



*Bishop Kelley High School*

*Summer Math Program*

*Course: Algebra IIA*

NAME: \_\_\_\_\_

**DIRECTIONS.** Read these directions very carefully!

- Show all work on in the packet.
- **This packet can be printed on front and back.**
- Please read the calculator requirement for this course. It is on the next page and it is also in the course catalog.
- 1- 26 on the math packet will be collected, graded, and points awarded at the discretion of each teacher on the first day of the math class.
- We will go over the rest of the assignment in class on the first day of school so you will have an opportunity to ask questions over anything you need clarified.
- A test on this material will be administered during the first week of the class.
- Videos specific to the 2<sup>nd</sup> part of this math packet are available June 1<sup>st</sup> at <https://sites.google.com/bishopkelley.org/sedmondson/home>
- An additional resource for help with this packet is <http://www.khanacademy.org>. It provides videos of about 10 minutes in length on hundreds of different math topics.

## School Supply List For Algebra IIA

1. At least a 1½ binder with paper (I have found the most durable binder to be the Avery brand. The Avery brand has 3 types Economy, Durable and Heavy Duty. My students have had good luck with the Avery Heavy Duty binder lasting all year and even the next year.)
2. Pencils
3. A TI-84 Plus CE or TI Plus-84 graphing calculator.  
TI stands for Texas Instrument and CE stands for Color Edition
4. Graph paper (punch holes in the paper and put it in the back of your binder)
5. A package of dry erase markers (for your own personal use)
6. A white block Hi-polymer eraser (the most common brand is Pentel and it is sold at Walmart and Target)



\*\*\* I will check for all required materials by the first Monday of school. Please email me or talk with me privately if purchasing these school supplies by the stated date is a financial burden.

Name \_\_\_\_\_

**SUMMER MATH PACKET**  
**Students entering Algebra IIA**

**Directions for Summer Math Packet:**

1. Use a pencil.
2. **Calculators are NOT permitted for this summer math packet, unless specifically directed.**
3. **Do not do work on a separate sheet of paper. Show all work in packet.**
4. **This part will be turned in to the teacher at the beginning of math class on the first day of class.**

