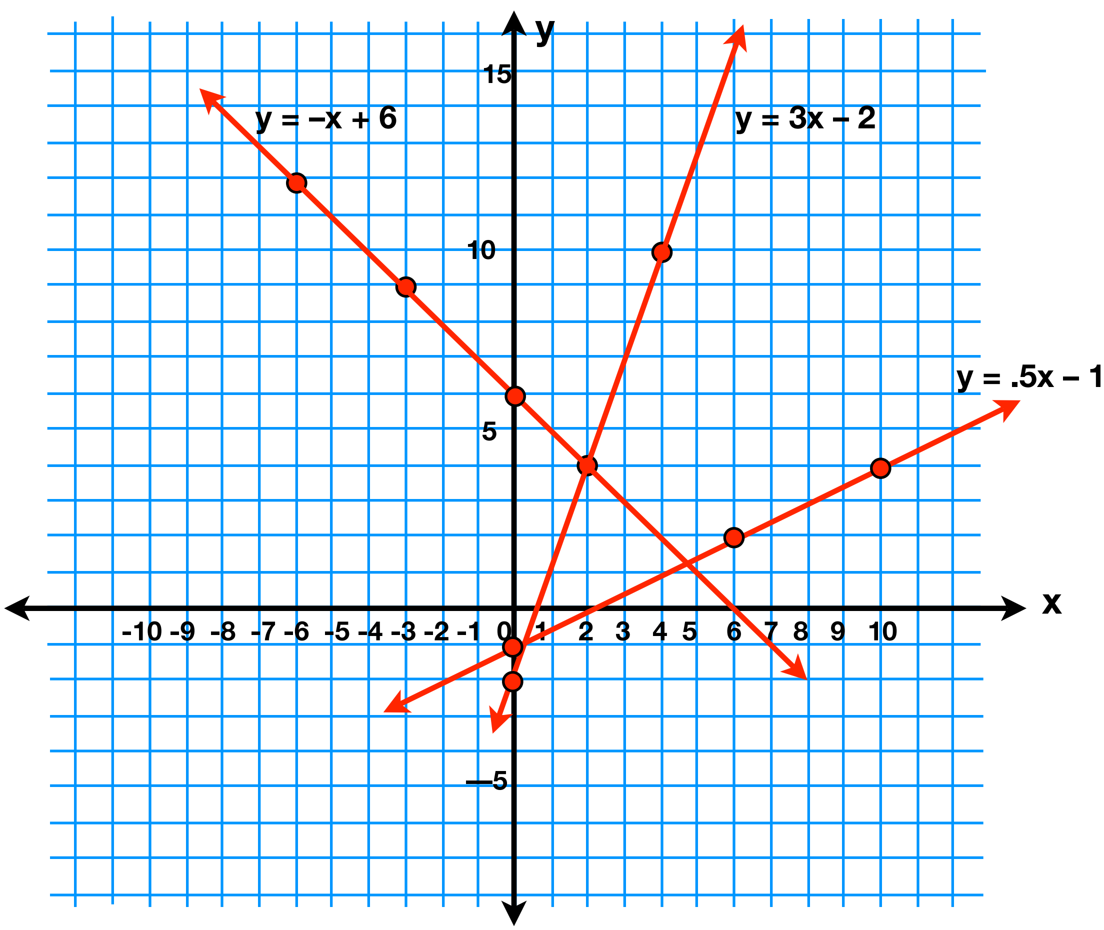
To graph the solution of the equation y= mx + b, identify the question being asked by the equation. Apply the question to arbitrary values of x (numbers associated with the x-axis of a coordinate plane). Plot points, above (+) or below (–) each x number, a number of units equal to the answer to the question. Draw the line that contains the plotted points.

Graph the solution of each equation. Determine the question being asked.

1) $y = 3x - 2$ (Determine the question. Apply the question to x= 0, 2, and 4.)

2) $y = .5x - 1$ (Determine the question. Apply the question to x= 0, 6, and 10.)

3) $y = -x + 6$ (Determine the question. Apply the question to x= –6, –3, and 0.)



Algebra to the Core

Task Rotation Activity

Graphing y- mx + b, M1, 7.1.3

Name ______________________

Period ______________________

Date ______________________

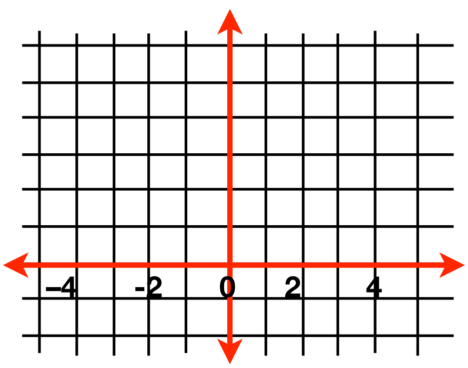
Directions: Perform each math task.

How to graph the solution of a linear equation, y= mx + b: Method 1

To graph the solution of the equation y= mx + b, identify the question being asked by the equation. Apply the question to arbitrary values of x (numbers associated with the x-axis of a coordinate plane). Plot points, above (+) or below (–) each x number, a number of units equal to the answer to the question. Draw the line that contains the plotted points.

Mastery Task:

Write the question associated with the equation y = .5x + 1. Apply the question to the numbers x= –2, 2, and 4, and plot the resulting points. Draw the line that contains the points. This is the graph of the solution of y= .5x + 1.



Interpersonal Task:

The Rapid Ride Taxi company charges a $4.00 pick-up fee plus $1.25 for each mile traveled. Work with a partner. Write an equation that delivers the cost (y) of a taxi ride of x miles. Your equation should be in the form y= mx + b, where m and b are numbers. Sketch the graph of your equation. How can your graph be used to determine the cost of various taxi rides?

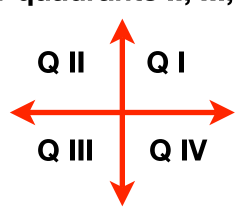
Understanding Task:

The number b in the equation y= mx + b is often referred to as the y-intercept of the graph of the solution of the equation y= mx + b. Write an explanation as to why this is the case.

Self-Expressive Task:

Create a linear equation of the form y = mx + b so the graph of the solution of the equation resides only in quadrants I, II, and IV of the coordinate plane.

Repeat this challenge for quadrants II, III, and IV.



Algebra to the Core

Practice Makes Perfect

Graphing y- mx + b, M2, 7.2.1

Name ____________________

Period ____________________

Date ____________________

Directions: Read and answer each question.

How to graph the solution of a linear equation, y= mx + b: Method 2

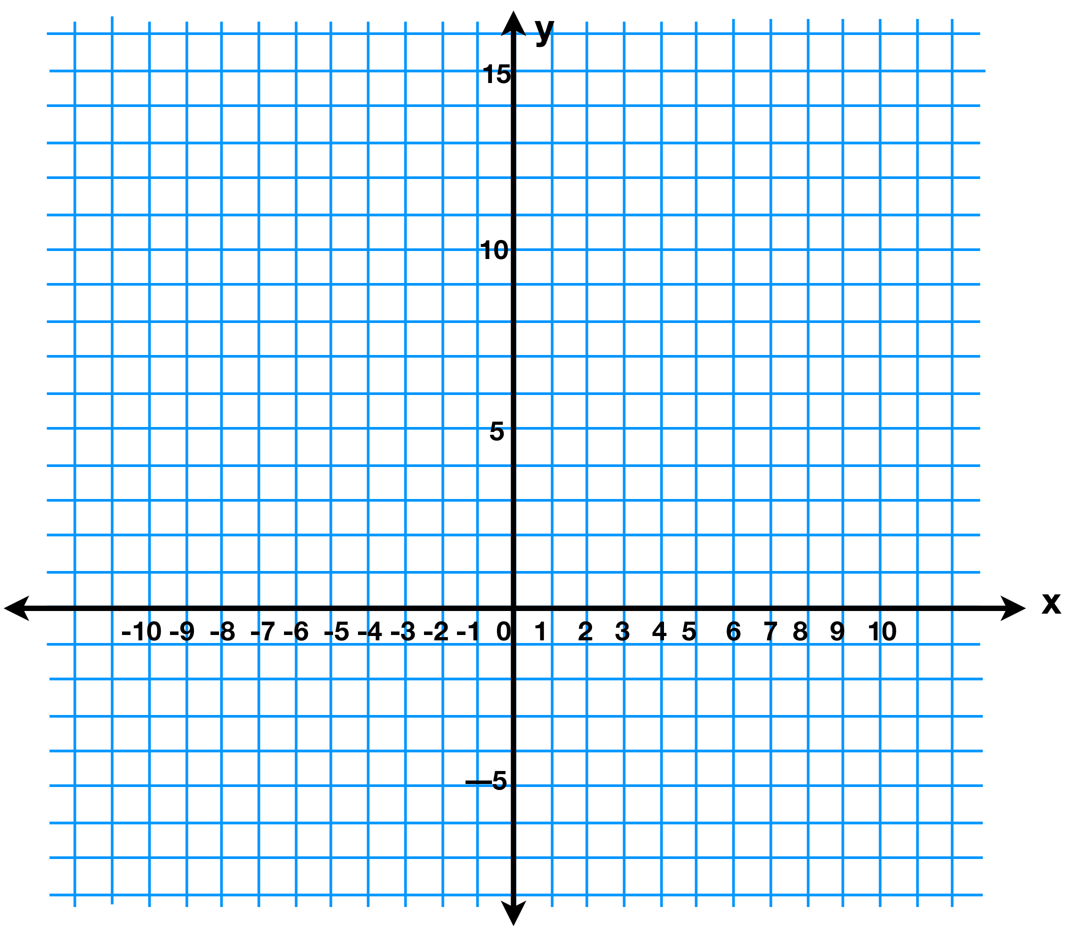
To graph the solution of the equation y= mx + b, using the speedy method, follow these steps. 1) Place a point on the y-axis b units from the origin (this point is the y-intercept. 2) Write m as a fraction v/h. 3) Place a second point h units horizontally and v units vertically from the y-intercept. 4) Draw the line that contains both points.

Graph the solution of each equation. Determine the question being asked.

1) $y = 2x + 3$

2) $y = .5x + 2$

3) $y = -x + 4$



Algebra to the Core

Practice Makes Perfect

Graphing y- mx + b, M2, 7.2.1

Solution Key

Directions: Sketch the graph of the solution of each equation.

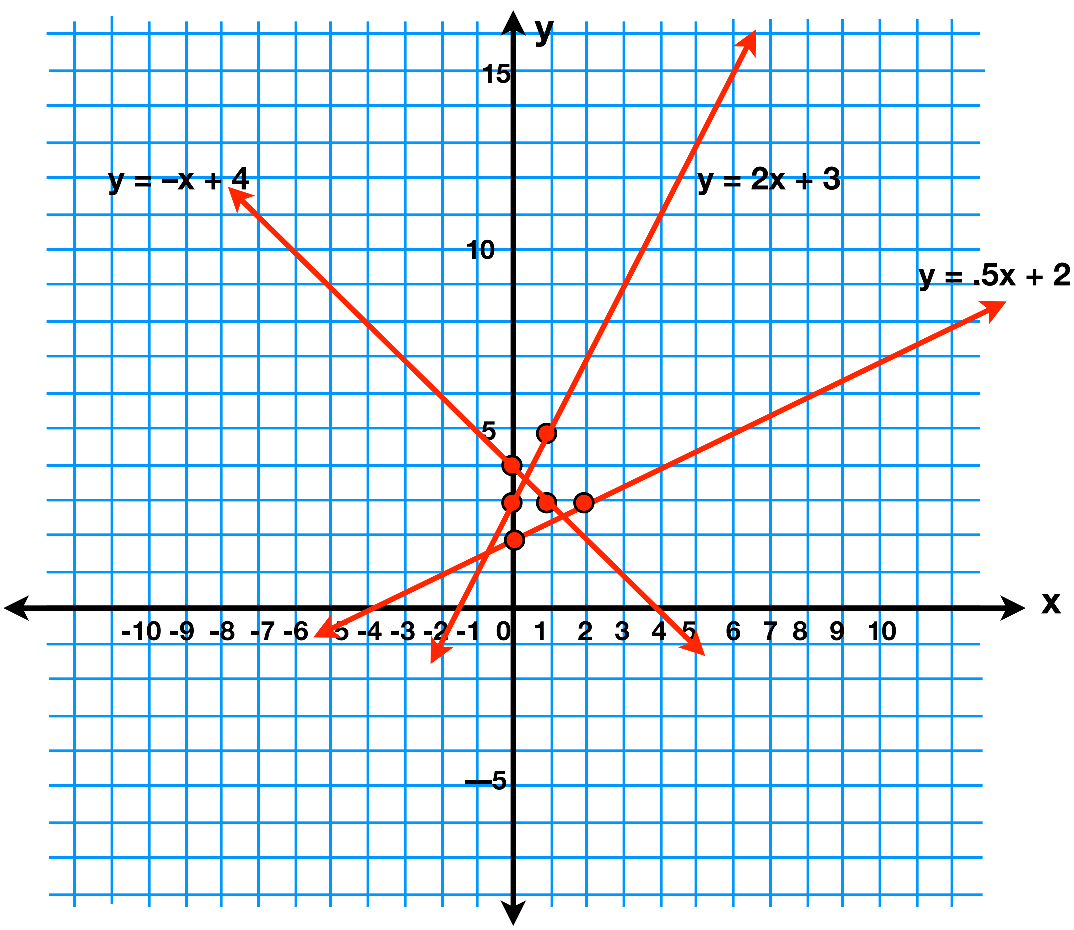
How to graph the solution of a linear equation, y= mx + b: Method 2
To graph the solution of the equation y= mx + b, using the speedy method, follow these steps. 1) Place a point on the y-axis b units from the origin (this point is the y-intercept. 2) Write m as a fraction v/h. 3) Place a second point h units horizontally and v units vertically from the y-intercept. 4) Draw the line that contains both points.

Graph the solution of each equation. Determine the question being asked.

1) y = 2x + 3 Plot the y-intercept (0,3). Use m= 2/1 to plot a second point (1,5).

2) y = .5x + 2 Plot the y-intercept (0,2). Use m= 1/2 to plot a second point (2,3).

3) y = –x + 4 Plot the y-intercept (0,4). Use m= –1/1 to plot a second point (1,3).



Algebra to the Core

Practice Makes Perfect

Graphing y- mx + b, M2, 7.2.2

Name ______________________

Period ______________________

Date ______________________

Directions: Read and answer each question.

How to graph the solution of a linear equation, y= mx + b: Method 2

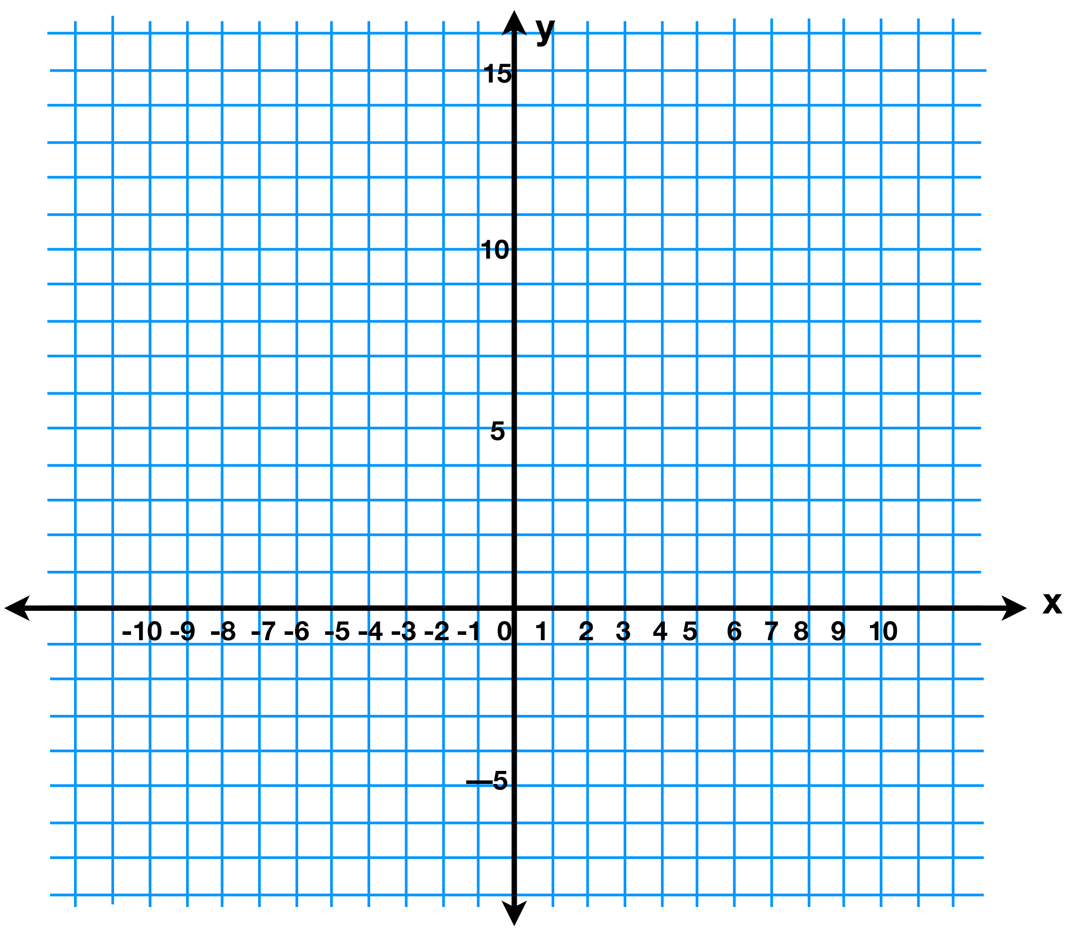
To graph the solution of the equation y= mx + b, using the speedy method, follow these steps. 1) Place a point on the y-axis b units from the origin (this point is the y-intercept. 2) Write m as a fraction v/h. 3) Place a second point h units horizontally and v units vertically from the y-intercept. 4) Draw the line that contains both points.

Graph the solution of each equation. Determine the question being asked.

1) $y = 3x - 2$

2) $y = .5x - 1$

3) $y = -x + 6$



Algebra to the Core

Practice Makes Perfect

Graphing y- mx + b, M2, 7.2.2

Solution Key

Directions: Sketch the graph of the solution of each equation.

How to graph the solution of a linear equation, y= mx + b: Method 1

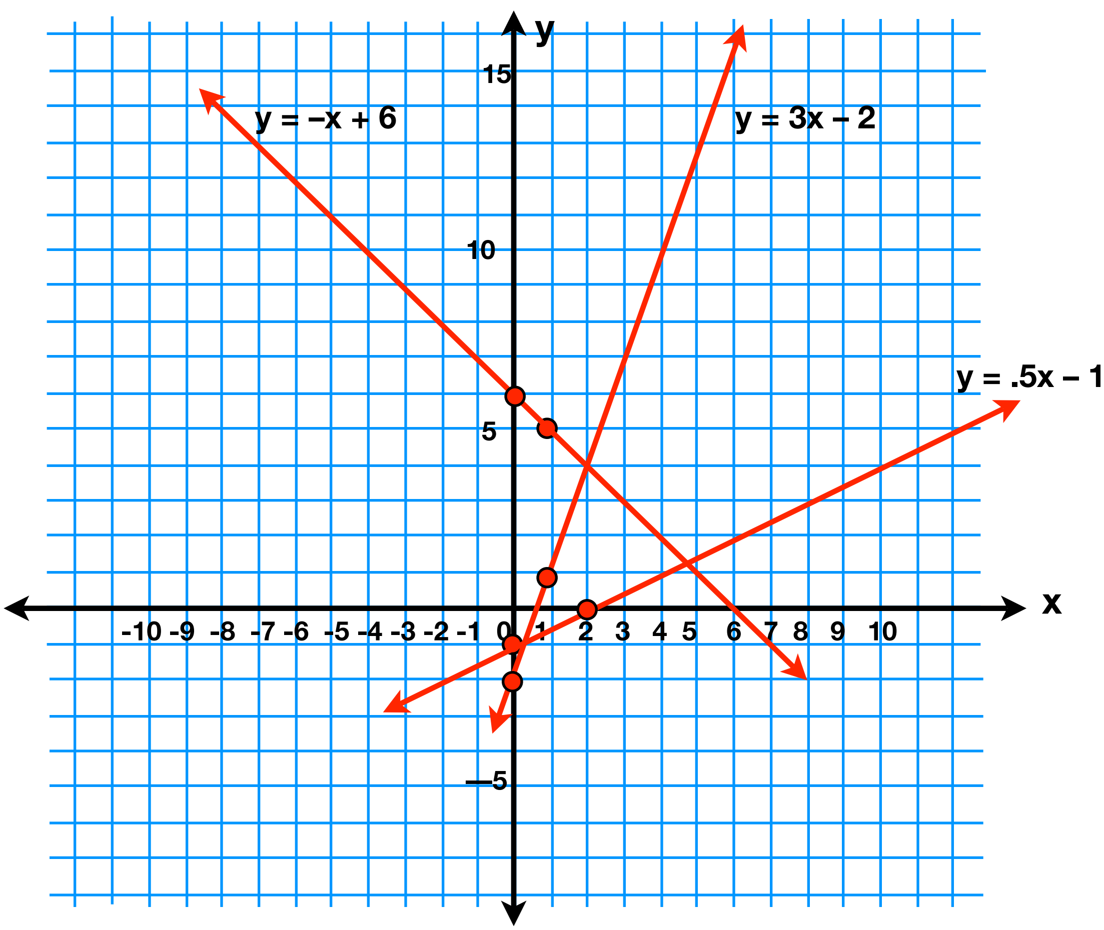
To graph the solution of the equation y= mx + b, identify the question being asked by the equation. Apply the question to arbitrary values of x (numbers associated with the x-axis of a coordinate plane). Plot points, above (+) or below (–) each x number, a number of units equal to the answer to the question. Draw the line that contains the plotted points.

Graph the solution of each equation. Determine the question being asked.

1) $y = 3x - 2$ Plot the y-intercept (0,–2). Use m= 3/1 to plot a second point (1,1).

2) $y = .5x - 1$ Plot the y-intercept (0,–1). Use m= 1/2 to plot a second point (2,0).

3) $y = -x + 6$ Plot the y-intercept (0,6). Use m= –1/1 to plot a second point (1,5).



Algebra to the Core

Task Rotation Activity

Graphing y- mx + b, M2, 7.2.3

Name ______________________

Period ______________________

Date ______________________

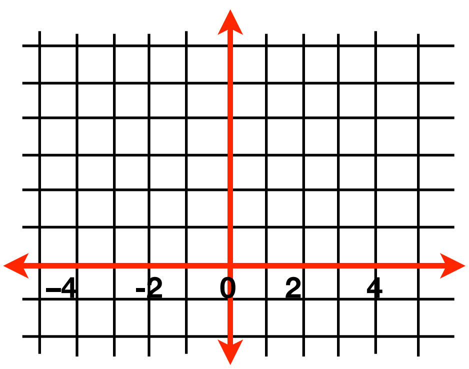
Directions: Perform each math task.

How to graph the solution of a linear equation, y= mx + b: Method 2

To graph the solution of the equation y= mx + b, using the speedy method, follow these steps. 1) Place a point on the y-axis b units from the origin (this point is the y-intercept. 2) Write m as a fraction v/h. 3) Place a second point h units horizontally and v units vertically from the y-intercept. 4) Draw the line that contains both points.

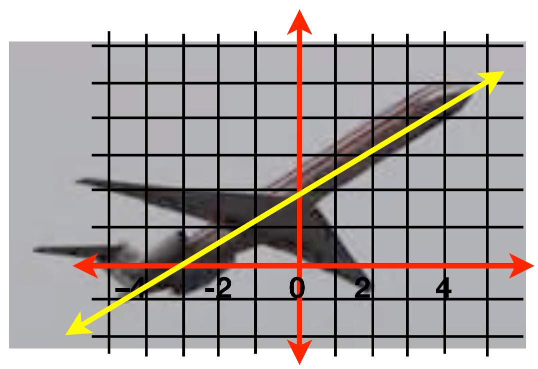
Mastery Task:

Use the speedy method to draw the line that represents the graph of the solution of y= 4x – 1.