**Find the slope between the given points.**

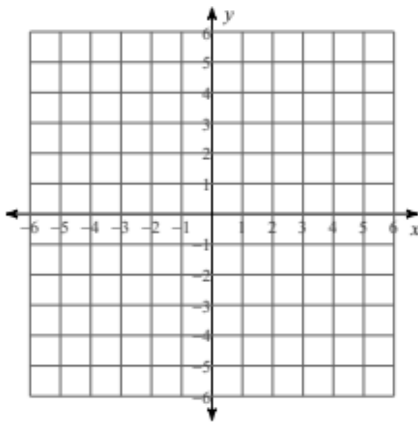
1)  $(2,4), (4,-6)$

2)  $(1,3), (-3,3)$

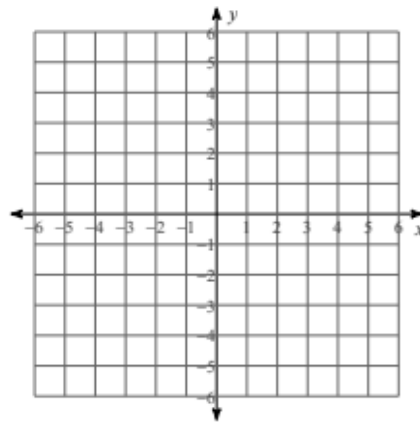
3)  $(-4,7), (-4,10)$

**Sketch the graph of each line.**

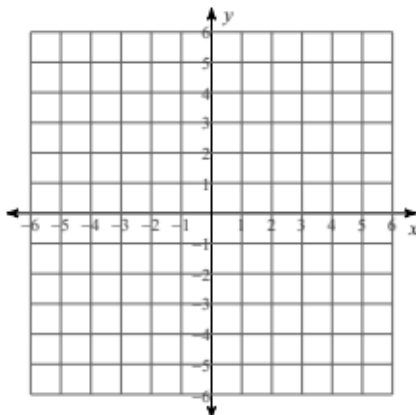
4)  $y = 2x + 4$



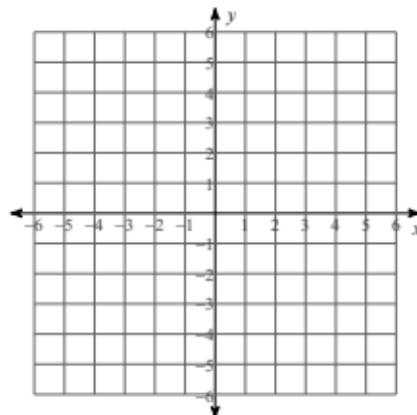
5)  $3x - 4y = 0$



6)  $x + y = -5$



7)  $x\text{-intercept} = 1, y\text{-intercept} = 1$



**Simplify. Your answer should contain only positive exponents.**

8)  $n^3 n^4$

9)  $(3v)^3$

10)  $\frac{4n^2}{3n^3}$

11)  $\frac{uv^3}{4u^2 v^{-2} \cdot 3u^{-4}}$

12)  $\frac{yx^{-1}}{(2x^{-3}y^4)^3}$

13)  $u^{-2} \cdot (u^{-2}v^2)^3$

**Factor each completely.**

14)  $y = x^2 - 2x - 3$

15)  $y = x^2 - 5x + 4$

16)  $y = x^2 - 3x - 4$

17)  $y = x^2 + 2x + 1$

18)  $y = 3x^2 - 10x + 8$

19)  $y = 2x^2 + 11x + 5$

20)  $y = 3x^2 + 5x - 2$

21)  $y = 10x^2 - 9x + 2$

22)  $y = 4x^2 + 4x - 15$

23)  $y = 4x^2 + 4x + 1$

24)  $n^2 - 1$

25)  $4n^2 - 9$

26)  $9x^2 - 25$

**First, take notes using the videos that are on my webpage.**

The videos are available at  
<https://sites.google.com/bishopkelley.org/sedmondson/home>

**Set-** a collection of objects whose contents can be clearly determined

**\*\*we use braces  $\{ \}$  to indicate a set**

**Element-** the objects in a set

**We have 2 ways to represent a set**

**1. roster method-** lists the elements of the set separated by commas.

**Example:**  $\{1, 3, 5, 7, 9, \dots\}$

**2. set-builder notation-** elements are described but not listed

**Example:**  $\{x \mid x \text{ is an odd natural number}\}$        $(x \mid$  means

$\in$  means

$\notin$  means

**Examples:**

**Roster method:**

$3 \in \{1, 3, 5, 7, 9, \dots\}$

**set builder notation:**

$4 \notin \{x \mid x \text{ is an odd number}\}$

**This is read as:**

**This is read as:**

**Now let's look at Sets of Numbers-**

**The Set of Natural Numbers –**

**The Set of Whole Numbers-**

**The Set of Integers**

**The Set of Rational Numbers-**

## The Set of Irrational Numbers-

## The Set of Real Numbers

Use the roster method to list the elements in each set.

Example:

$$\{x \mid x \text{ is a natural number less than } 5\}$$

Determine if true or false.

Example:

$$-\frac{1}{2} \in \{x \mid x \text{ is an integer}\}$$

$$\sqrt{3} \notin \{x \mid x \text{ is a rational number}\}$$

## Interval Notation:

Express each interval in set-builder notation and graph the interval on a number line.

Examples:

$$(-2, 4]$$

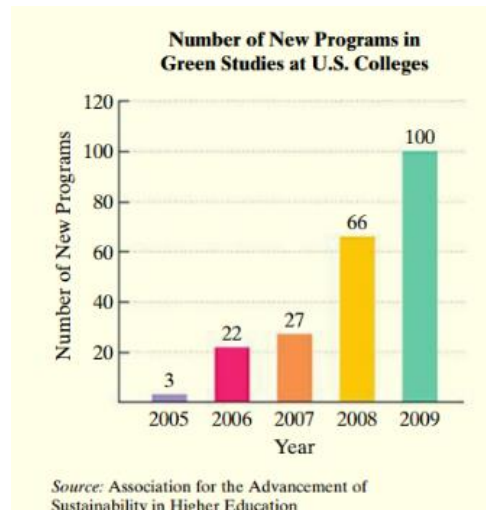
$$[-2, \infty)$$

$$(-\infty, 5)$$

A bracket indicates endpoints are included in the interval

A parentheses indicates endpoints are NOT included in the interval. Parenthesis are always used with  $\infty$  or  $-\infty$

In 2009, U.S. colleges created 100 new majors, minors and certificates in energy and sustainability-focused programs. The bar graph shows the number of new college programs in green studies from 2006 through 2009.