Interpersonal Task:

The image of a jet taking off is shown in reference to a coordinate plane. Use your knowledge of graphs of linear equations to write the equation y= mx + b that represents the line of flight during take off.



Understanding Task:

The number m in the equation y= mx + b is often referred to as the slope of the graph of y= mx + b. Write an explanation as to why this is the case.

Self-Expressive Task:

Create a way to determine the slope m of the line that represents the slope of the roller coaster track shown to the right.

Algebra to the Core

Practice Makes Perfect

Factoring Trinomials 8.1.1

Name ____________________

Period ____________________

Date ____________________

Directions: Factor each trinomial into the product of two binomials.

Factoring $ax^2 + bx + c$

The big X factoring procedure can be used as follows.

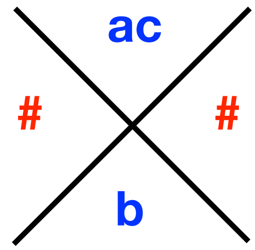
Step 1. Draw a big X.

Step 2: Write ac in the north quadrant and b in the south.

Step 3: Find two factors of ac that add to b and write them in the east and west quadrants.

Step 4: Divide the east and west numbers by a.

Step 5: Use the east and west ratios to write your answer.



Problem Set I

1. ____________ $x^2 + 7x + 10$
2. ____________ $2x^2 + 9x + 12$
3. ____________ $x^2 + 12x + 35$
4. ____________ $5x^2 + 17x + 6$
5. ____________ $6x^2 + 13x + 2$

Problem Set II

1. ____________ $x^2 + 8x + 15$
2. ____________ $6x^2 + 11x + 4$
3. ____________ $x^2 + 4x - 12$
4. ____________ $6x^2 + 7x + 2$
5. ____________ $2x^2 - 11x + 9$

Problem Set III

1. ____________ $x^2 - 5x - 14$
2. ____________ $6x^2 - 19x + 8$
3. ____________ $5x^2 - 16x + 12$
4. ____________ $8x^2 + 22x + 5$
5. ____________ $7x^2 - 9x + 2$

Algebra to the Core
Practice Makes Perfect
Factoring Trinomials 8.1.1

Solution Key

Directions: Factor each trinomial into the product of two binomials.

Factoring $ax^2 + bx + c$

The big X factoring procedure can be used as follows.

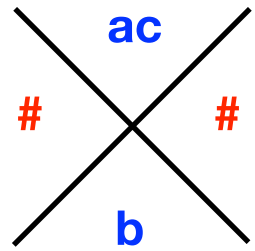
Step 1. Draw a big X.

Step 2: Write ac in the north quadrant and b in the south.

Step 3: Find two factors of ac that add to b and write them in the east and west quadrants.

Step 4: Divide the east and west numbers by a.

Step 5: Use the east and west ratios to write your answer.



Problem Set I

1. ______________ $x^2 + 7x + 10$ **$(x + 2)(x + 5)$**
2. ______________ $2x^2 + 9x + 12$ **$(2x + 3)(x + 4)$**
3. ______________ $x^2 + 12x + 35$ **$(x + 7)(x + 5)$**
4. ______________ $5x^2 + 17x + 6$ **$(5x + 2)(x + 3)$**
5. ______________ $6x^2 + 13x + 2$ **$(6x + 1)(x + 2)$**

Problem Set II

1. ______________ $x^2 + 8x + 15$ **$(x + 5)(x + 3)$**
2. ______________ $6x^2 + 11x + 4$ **$(2x + 1)(3x + 4)$**
3. ______________ $x^2 + 4x - 12$ **$(x - 2)(x + 6)$**
4. ______________ $6x^2 + 7x + 2$ **$(3x + 2)(2x + 1)$**
5. ______________ $2x^2 - 11x + 9$ **$(x - 1)(2x - 9)$**

Problem Set III

1. ______________ $x^2 - 5x - 14$ **$(x - 7)(x + 2)$**
2. ______________ $6x^2 - 19x + 8$ **$(2x - 1)(3x - 8)$**
3. ______________ $5x^2 - 16x + 12$ **$(x - 2)(5x - 6)$**
4. ______________ $8x^2 + 22x + 5$ **$(4x + 1)(2x + 5)$**
5. ______________ $7x^2 - 9x + 2$ **$(x - 1)(7x - 2)$**

Algebra to the Core

Practice Makes Perfect

Factoring Trinomials 8.1.2

Name ____________________

Period ____________________

Date ____________________

Directions: Factor each trinomial into the product of two binomials.

Factoring $ax^2 + bx + c$

The big X factoring procedure can be used as follows.

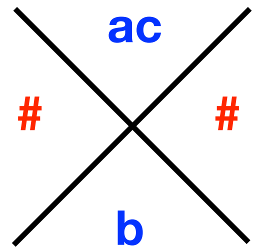
Step 1. Draw a big X.

Step 2: Write ac in the north quadrant and b in the south.

Step 3: Find two factors of ac that add to b and write them in the east and west quadrants.

Step 4: Divide the east and west numbers by a.

Step 5: Use the east and west ratios to write your answer.



Problem Set I

1. ______________ $x^2 + 9x + 20$
2. ______________ $2x^2 + 3x + 1$
3. ______________ $x^2 + 9x + 20$
4. ______________ $9x^2 + 18x + 8$
5. ______________ $5x^2 + 26x + 5$

Problem Set II

1. ______________ $x^2 + 11x + 24$
2. ______________ $6x^2 + 13x + 6$
3. ______________ $x^2 + 3x - 28$
4. ______________ $6x^2 - x - 12$
5. ______________ $2x^2 - 7x + 3$

Problem Set III

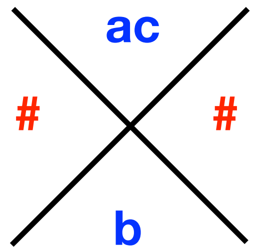
1. ______________ $x^2 - 6x + 9$
2. ______________ $6x^2 - 13x + 6$
3. ______________ $x^2 - 14x + 48$
4. ______________ $8x^2 + 30x + 25$
5. ______________ $x^2 - 14x + 49$

Algebra to the Core
Practice Makes Perfect
Factoring Trinomials 8.1.2

Solution Key

Directions: Factor each trinomial into the product of two binomials.

Factoring $ax^2 + bx + c$
The big X factoring procedure can be used as follows.
Step 1. Draw a big X.
Step 2: Write ac in the north quadrant and b in the south.
Step 3: Find two factors of ac that add to b and write them in the east and west quadrants.
Step 4: Divide the east and west numbers by a.
Step 5: Use the east and west ratios to write your answer.



Problem Set I

1. ______________ $x^2 + 9x + 20$ $(x + 4)(x + 5)$
2. ______________ $2x^2 + 3x + 1$ $(2x + 1)(x + 1)$
3. ______________ $x^2 + 9x + 20$ $(x + 4)(x + 5)$
4. ______________ $9x^2 + 18x + 8$ $(3x + 2)(3x + 4)$
5. ______________ $5x^2 + 26x + 5$ $(5x + 1)(x + 5)$

Problem Set II

1. ______________ $x^2 + 11x + 24$ $(x + 8)(x + 3)$
2. ______________ $6x^2 + 13x + 6$ $(2x + 3)(3x + 2)$
3. ______________ $x^2 + 3x - 28$ $(x - 4)(x + 7)$
4. ______________ $6x^2 - x - 12$ $(3x + 4)(2x - 3)$
5. ______________ $2x^2 - 7x + 3$ $(x - 3)(2x - 1)$

Problem Set III

1. ______________ $x^2 - 6x + 9$ $(x - 3)(x - 3)$
2. ______________ $6x^2 - 13x + 6$ $(2x - 3)(3x - 2)$
3. ______________ $x^2 - 14x + 48$ $(x - 8)(x - 6)$
4. ______________ $8x^2 + 30x + 25$ $(4x + 5)(2x + 5)$
5. ______________ $x^2 - 14x + 49$ $(x - 7)(x - 7)$

Algebra to the Core

Task Rotation Activity

Factoring Trinomials 8.1.3

Name ____________________

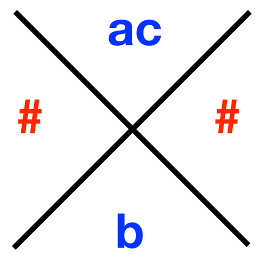
Period ____________________

Date ____________________

Directions: Perform each math task.

Factoring $ax^2 + bx + c$

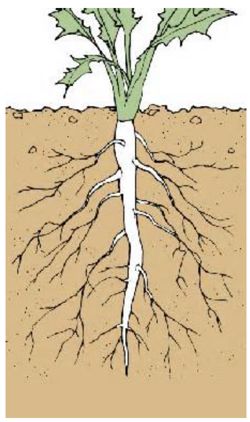
The big X factoring procedure can be used as follows.
Step 1. Draw a big X.
Step 2: Write ac in the north quadrant and b in the south.
Step 3: Find two factors of ac that add to b and write them in the east and west quadrants.
Step 4: Divide the east and west numbers by a.
Step 5: Use the east and west ratios to write your answer.



Mastery Task:

Factor each trinomial.

1. $2x^2 + 13x + 20$
2. $3x^2 + 17x + 20$
3. $x^2 + 7x + 6$



Interpersonal Task:

Find the square roots of the following numbers. 16, 25, 100, 64. What does it mean for a number to be the square root of another number? Work with a partner and find the square roots of the trinomials below.

1. $x^2 + 8x + 16$
2. $x^2 + 20x + 100$

Understanding Task:

Factor the expressions

$x^2 + 6x + 9$ and $x^2 + 10x + 25$.

What do you notice about your answers? These trinomials are perfect square trinomials. How are these similar to a perfect square whole number? How can you determine whether or not a trinomial is a perfect square trinomial?

Self-Expressive Task:

Create two different perfect square trinomials (different from ones that appear on this page). Factor each and use the FOIL method to check your answers.

Extra Challenge for Experts: Create a perfect square trinomial of the form $x^2 - bx + c$. Is this possible? Why or why not?

Algebra to the Core

Practice Makes Perfect
Factoring Differences of Perfect Squares 8.2.1

Name ____________________

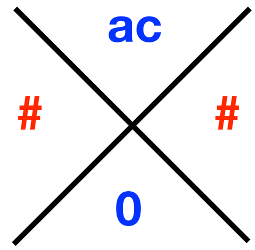
Period ____________________

Date ____________________

Directions: Factor each difference of perfect squares into the product of two binomials.

Factoring $ax^2 - c^2$

The big X factoring procedure can be used as follows.
Step 1. Draw a big X.
Step 2: Write ac in the north quadrant and 0 in the south.
Step 3: Find two factors of ac that add to 0 and write them in the east and west quadrants.
Step 4: Divide the east and west numbers by a.
Step 5: Use the east and west ratios to write your answer.



Problem Set I

1. ________________ $4x^2 - 25$
2. ________________ $16x^2 - 9$
3. ________________ $x^2 - 49$
4. ________________ $x^2 - 36$
5. ________________ $9x^2 - 100$

Problem Set II

1. ________________ $x^2 - 1$
2. ________________ $49x^2 - 4$
3. ________________ $x^2 - 64$
4. ________________ $16x^2 - 25$
5. ________________ $25x^2 - 9$

Problem Set III

1. ________________ $x^2 - 100$
2. ________________ $121x^2 - 1$
3. ________________ $144x^2 - 16$
4. ________________ $400x^2 - 25$
5. ________________ $225x^2 - 4$

Algebra to the Core

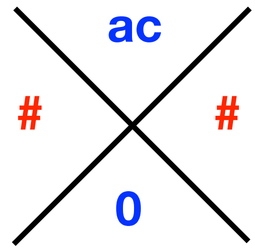
Practice Makes Perfect
Factoring Differences of Perfect Squares 8.2.1

Solution Key

Directions: Factor each difference of perfect squares into the product of two binomials.

Factoring $ax^2 - c^2$

The big X factoring procedure can be used as follows.
Step 1. Draw a big X.
Step 2: Write ac in the north quadrant and 0 in the south.
Step 3: Find two factors of ac that add to 0 and write them in the east and west quadrants.
Step 4: Divide the east and west numbers by a.
Step 5: Use the east and west ratios to write your answer.



Problem Set I

1.	______________	$4x^2 - 25$	$(2x + 5)(2x - 5)$
2.	______________	$16x^2 - 9$	$(4x + 3)(4x - 3)$
3.	______________	$x^2 - 49$	$(x + 7)(x - 7)$
4.	______________	$x^2 - 36$	$(x + 6)(x - 6)$
5.	______________	$9x^2 - 100$	$(3x + 10)(3x - 10)$

Problem Set II

1.	______________	$x^2 - 1$	$(x + 1)(x - 1)$
2.	______________	$49x^2 - 4$	$(7x + 2)(7x - 2)$
3.	______________	$x^2 - 64$	$(x + 8)(x - 8)$
4.	______________	$16x^2 - 25$	$(4x + 5)(4x - 5)$
5.	______________	$25x^2 - 9$	$(5x + 3)(5x - 3)$

Problem Set III

1.	______________	$x^2 - 100$	$(x + 10)(x - 10)$
2.	______________	$121x^2 - 1$	$(11x + 1)(11x - 1)$
3.	______________	$144x^2 - 16$	$(12x + 4)(12x - 4)$
4.	______________	$400x^2 - 25$	$(20x + 5)(10x - 5)$
5.	______________	$225x^2 - 4$	$(15x + 2)(15x - 2)$

Algebra to the Core

Practice Makes Perfect

Factoring Differences of Perfect Squares 8.2.2

Name ____________________

Period ____________________

Date ____________________

Directions: Factor each difference of perfect squares into the product of two binomials.

Factoring $ax^2 - c^2$ (Traditional Method)

Step 1. Draw two sets of parentheses

Step 2: Write the square root of ax^2 in the first space of each binomial.

Step 3: Write the square root of c^2 in the last space of each binomial.

Step 4: Write a + sign in one binomial and a – in the other binomial.

Step 5: Check your answer using the Foil Method

(F L)(F L)

Problem Set I

1. ______________ $9x^2 - 16$
2. ______________ $25x^2 - 4$
3. ______________ $64^2 - 1$
4. ______________ $x^2 - 49$
5. ______________ $36x^2 - 81$

Problem Set II

1. ______________ $x^2 - 100$
2. ______________ $25x^2 - 9y^2$
3. ______________ $a^2 - 16b^2$
4. ______________ $144x^2 - y^2$
5. ______________ $49x^2y^2 - 9$

Problem Set III

1. ______________ $(x + y)^2 - 25$
2. ______________ $(a + 6)^2 - y^2$
3. ______________ $(1/4)x^2 - 49$
4. ______________ $(1/9)x^2 - 196$
5. ______________ $81x^4 - 4$

Algebra to the Core

Practice Makes Perfect
Factoring Differences of Perfect Squares 8.2.2

Solution Key

Directions: Factor each difference of perfect squares into the product of two binomials.

Factoring $ax^2 - c^2$ (Traditional Method)

Step 1. Draw two sets of parentheses
Step 2: Write the square root of ax^2 in the first space of each binomial.
Step 3: Write the square root of c^2 in the last space of each binomial.
Step 4: Write a + sign in one binomial and a – in the other binomial.
Step 5: Check your answer using the Foil Method

(F L)(F L)

Problem Set I

1. ______________ $9x^2 - 16$ **$(3x + 4)(3x - 4)$**
2. ______________ $25x^2 - 4$ **$(5x + 2)(5x - 2)$**
3. ______________ $64^2 - 1$ **$(8x + 1)(8x - 1)$**
4. ______________ $x^2 - 49$ **$(x + 7)(x - 7)$**
5. ______________ $36x^2 - 81$ **$(6x + 9)(6x - 9)$**

Problem Set II

1. ______________ $x^2 - 100$ **$(x + 10)(x - 10)$**
2. ______________ $25x^2 - 9y^2$ **$(5x + 3y)(5x - 3y)$**
3. ______________ $a^2 - 16b^2$ **$(a + 4b)(a - 4b)$**
4. ______________ $144x^2 - y^2$ **$(12x + y)(12x - y)$**
5. ______________ $49x^2y^2 - 9$ **$(7xy + 3)(7xy - 3)$**

Problem Set III

1. ______________ $(x + y)^2 - 25$ **$((x + y) + 5)((x + y) - 5)$**
2. ______________ $(a + 6)^2 - y^2$ **$((a + 6) + y)((a + 6) - y)$**
3. ______________ $(1/4)x^2 - 49$ **$((1/2)x + 7)((1/2)x - 7)$**
4. ______________ $(1/9)x^2 - 196$ **$((1/3)x + 14)((1/3)x - 14)$**
5. ______________ $81x^4 - 4$ **$(9x^2 + 2)(9x^2 - 2)$**

Algebra to the Core
Task Rotation Activity
Factoring Differences of Perfect Squares 8.2.3

Name ______________________
Period ______________________
Date ______________________

Directions: Perform each math task.

Factoring $ax^2 - c^2$ (Traditional Method)

Step 1. Draw two sets of parentheses.

Step 2: Write the square root of ax^2 in the first space of each binomial.

Step 3: Write the square root of c^2 in the last space of each binomial.

Step 4: Write a + sign in one binomial and a – in the other binomial.

Step 5: Check your answer using the Foil Method

(F L)(F L)

Mastery Task:

Factor each difference of perfect squares.

1. $x^2 - 81$
2. $4x^2 - 64$
3. $121x^2 - 225$

Interpersonal Task:

This lesson showed two ways to factor a difference of two perfect squares: the big X method and the parentheses method. Work with a partner and factor each expression below using both methods. Which method do you like best and why?

1. $x^2 - 16$
2. $9x^2 - 4$

Understanding Task:

In this lesson, you learned how to factor expressions that are differences of perfect squares, like the ones shown below.

$x^2 - 9$ and $9x^2 - 25$.

Sums of perfect squares, like

$x^2 + 9$ and $9x^2 + 25$

cannot be factored into the product of two binomials. Work with a partner, launch an investigation, and explain why this is the case.

Self-Expressive Task:

Create a difference of perfect squares binomial that contains all the digits of the room number of the room you are in (additional digits are allowed). Factor your expression. Use the FOIL method to check your answer.

If, for some reason, your room does not have a room number, use the digits 8, 4, and 1.

Algebra to the Core

Practice Makes Perfect

Factoring Out the GCF 8.3.1

Name ______________________

Period ______________________

Date ______________________

Directions: For each polynomial, factor out the GCF and factor the remaining polynomial when possible.

Factoring $akx^2 + bkx + kc$ or $akx^2 - bky^2$.

Step 1: Identify the greatest common factor

Step 2: Divide each term of the polynomial by the GCF.

Step 4: Write the original polynomial in factored form

GCF (remaining polynomial)

Step 5: When possible, factor the remaining polynomial.

Problem Set I

1. ______________ $7x^2 - 63$
2. ______________ $6x^2 + 27x + 36$
3. ______________ $8x^2 - 128$
4. ______________ $x^3 - 25x$
5. ______________ $6x^2 + 24x + 36$

Problem Set II

1. ______________ $2x^2 + 16x + 30$
2. ______________ $27x^2 - 3$
3. ______________ $2x^2y + 18xy + 40y$
4. ______________ $48ab^2 - 300a$
5. ______________ $5x^2 + 15x - 140$

Problem Set III

1. ______________ $20x^2y^2 - 80y^2$
2. ______________ $24x^2 + 20x + 4$
3. ______________ $50x^2 - 32$
4. ______________ $12ad + 15bd - 18cd$
5. ______________ $45x^2 + 20$

Algebra to the Core

Practice Makes Perfect

Factoring Out the GCF 8.3.1

Solution Key

Directions: For each polynomial, factor out the GCF and factor the remaining polynomial when possible.

Factoring $akx^2 + bkx + kc$ or $akx^2 - bky^2$.

Step 1: Identify the greatest common factor

Step 2: Divide each term of the polynomial by the GCF.

Step 4: Write the original polynomial in factored form

GCF (remaining polynomial)

Step 5: When possible, factor the remaining polynomial.

Problem Set I

1.	______________	$7x^2 - 63$	$7(x+3)(x-3)$
2.	______________	$6x^2 + 27x + 36$	$3(2x+1)(x+1)$
3.	______________	$8x^2 - 128$	$2(2x+8)(2x-8)$
4.	______________	$x^3 - 25x$	$x(x+5)(x-5)$
5.	______________	$6x^2 + 24x + 36$	$6(x^2 + 4x + 6)$

Problem Set II

1.	______________	$2x^2 + 16x + 30$	$2(x+3)(x+5)$
2.	______________	$27x^2 - 3$	$3(3x+1)(3x-1)$
3.	______________	$2x^2y + 18xy + 40y$	$2y(x+4)(x+5)$
4.	______________	$48ab^2 - 300a$	$3a(4b+10)(4b-10)$
5.	______________	$5x^2 + 15x - 140$	$5(x+7)(x-4)$

Problem Set III

1.	______________	$20x^2y^2 - 80y^2$	$20y^2(x+2)(x-2)$
2.	______________	$24x^2 + 20x + 4$	$4(2x+1)(3x+1)$
3.	______________	$50x^2 - 32$	$2(5x+4)(5x-4)$
4.	______________	$12ad + 15bd - 18cd$	$3d(4a + 5b - 6c)$
5.	______________	$45x^2 + 20$	$5(9x^2 + 4)$

Algebra to the Core

Practice Makes Perfect

Factoring Out the GCF 8.3.2

Name ______________________

Period ______________________

Date ______________________

Directions: For each polynomial, factor out the GCF and factor the remaining polynomial when possible.

Factoring $akx^2 + bkx + kc$ or $akx^2 - bky^2$.

Step 1: Identify the greatest common factor

Step 2: Divide each term of the polynomial by the GCF.

Step 4: Write the original polynomial in factored form

GCF (remaining polynomial)

Step 5: When possible, factor the remaining polynomial.

Problem Set I

1. ______________ $8x^2 - 32$
2. ______________ $36x^2 + 24x + 4$
3. ______________ $8x^2 - 50$
4. ______________ $x^3 - 121x$
5. ______________ $6x^2 + 30x + 36$

Problem Set II

1. ______________ $2x^2 + 20x + 42$
2. ______________ $45x^2 - 5$
3. ______________ $2x^2y + 22xy + 60y$
4. ______________ $3ab^2 - 300a$
5. ______________ $2x^2 - 22x + 56$

Problem Set III

1. ______________ $5x^2y^2 - 20y^2$
2. ______________ $12x^2 + 22x + 6$
3. ______________ $200x^2 - 50$
4. ______________ $15rv + 15sv - 45tv$
5. ______________ $5x^2 + 5x^2 + 10x$

Algebra to the Core
Practice Makes Perfect
Factoring Out the GCF 8.3.2

Solution Key

Directions: For each polynomial, factor out the GCF and factor the remaining polynomial when possible.

Factoring $akx^2 + bkx + kc$ or $akx^2 - bky^2$.

Step 1: Identify the greatest common factor

Step 2: Divide each term of the polynomial by the GCF.

Step 4: Write the original polynomial in factored form

GCF (remaining polynomial)

Step 5: When possible, factor the remaining polynomial.