The data in the graph can be modeled by the formula

$$G = 4.6x^2 + 5.5x + 5,$$

where  $G$  represents the number of new college programs in green studies  $x$  years after 2005. Use this formula to solve the next problem.

According to the formula, how many new college programs in green studies were created in 2009? Round to the nearest whole number. Does this rounded value underestimate or overestimate the actual number shown by the bar graph? By how much?





## **Chapter 1 Lesson 1 Assignment.**

**Using the videos, complete the 1.1 notes page FIRST, then do this assignment.**

**On the first day of class, we will go over questions you have regarding this part of the math packet.**

**Write each English phrase as an algebraic expression. Let  $x$  represent the number.**

**1. Five more than a number**

**5. Four times a number.**

**9. The difference of six and half of a number.**

**13. The quotient of three and the difference of five and a number.**

**Evaluate each algebraic expression for the given value or values of the variable(s).**

**17.  $6x - y$  for  $x = 3$  and  $y = 8$**

**21.  $x^2 - 6x + 3$  for  $x = 7$**

**25.  $x^2 - 3(x - y)$ , for  $x = 8$  and  $y = 2$**

Use the roster method to list the elements in each set.

29.  $\{x \mid x \text{ is a natural number less than } 5\}$

33.  $\{x \mid x \text{ is an odd whole number less than } 11\}$

Use the meaning of the symbols  $\in$  and  $\notin$  to determine whether each statement is true or false.

37.  $7 \in \{x \mid x \text{ is an integer}\}$

41.  $3 \in \{x \mid x \text{ is an irrational number}\}$

45.  $\sqrt{2} \in \{x \mid x \text{ is a rational number}\}$

Determine whether the inequality is true or false.

49.  $-6 < -2$

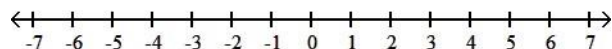
53.  $0 < -4$

57.  $-2 \leq -6$

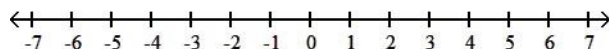
61.  $-2 \geq -2$

Graph each interval on a number line (you don't have to express in set notation)

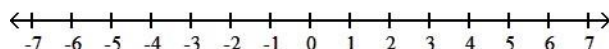
65.  $(1, 6]$



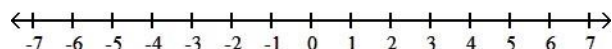
69.  $[-3, 1]$



73.  $[-3, \infty)$



77.  $(-\infty, 5.5)$



Data indicates that we improve our emotional health with age. One theory is that key centers of the brain tend to create less resistance to feeling of happiness as we age. The equation that shows the average resistance to happiness on a scale of 0 (no resistance) to 8 (completely resistant for persons of various ages is:

$$R = 4.6 - 0.02x$$

where  $R$  represents the average resistance to happiness, on a scale of 0 to 8, for a person who is  $x$  years old. Use this formula to answer the following questions.

89. According to the formula, what is the average resistance to happiness at age 20?

92. What is the difference between the average resistance to happiness at age 20 and age 70?



Algebra IIA  
Notes on 1.2

**First, take notes using the videos that are on my webpage.**

The videos will be available at

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**Common Mistake!**

$$(-3)^2$$

$$-3^2$$

**Properties-**

**Commutative**

**Associative**

**Distributive**

Use the commutative property to write an equivalent algebraic expression to the give expression.

$$7x - 5$$

Commutative Property of addition: \_\_\_\_\_

Commutative Property of multiplication: \_\_\_\_\_

Use the associative property to write an equivalent algebraic expression to the given expression.

$$5 + (3 + 9x)$$

$$7(3x)$$

**Combining Like Terms Examples:**

$$3c + 5d - c + 3d$$

$$7x^2 - 9x + x^2$$

$$3(2y - z) - (5y - 8z)$$

$$3 - 2[5(y - 2) - 8y]$$



## Chapter 1 Lesson 2 Assignment.

Using the videos, complete the 1.2 notes page FIRST, then complete the following assignment.