Problem Set I

1. _______________ $8x^2 - 32$ **$8(x+2)(x-2)$**
2. _______________ $36x^2 + 24x + 4$ **$4(3x+1)(3x+1)$**
3. _______________ $8x^2 - 50$ **$2(2x+5)(2x-5)$**
4. _______________ $x^3 - 121x$ **$x(x+11)(x-11)$**
5. _______________ $6x^2 + 30x + 36$ **$6(x^2+5x+6)$**

Problem Set II

1. _______________ $2x^2 + 20x + 42$ **$2(x+3)(x+7)$**
2. _______________ $45x^2 - 5$ **$5(3x+1)(3x-1)$**
3. _______________ $2x^2y + 22xy + 60y$ **$2y(x+6)(x+5)$**
4. _______________ $3ab^2 - 300a$ **$3a(b+10)(b-10)$**
5. _______________ $2x^2 - 22x + 56$ **$2(x-7)(x-4)$**

Problem Set III

1. _______________ $5x^2y^2 - 20y^2$ **$5y^2(x+2)(x-2)$**
2. _______________ $12x^2 + 22x + 6$ **$2(2x+3)(3x+1)$**
3. _______________ $200x^2 - 50$ **$2(10x+5)(10x-5)$**
4. _______________ $15rv + 15sv - 45tv$ **$15v(r+s-3t)$**
5. _______________ $5x^2 + 5x^2 + 10x$ **$10x(x+1)$**

Algebra to the Core

Task Rotation Activity

Factoring Out the GCF 8.3.3

Name ________________________

Period ________________________

Date ________________________

Directions: Perform each math task.

Factoring $akx^2 + bkx + kc$ or $akx^2 – bky^2$.

Step 1: Identify the greatest common factor

Step 2: Divide each term of the polynomial by the GCF.

Step 4: Write the original polynomial in factored form

GCF (remaining polynomial)

Step 5: When possible, factor the remaining polynomial.

Mastery Task:

Factor each polynomial completely.

1. $5x^2y – 45y$
2. $2x^2 + 22x + 60$
3. $ab^2 – 2ab – 15a$

Interpersonal Task:

Work with a partner. The cost of 3 sandwiches is represented by $24x^2 + 9x + 3$ dollars. Find the cost of 1 sandwich.

If x = fifty cents, does your answer make sense? (no pun intended!)

Understanding Task:

Factoring out the GCF **is often called the Distributive Property in reverse. Develop an explanation as to why that is so. Use the polynomial below in your explanation.**

$2x^2y + 24xy + 10y$

Self-Expressive Task:

1) Create a polynomial with the following characteristics.

- **has the form $ax^3 + bx^2 + cx$**
- **has the factored form $2x (x + d)(x – d)$.**

2) Create a polynomial with the following characteristics.

- **has the form $ax^3 + bx^2 + cx$**
- **has the factored form $5x (x + d)(x + d)$.**

Algebra to the Core

Practice Makes Perfect

Graphing Inequalities 9.1

Name ______________________

Period ______________________

Date ______________________

Directions: Sketch the graph of the solution of each inequality.

Graphing the solution of an inequality:

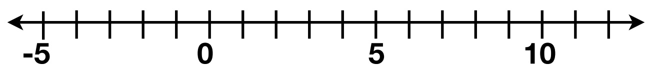
Step 1: Solve the inequality as if it is an equation. If the inequality has only one variable, then find the value of the variable that makes the equation true. If the inequality has two variables, then sketch the line or parabola, on a coordinate plane, that represents the ordered pairs that make the equation true.

Step 2: If the inequality has only one variable, and a < or < sign, sketch a half line (initial point: open ○ , > : shade right, < : shade left). If the inequality has two variables and a ≤ or ≥ sign, sketch a half plane (initial line: dashed -----, > : shade the region north of the line, < : shade the region south of the line) to represent the solution.

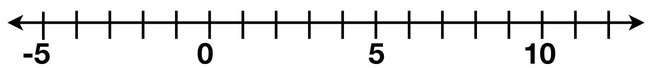
Step 3: If the inequality has a ≤ or ≥ sign, then sketch a ray (closed point ● , ≥ : shade right, ≤ : shade left) or half plane + line (initial line: solid ——— , ≥ : shade north, ≤ : shade south) to represent the solution.

Problem Set I: Solve each inequality and sketch the solution on a number line.

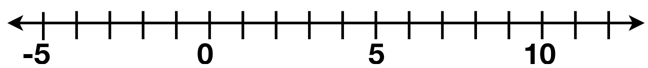
1. __________ $4x + 10 > 30$



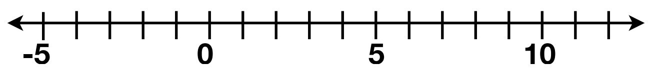
2. __________ $3x - 1 < 5$



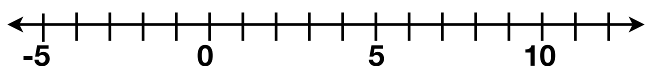
3. __________ $5x - 3 \leq -8$



4. __________ $10x + 5 \geq 35$

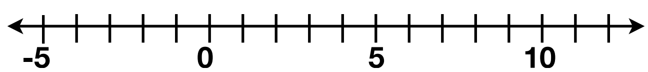


5. __________ $-2x + 6 > 0$

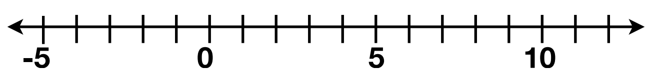


Problem Set II: Solve each inequality and sketch the solution on a number line.

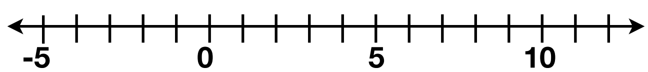
1. __________ $6x + 2 < 50$



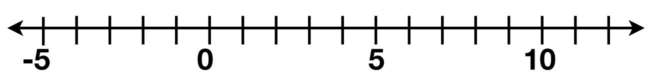
2. __________ $(1/2)x - 3 < 2$



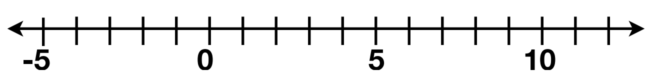
3. __________ $3x + 3 \leq 15$



4. __________ $7x + 5 \geq 19$



5. __________ $-3x + 3 > 12$



Algebra to the Core
Practice Makes Perfect
Graphing Inequalities 9.1

Solution Key

Directions: Sketch the graph of the solution of each inequality.

Graphing the solution of an inequality:

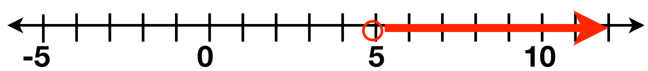
Step 1: Solve the inequality as if it is an equation. If the inequality has only one variable, then find the value of the variable that makes the equation true. If the inequality has two variables, then sketch the line or parabola, on a coordinate plane, that represents the ordered pairs that make the equation true.

Step 2: If the inequality has only one variable, and a < or < sign, sketch a half line (initial point: open ○ , > : shade right, < : shade left). If the inequality has two variables and a ≤ or ≥ sign, sketch a half plane (initial line: dashed -----, > : shade the region north of the line, < : shade the region south of the line) to represent the solution.

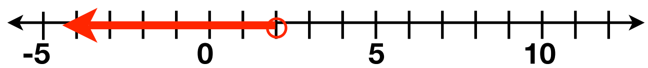
Step 3: If the inequality has a ≤ or ≥ sign, then sketch a ray (closed point ● , ≥ : shade right, ≤ : shade left) or half plane + line (initial line: solid ——— , ≥ : shade north, ≤ : shade south) to represent the solution.

Problem Set I: Solve each inequality and sketch the solution on a number line.

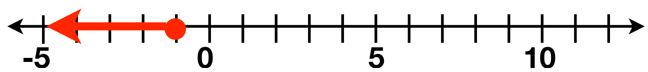
1. __________ $4x + 10 > 30$



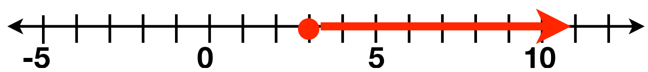
2. __________ $3x - 1 < 5$



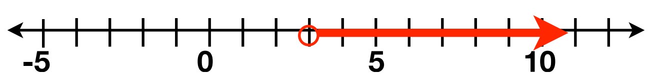
3. __________ $5x - 3 \leq -8$



4. __________ $10x + 5 \geq 35$

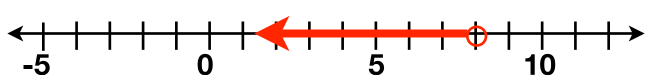


5. __________ $-2x + 6 > 0$

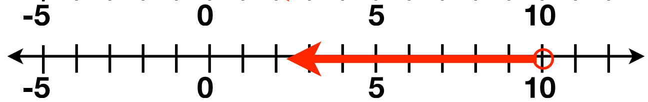


Problem Set II: Solve each inequality and sketch the solution on a number line.

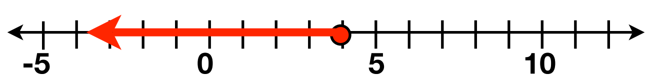
1. __________ $6x + 2 < 50$



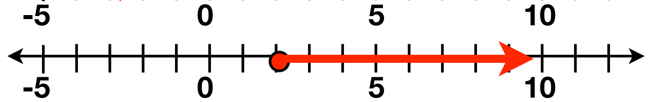
2. __________ $(1/2)x - 3 < 2$



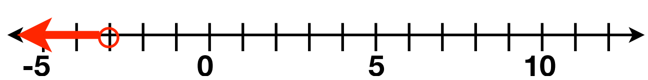
3. __________ $3x + 3 \leq 15$



4. __________ $7x + 5 \geq 19$



5. __________ $-3x + 3 > 12$



Algebra to the Core

Practice Makes Perfect

Graphing Inequalities 9.2

Name ______________________

Period ______________________

Date ______________________

Directions: Sketch the graph of the solution of each inequality.

Graphing the solution of an inequality:

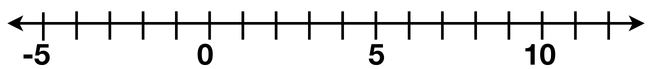
Step 1: Solve the inequality as if it is an equation. If the inequality has only one variable, then find the value of the variable that makes the equation true. If the inequality has two variables, then sketch the line or parabola, on a coordinate plane, that represents the ordered pairs that make the equation true.

Step 2: If the inequality has only one variable, and a $<$ or $<$ sign, sketch a half line (initial point: open ○ , $>$: shade right, $<$: shade left). If the inequality has two variables and a $\leq$ or $\geq$ sign, sketch a half plane (initial line: dashed -----, $>$: shade the region north of the line, $<$: shade the region south of the line) to represent the solution.

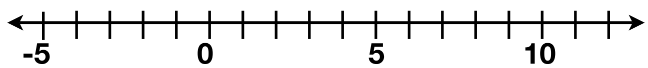
Step 3: If the inequality has a $\leq$ or $\geq$ sign, then sketch a ray (closed point ● , $\geq$: shade right, $\leq$: shade left) or half plane + line (initial line: solid ——— , $\geq$: shade north, $\leq$: shade south) to represent the solution.

Problem Set I: Solve each inequality and sketch the solution on a number line.

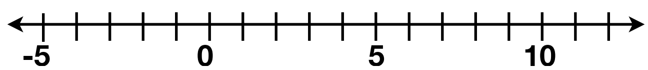
1. __________ $2x + 7 > 15$



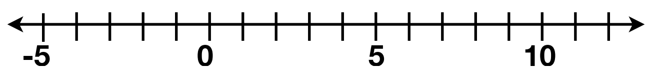
2. __________ $2x - 1 < 11$



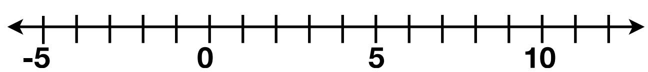
3. __________ $3x - 5 \leq 25$



4. __________ $5x + 5 \geq 15$

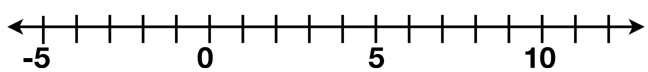


5. __________ $-4x + 6 > 2$

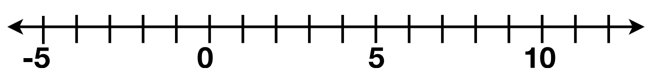


Problem Set II: Solve each inequality and sketch the solution on a number line.