On the first day of class, we will go over questions you have regarding this part of the math packet.

Find each absolute value.

1.  $|-7|$

5.  $|-7.6|$

9.  $|\sqrt{2}|$

Add, as indicated.

13.  $-3 + (-8)$

17.  $-6.8 + 2.3$

21.  $-\frac{2}{9} - \frac{3}{4}$

25.  $0 + (-12.4)$

Find  $-x$  for the given value of  $x$

29.  $x = 11$

33.  $x = 0$

**Subtract, as indicated.**

37.  $3 - 15$

41.  $\frac{1}{4} - \frac{1}{2}$

45.  $0 - (-\sqrt{2})$

**Multiply, as indicated.**

49.  $(-3)(-11)$

53.  $-\sqrt{2} \cdot 0$

57.  $2(-3)(-1)(-2)(-4)$

61.  $-10^2$

65.  $(-1)^4$

69.  $-\left(-\frac{1}{2}\right)^3$

**Divide as indicated or state that the division is undefined.**

73.  $\frac{-90}{-2}$

77.  $\frac{-7.6}{0}$

81.  $6 \div \left(-\frac{2}{5}\right)$



Use order of operations to simplify each expression.

85.  $3(-2)^2 - 4(-3)^2$

89.  $\frac{5 \cdot 2 - 3^2}{[3^2 - (-2)]^2}$

93.  $\frac{2(-2) - 4(-3)}{5 - 8}$

97.  $15 - \sqrt{3 - (-1)} + 12 \div 2 \cdot 3$

Write an algebraic expression equivalent to the given expression using each commutative properties.  
(See examples in 1.2 notes attached to the end of this packet)

101.  $4x + 10$

Commutative property of addition: \_\_\_\_\_

Commutative property of multiplication: \_\_\_\_\_

Use the associative property to write an algebraic expression equivalent to each expression and simplify.  
(see examples in 1.2 notes attached to the end of this packet)

105.  $4 + (6 + x)$

109.  $-\frac{1}{3}(-3y)$

Use the distributive property to write an equivalent expression.

113.  $-7(2x + 3)$

**Simplify each algebraic expression.**

**117.**  $7x + 5x$

**121.**  $6x + 10x^2 + 4x + 2x^2$

**125.**  $5(3y - 2) - (7y + 2)$

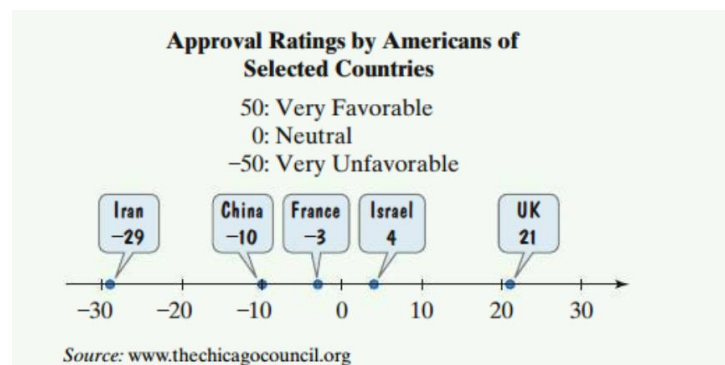
**129.**  $18x^2 + 4 - [6(x^2 - 2) + 5]$

**Write each English phrase as an algebraic expression. Then simplify the expression. Let  $x$  represent the number.**

**133.** Six times the product of negative 5 and a number.

**137.** The difference between the product of eight times a number and six more than three times the number.

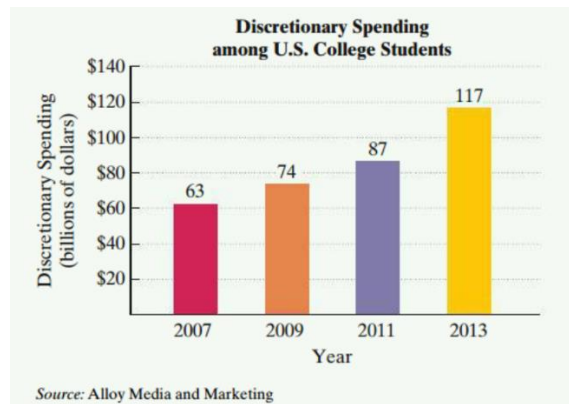
**Use the graph below to answer the following questions.**



**141.** What is the difference between the approval rating of the UK and approval rating of Iran?

**145.** What is the average of the approval ratings for China, France and Israel?

Use the graph below to answer the following questions.