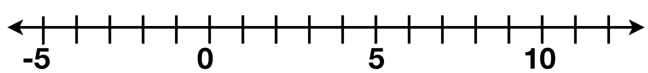
1. __________ $2x + 1 < 13$



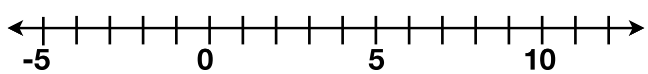
2. __________ $(1/2)x + 5 \leq 7$



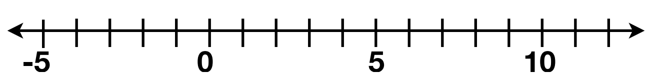
3. __________ $6x + 3 \leq 15$



4. __________ $9x + 5 \geq 32$



5. __________ $-2x + 3 > -9$



Algebra to the Core
Practice Makes Perfect
Graphing Inequalities 9.2

Solution Key

Directions: Sketch the graph of the solution of each inequality.

Graphing the solution of an inequality:

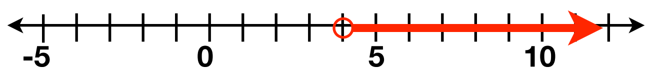
Step 1: Solve the inequality as if it is an equation. If the inequality has only one variable, then find the value of the variable that makes the equation true. If the inequality has two variables, then sketch the line or parabola, on a coordinate plane, that represents the ordered pairs that make the equation true.

Step 2: If the inequality has only one variable, and a < or < sign, sketch a half line (initial point: open ○ , > : shade right, < : shade left). If the inequality has two variables and a ≤ or ≥ sign, sketch a half plane (initial line: dashed -----, > : shade the region north of the line, < : shade the region south of the line) to represent the solution.

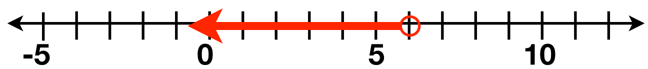
Step 3: If the inequality has a ≤ or ≥ sign, then sketch a ray (closed point ● , ≥ : shade right, ≤ : shade left) or half plane + line (initial line: solid ——— , ≥ : shade north, ≤ : shade south) to represent the solution.

Problem Set I: Solve each inequality and sketch the solution on a number line.

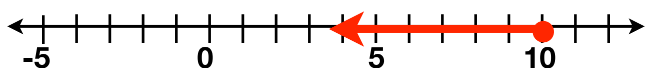
1. __________ $2x + 7 > 15$



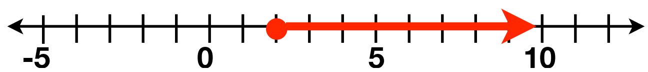
2. __________ $2x - 1 < 11$



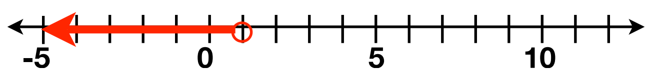
3. __________ $3x - 5 \leq 25$



4. __________ $5x + 5 \geq 15$

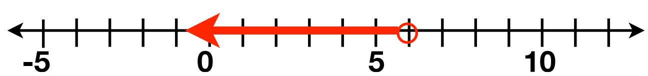


5. __________ $-4x + 6 > 2$

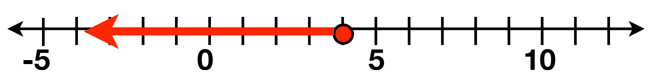


Problem Set II: Solve each inequality and sketch the solution on a number line.

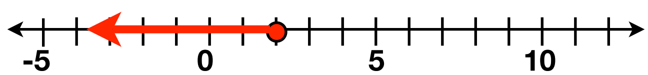
1. __________ $2x + 1 < 13$



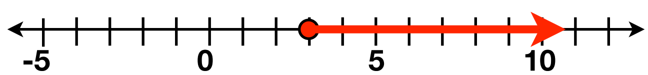
2. __________ $(1/2)x + 5 \leq 7$



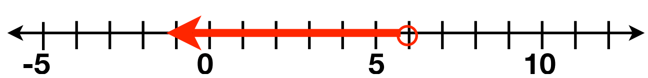
3. __________ $6x + 3 \leq 15$



4. __________ $9x + 5 \geq 32$



5. __________ $-2x + 3 > -9$



Algebra to the Core

Practice Makes Perfect

Graphing Compound Inequalities with One Variable 9.3

Name ____________________

Period ____________________

Date ____________________

Directions: Sketch the graph of the solution of each inequality.

Graphing the solution of a compound inequality with one variable:

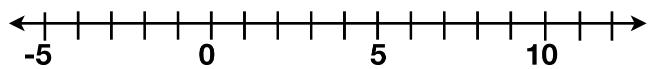
Step 1: Solve the inequality as if it represents two equations. The two solutions will represent points A and B on a number line.

Step 2: If the compound inequality represents an AND statement (Problem Set I), place points at A and B, using an clear point ○ for < or >, and a solid point ● for ≤ or ≥. Connect points A and B with a line segment.

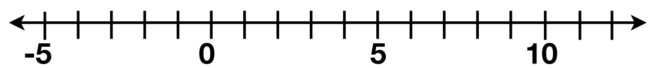
Step 3: If the compound inequality represents an OR statement (Problem Set II), place points at A and B, using an clear point ○ for < or >, and a solid point ● for ≤ or ≥. Draw two rays and/or half lines extending from A and B.

Problem Set I: Solve each compound inequality and sketch the solution on a number line.

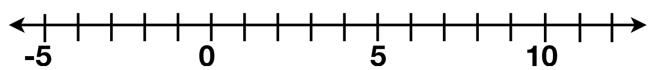
1. ______________ $10 < 2x + 4 < 20$



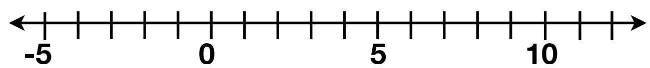
2. ______________ $7 \leq 2x - 1 \leq 15$



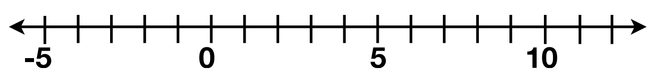
3. ______________ $-14 < 3x - 2 \leq 13$



4. ______________ $-15 \leq 6x - 3 \leq 15$

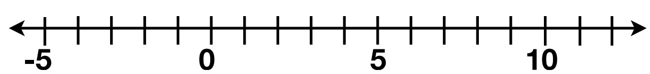


5. ______________ $5 < 4x + 1 \leq 9$

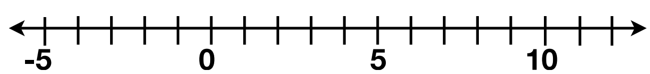


Problem Set II: Solve each inequality and sketch the solution on a number line.

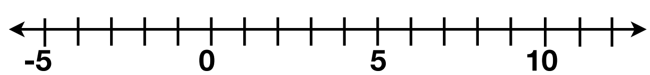
1. ______________ $2x < 6$ or $x > 5$



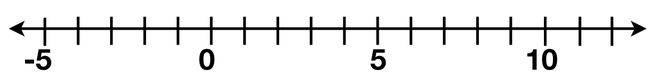
2. ______________ $(1/2)x < 1$ or $x > 7$



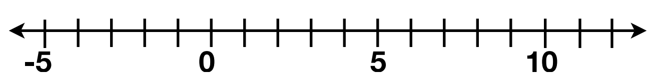
3. ______________ $6x \leq 12$ or $2x > 20$



4. ______________ $2x + 2 \leq 0$ or $3x \geq 12$



5. ______________ $-2x > -8$ or $2x > 10$



Algebra to the Core

Practice Makes Perfect

Graphing Compound Inequalities with One Variable 9.3

Solution Key

Directions: Sketch the graph of the solution of each inequality.

Graphing the solution of a compound inequality with one variable:

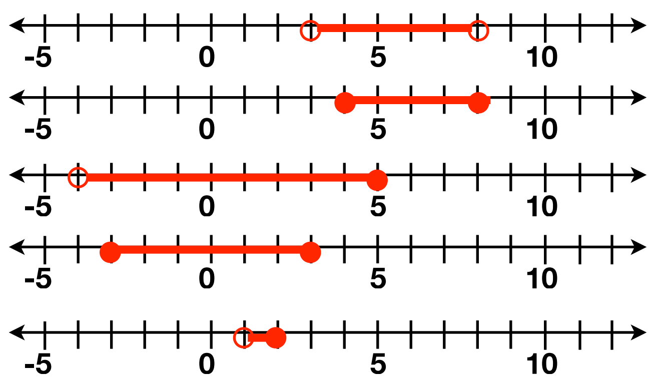
Step 1: Solve the inequality as if it represents two equations. The two solutions will represent points A and B on a number line.

Step 2: If the compound inequality represents an AND statement (Problem Set I), place points at A and B, using an clear point ○ for < or >, and a solid point ● for ≤ or ≥. Connect points A and B with a line segment.

Step 3: If the compound inequality represents an OR statement (Problem Set II), place points at A and B, using an clear point ○ for < or >, and a solid point ● for ≤ or ≥. Draw two rays and/or half lines extending from A and B.

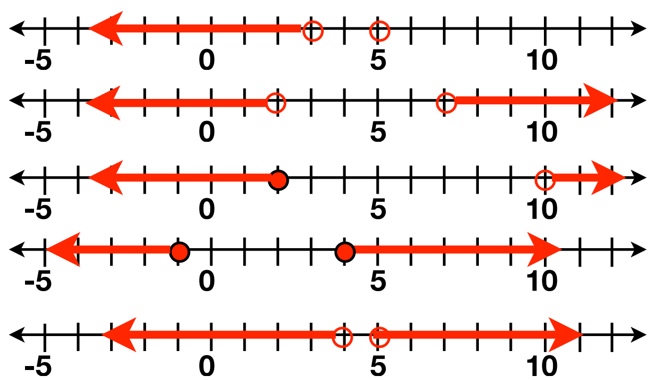
Problem Set I: Solve each compound inequality and sketch the solution on a number line.

1. ______________ $10 < 2x + 4 < 20$
2. ______________ $7 \leq 2x - 1 \leq 15$
3. ______________ $-14 < 3x - 2 \leq 13$
4. ______________ $-15 \leq 6x - 3 \leq 15$
5. ______________ $5 < 4x + 1 \leq 9$



Problem Set II: Solve each inequality and sketch the solution on a number line.

1. ______________ $2x < 6$ or $x > 5$
2. ______________ $(1/2)x < 1$ or $x > 7$
3. ______________ $6x \leq 12$ or $2x > 20$
4. ______________ $2x + 2 \leq 0$ or $3x \geq 12$
5. ______________ $-2x > -8$ or $2x > 10$



Algebra to the Core

Practice Makes Perfect

Graphing Inequalities with Two Variables 9.4

Name ______________________

Period ______________________

Date ______________________

Directions: Sketch the graph of the solution of each inequality.

Graphing the solution of an inequality:

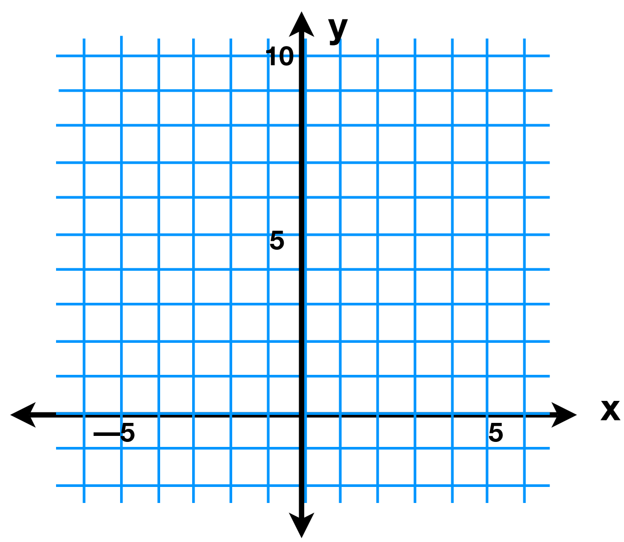
Step 1: Solve the inequality as if it is an equation. Sketch the line or parabola, on a coordinate plane. The graph represents the ordered pairs that make the equation true.

Step 2: If the inequality has a < or > sign, sketch the graph using a dashed line -----, and shade the plane region north of the line (>) or south of the line (<) to represent the solution.

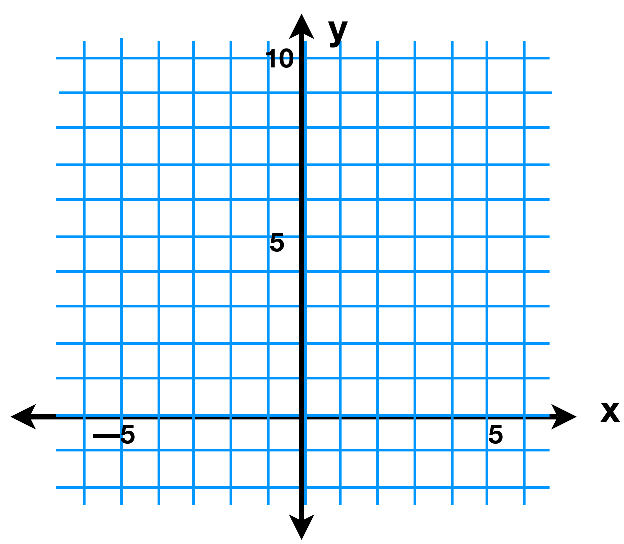
Step 3: If the inequality has a $\leq$ or $\geq$ sign, then sketch the graph using a solid line ——— and shade the plane region north of the line ($\geq$) or south of the line ($\leq$) to represent the solution.

Problem Set I: Sketch the graph of the solution of each inequality.

1. $y > 2x + 4$



2. $y \geq x^2 - 1$



Algebra to the Core

Practice Makes Perfect

Graphing Inequalities with Two Variables 9.4

Solution Key

Directions: Sketch the graph of the solution of each inequality.

Graphing the solution of an inequality:

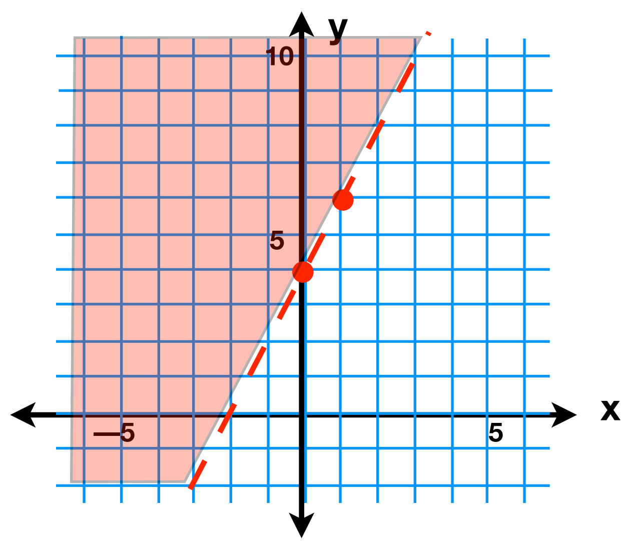
Step 1: Solve the inequality as if it is an equation. Sketch the line or parabola, on a coordinate plane. The graph represents the ordered pairs that make the equation true.

Step 2: If the inequality has a < or > sign, sketch the graph using a dashed line -----, and shade the plane region north of the line (>) or south of the line (<) to represent the solution.

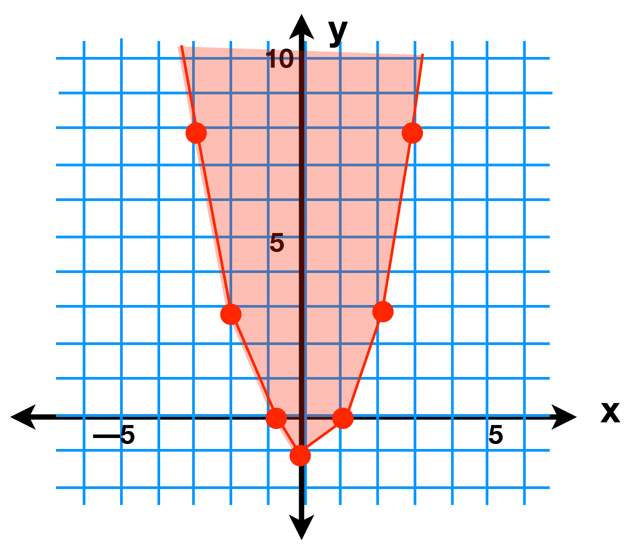
Step 3: If the inequality has a $\leq$ or $\geq$ sign, then sketch the graph using a solid line ——— and shade the plane region north of the line ($\geq$) or south of the line ($\leq$) to represent the solution.

Problem Set I: Sketch the graph of the solution of each inequality.

1. $y > 2x + 4$



2. $y \geq x^2 - 1$



Algebra to the Core
Practice Makes Perfect
Graphing Inequalities with Two Variables 9.5

Name ______________________

Period ______________________

Date ______________________

Directions: Sketch the graph of the solution of each inequality.

Graphing the solution of an inequality:

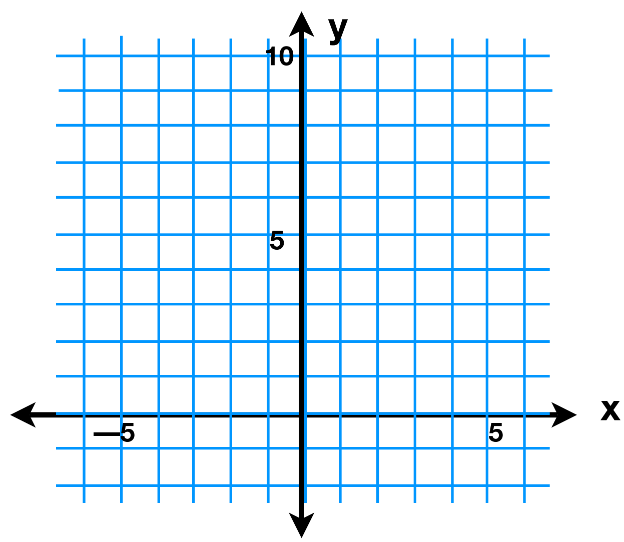
Step 1: Solve the inequality as if it is an equation. Sketch the line or parabola, on a coordinate plane. The graph represents the ordered pairs that make the equation true.

Step 2: If the inequality has a < or > sign, sketch the graph using a dashed line -----, and shade the plane region north of the line (>) or south of the line (<) to represent the solution.

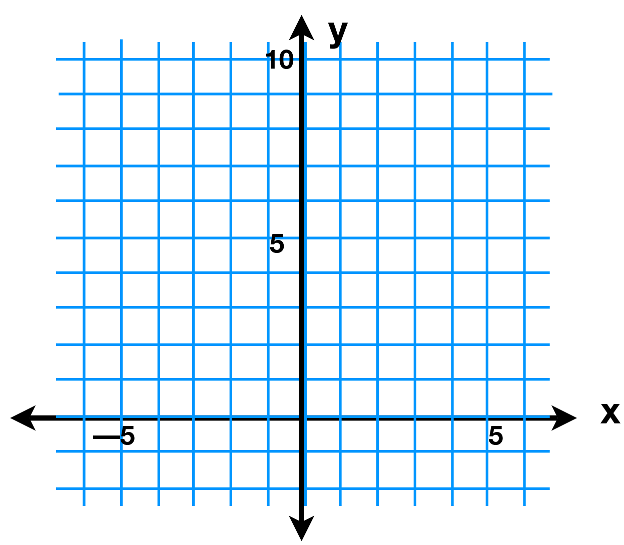
Step 3: If the inequality has a $\leq$ or $\geq$ sign, then sketch the graph using a solid line ——— and shade the plane region north of the line ($\geq$) or south of the line ($\leq$) to represent the solution.

Problem Set I: Sketch the graph of the solution of each inequality.

1. $y \leq 2x + 4$



2. $y \geq |x|$



Algebra to the Core

Practice Makes Perfect

Graphing Inequalities with Two Variables 9.5

Solution Key

Directions: Sketch the graph of the solution of each inequality.

Graphing the solution of an inequality:

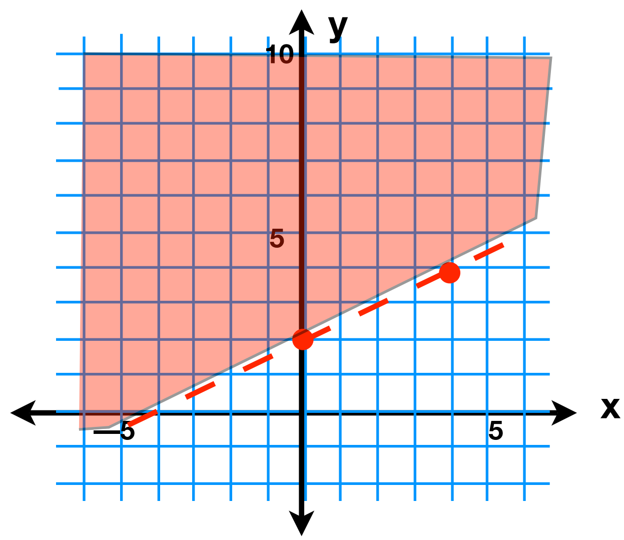
Step 1: Solve the inequality as if it is an equation. Sketch the line or parabola, on a coordinate plane. The graph represents the ordered pairs that make the equation true.

Step 2: If the inequality has a < or > sign, sketch the graph using a dashed line -----, and shade the plane region north of the line (>) or south of the line (<) to represent the solution.

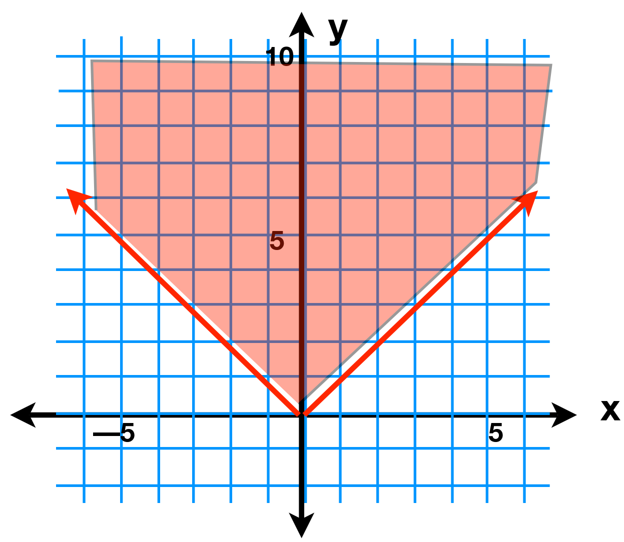
Step 3: If the inequality has a ≤ or ≥ sign, then sketch the graph using a solid line ——— and shade the plane region north of the line (≥) or south of the line (≤) to represent the solution.

Problem Set I: Sketch the graph of the solution of each inequality.

1. $y \leq .5x + 2$



2. $y \geq |x|$



Algebra to the Core

Task Rotation Activity

Solving Inequalities 9.6

Name ______________________

Period ______________________

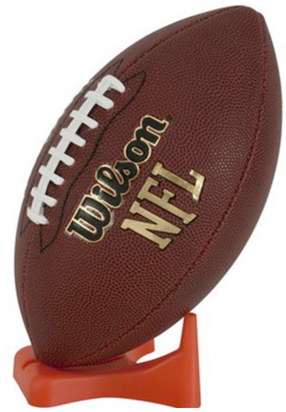
Date ______________________

Directions: Perform each math task.

Solving an Inequality

- **The process of solving an equation delivers solutions that make the equation true. That is, solutions that make the left side equal to the right side.**

- **The process of solving an inequality also delivers solutions that make the inequality true. However, these solutions make one side greater than, less than, greater than and equal to, or less than and equal to the other side.**



Mastery Task:

Solve and graph each inequality.

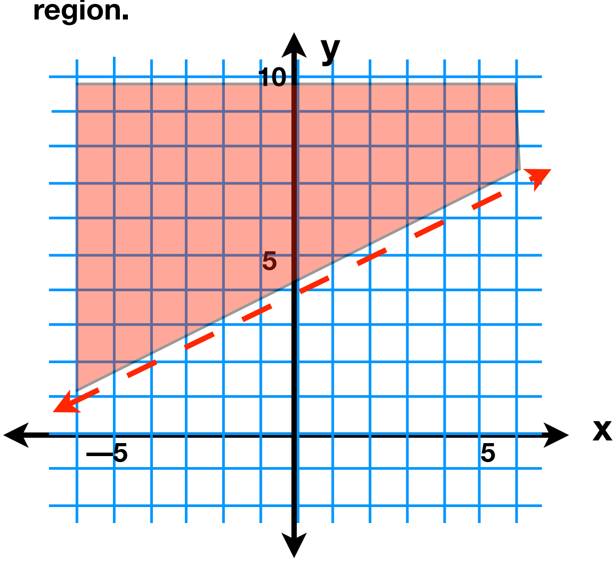
1. $2x + 6 > 10$

2. $5x \leq -20$ or $x + 6 > 8$

3. $y > x + 5$

Understanding Task:

The graph of the inequality $y > .5x + 4$ contains a dashed line and a shaded plane region. Explain the significance of the dashed line <u>and</u> the shaded region.



Interpersonal Task:

A football game is in the fourth quarter and the home team is down 34 - 21. Assume the visiting team does not score any more points, and the home team gets the ball three more times and scores points on all three drives. Work with a partner and create a double inequality that expresses the number of points the home team can score from this point forward. Create a double inequality that represents the number of points the home team can score and win the game. Create a double inequality that represents the number of points the home team can score and lose the game.

Self-Expressive Task:

Create three different word problems that each reflect a real-world problem. The problems should span three of the four different kinds of inequalities shown below. Solve your problems and graph the solutions.

- $ax + b >, \geq, <, \leq c$
- ª $c <, \leq ax + b <, \leq d$
- $ax + b >, \geq, <, \leq c$ OR $ex + f >, \geq, <, \leq d$
- $y >, \geq, <, \leq mx + b$

Algebra to the Core

Practice Makes Perfect

Working with Square Roots 10.1

Name ____________________

Period ____________________

Date ____________________

Directions: Use the Rules of square roots to perform the indicated operations, and to simplify your answers and expressions..

Rules of Square Roots:

$\sqrt{a}$ = b if and only if b (b) = a	$\sqrt{a} = a^{1/2}$
$\sqrt{ab} = \sqrt{a} \bullet \sqrt{b}$	$m\sqrt{a} + n\sqrt{a} = (m+n)\sqrt{a}$
$\sqrt{a/b} = \sqrt{a} \;/\; \sqrt{b}$	

Problem Set I:

1. __________ $\sqrt{121} + \sqrt{225}$
2. __________ $\sqrt{20}$
3. __________ $\sqrt{32} \div \sqrt{2}$
4. __________ $4\sqrt{5} + 3\sqrt{5}$
5. __________ $144^{1/2} - 100^{1/2}$

Problem Set II:

1. __________ $\sqrt{256} + \sqrt{400}$
2. __________ $\sqrt{18}$
3. __________ $\sqrt{72} \div \sqrt{2}$
4. __________ $8\sqrt{3} + 2\sqrt{3}$
5. __________ $144^{1/2} - 100^{1/2}$

Problem Set III:

1. __________ $\sqrt{289} + \sqrt{324}$
2. __________ $\sqrt{50}$
3. __________ $\sqrt{32} \div \sqrt{8}$
4. __________ $5\sqrt{9} - 2\sqrt{9}$
5. __________ $361^{1/2} - 324^{1/2}$

Algebra to the Core

Practice Makes Perfect

Working with Square Roots 10.1

Solution Key

Directions: Use the Rules of square roots to perform the indicated operations, and to simplify your answers and expressions..

Rules of Square Roots:

$\sqrt{a} = b$ if and only if $b\,(b) = a$	$\sqrt{a} = a^{1/2}$
$\sqrt{ab} = \sqrt{a} \bullet \sqrt{b}$	$m\sqrt{a} + n\sqrt{a} = (m+n)\sqrt{a}$
$\sqrt{a/b} = \sqrt{a} \;/\; \sqrt{b}$	

Problem Set I:

1. ________ $\sqrt{121} + \sqrt{225}$ — $11 + 15 = 26$
2. ________ $\sqrt{20}$ — $\sqrt{4 \bullet 5} = 2\sqrt{5}$
3. ________ $\sqrt{32} \div \sqrt{2}$ — $\sqrt{16} = 4$
4. ________ $4\sqrt{5} + 3\sqrt{5}$ — $7\sqrt{5}$
5. ________ $144^{1/2} - 100^{1/2}$ — $12 + 10 = 22$

Problem Set II:

1. ________ $\sqrt{256} + \sqrt{400}$ — $16 + 20 = 36$
2. ________ $\sqrt{18}$ — $\sqrt{9 \bullet 2} = 3\sqrt{2}$
3. ________ $\sqrt{72} \div \sqrt{2}$ — $\sqrt{36} = 6$
4. ________ $8\sqrt{3} + 2\sqrt{3}$ — $10\sqrt{3}$
5. ________ $196^{1/2} - 121^{1/2}$ — $14 - 11 = 3$

Problem Set III:

1. ________ $\sqrt{289} + \sqrt{324}$ — $17 + 18 = 35$
2. ________ $\sqrt{50}$ — $\sqrt{25 \bullet 2} = 5\sqrt{2}$
3. ________ $\sqrt{32} \div \sqrt{8}$ — $\sqrt{4} = 2$
4. ________ $5\sqrt{9} - 2\sqrt{9}$ — $3\sqrt{9} = 3\,(3) = 9$
5. ________ $361^{1/2} - 324^{1/2}$ — $19 - 18 = 1$

Algebra to the Core

Practice Makes Perfect

Working with Square Roots 10.2

Name ____________________

Period ____________________

Date ____________________

Directions: Use the Rules of square roots to perform the indicated operations, and to simplify your answers and expressions..

Rules of Square Roots:

$\sqrt{a} = b$ if and only if $b(b) = a$	$\sqrt{a} = a^{1/2}$
$\sqrt{ab} = \sqrt{a} \bullet \sqrt{b}$	$m\sqrt{a} + n\sqrt{a} = (m+n)\sqrt{a}$
$\sqrt{a/b} = \sqrt{a} \;/\; \sqrt{b}$	

Problem Set I:

1. ________ $\sqrt{81} + \sqrt{100}$
2. ________ $\sqrt{48}$
3. ________ $\sqrt{98} \div \sqrt{2}$
4. ________ $5\sqrt{8} + 5\sqrt{8}$
5. ________ $25^{1/2} - 49^{1/2}$

Problem Set II:

1. ________ $\sqrt{121} + \sqrt{324}$
2. ________ $\sqrt{44}$
3. ________ $\sqrt{60} \div \sqrt{15}$
4. ________ $3\sqrt{6} + 9\sqrt{6}$
5. ________ $32^{1/2} - 8^{1/2}$

Problem Set III:

1. ________ $\sqrt{289} + \sqrt{256} - \sqrt{144}$
2. ________ $\sqrt{300}$
3. ________ $\sqrt{75} \div \sqrt{15}$
4. ________ $1\sqrt{1} - 1\sqrt{1}$
5. ________ $.5^{1/2} + 1^{1/2}$

Algebra to the Core

Practice Makes Perfect

Working with Square Roots 10.2

Solution Key

Directions: Use the Rules of square roots to perform the indicated operations, and to simplify your answers and expressions..

Rules of Square Roots:

$\sqrt{a} = b$ if and only if $b\,(b) = a$	$\sqrt{a} = a^{1/2}$
$\sqrt{ab} = \sqrt{a} \bullet \sqrt{b}$	$m\sqrt{a} + n\sqrt{a} = (m+n)\sqrt{a}$
$\sqrt{a/b} = \sqrt{a} \,/\, \sqrt{b}$	

Problem Set I:

1. __________ $\sqrt{81} + \sqrt{100}$ $\quad$ $9 + 10 = 19$
2. __________ $\sqrt{48}$ $\quad$ $\sqrt{16 \bullet 3} = 4\sqrt{3}$
3. __________ $\sqrt{98} \div \sqrt{2}$ $\quad$ $\sqrt{49} = 7$
4. __________ $5\sqrt{8} + 5\sqrt{8}$ $\quad$ $10\sqrt{8} = 10\sqrt{9 \bullet 2} = 10\,(3)\sqrt{2} = 30\sqrt{2}$
5. __________ $25^{1/2} - 49^{1/2}$ $\quad$ $5 - 7 = -2$

Problem Set II:

1. __________ $\sqrt{121} + \sqrt{324}$ $\quad$ $11 + 18 = 29$
2. __________ $\sqrt{44}$ $\quad$ $\sqrt{4 \bullet 11} = 2\sqrt{11}$
3. __________ $\sqrt{60} \div \sqrt{15}$ $\quad$ $\sqrt{4} = 2$
4. __________ $3\sqrt{6} + 9\sqrt{6}$ $\quad$ $12\sqrt{6}$
5. __________ $32^{1/2} - 8^{1/2}$ $\quad$ $\sqrt{32} - \sqrt{8} = \sqrt{16\,(2)} - \sqrt{4\,(2)} = (4-2)\sqrt{2} = 2\sqrt{2}$

Problem Set III:

1. __________ $\sqrt{289} + \sqrt{256} - \sqrt{144}$ $\quad$ $17 + 16 - 12 = 21$
2. __________ $\sqrt{300}$ $\quad$ $\sqrt{100 \bullet 3} = 10\sqrt{3}$
3. __________ $\sqrt{75} \div \sqrt{15}$ $\quad$ $\sqrt{5}$
4. __________ $1\sqrt{1} - 1\sqrt{1}$ $\quad$ 0
5. __________ $.5^{1/2} + 1^{1/2}$ $\quad$ $.25 + 1 = 1.25$

Algebra to the Core

Task Rotation Activity

Working with Square Roots 10.3

Name ____________________

Period ____________________

Date ____________________

Directions: Perform each math task.

Rules of Square Roots:

$\sqrt{a} = b$ if and only if $b\,(b) = a$	$\sqrt{a} = a^{1/2}$
$\sqrt{ab} = \sqrt{a} \bullet \sqrt{b}$	$m\sqrt{a} + n\sqrt{a} = (m+n)\sqrt{a}$
$\sqrt{a/b} = \sqrt{a} \;/\; \sqrt{b}$	

Mastery Task:

Simplify each expression.

1. $\sqrt{8} + \sqrt{18}$
2. $\sqrt{162} \div \sqrt{2}$
3. $121^{1/2} + 144^{1/2} - 100^{1/2}$

Interpersonal Task:

In math, the square root of a number n is generally written using the notation $\sqrt{n}$. in computer programming and spread sheet applications, the square root of a number n is generally written using the notation sqr [n]. Which notation do you like better? Why? If you have access to a computer with a spreadsheet application, try out the sqr [ ] notation and see if it works.

Understanding Task:

In math, $\sqrt{25} = 5$. While it is true that $-5\,(-5) = 25$, the plain square root symbol refers to the positive root. The notation $\pm\sqrt{25}$ delivers the numbers 5 and –5. When solving an equation, the act of solving $x^2 = n$, delivers the answer $x = \pm\sqrt{n}$ by rule. Use this fact to solve the equation $2x^2 + 12 = 20$ for x.

Self-Expressive Task:

For each expression below, find numeric values for a, b, and c that make the expressions = $8\sqrt{2}$.

- $a\sqrt{18} + b\sqrt{8} - c\sqrt{32}$
- $a\sqrt{50} + b\sqrt{128} - c\sqrt{200}$