The data for discretionary spending among U.S. college students can modeled by the formula

$$D = -0.2x^2 + 5(x+12)$$

where  $D$  represents discretionary spending among U.S. college students, in billions of dollars,  $x$  years after 2006.

146. Define discretionary spending (If you don't know what it is, look it up in the dictionary)

Give an example of discretionary spending.

147. According to the formula, how much money did college students spend in 2010? (let's take this in parts)

a) To answer this, first tell me what  $D$  stands for ? go back and re-read the problem, it tells you!

b)  $x$  stands for?

c) Based on what  $x$  stands for, what does that tell you about 2010? (look on 1.2 notes page if you need a hint)

d) now use all of this info to answer the question of how much discretionary money did college students spend in 2010? (you can use a calc on this one)

Show me what you will enter into the calculator: \_\_\_\_\_

What is answer? \_\_\_\_\_



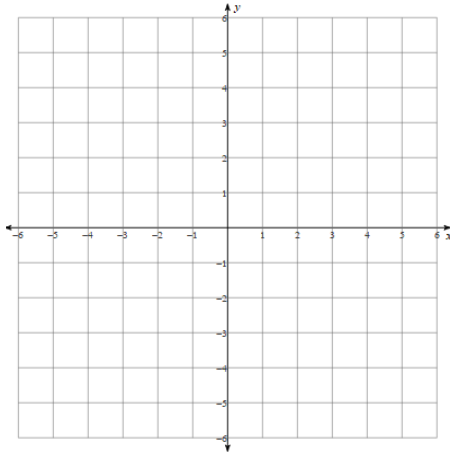
Algebra IIA  
Notes on 1.3  
Graphing

**First, take notes using the videos that are on my webpage.**

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Plot the following points.



A  $(3, -2)$

B  $(-1, 4)$

C  $(-2, -3)$

Name points on the x-axis:

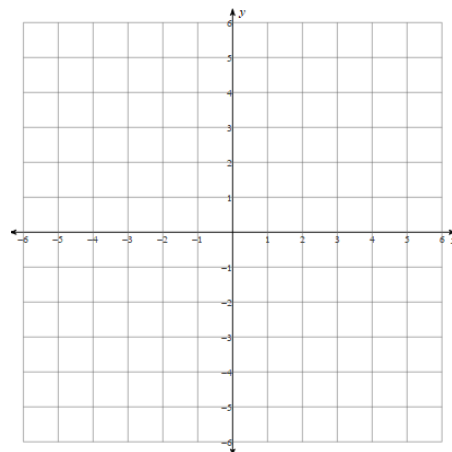
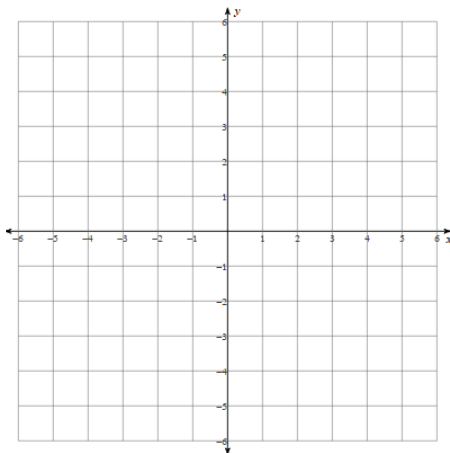
Name points on the y-axis:

Graph each equation. Let  $x = -3, -2, -1, 0, 1, 2, 3$

Examples:

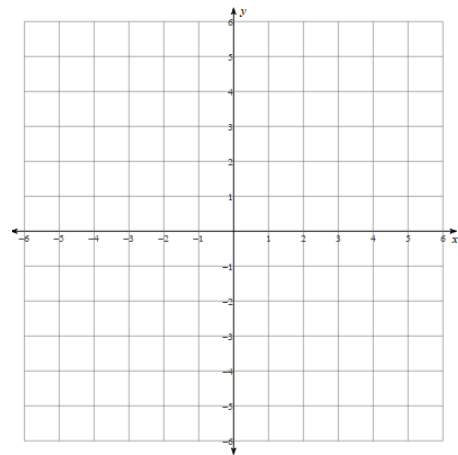
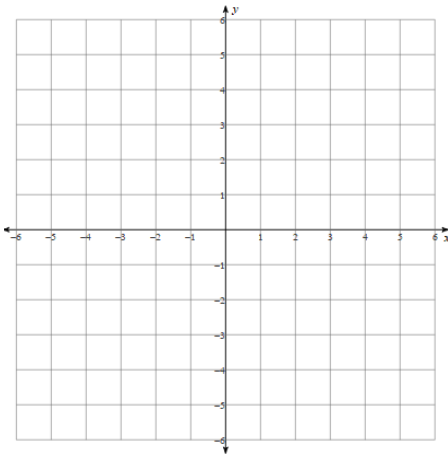
$$y = x + 2$$

$$y = -2x - 1$$



$$y = x^2 - 2$$

$$y = 2|x| + 1$$



Standard Viewing window—

Draw the following viewing window  $[-8, 8, 2]$  by  $[0, 15, 5]$

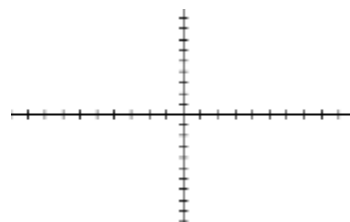
Now, let's go back and graph 2 graphs from the front page using our graphing calculator so I can show you some things....

Find the table of values generated by the calculator.

$$y_1 = x + 2$$

$$y_2 = -2x - 1$$

| X  | Y <sub>1</sub> | Y <sub>2</sub> |
|----|----------------|----------------|
| -4 | -2             | 7              |
| -3 | -1             | 5              |
| -2 | 0              | 3              |
| -1 | 1              | 1              |
| 0  | 2              | -1             |
| 1  | 3              | -3             |
| 2  | 4              | -5             |
| 3  | 5              | -7             |
| 4  | 6              | -9             |
| 5  | 7              | -11            |
| 6  | 8              | -13            |



At which point does the graph on  $y_1$  cross the x-axis?

At which point does  $y_2$  cross the y-axis?

At which point(s) do the graphs of  $y_1$  and  $y_2$  intersect?

## Chapter 1 Lesson 3 Assignment.

Using the videos, complete the 1.3 notes page **FIRST**, then complete the following assignment.

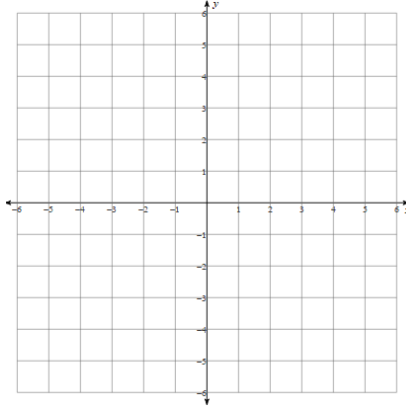
On the first day of class, **we will go over questions** you have regarding this part of the math packet.

Plot the given points in a rectangular coordinate system.

3. A  $(-2, 3)$

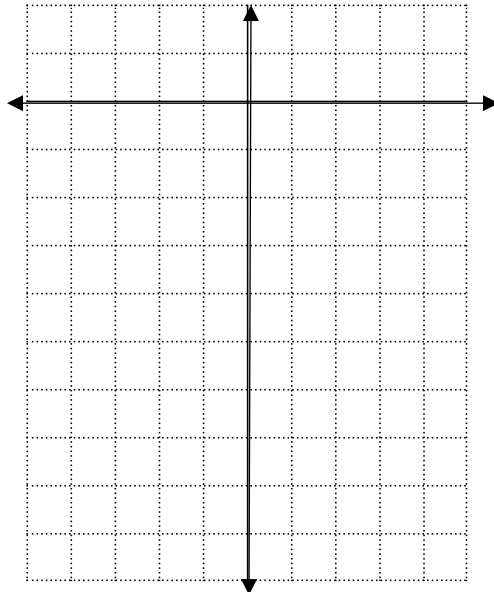
6. B  $(-4, -2)$

9. C  $(-4, 0)$

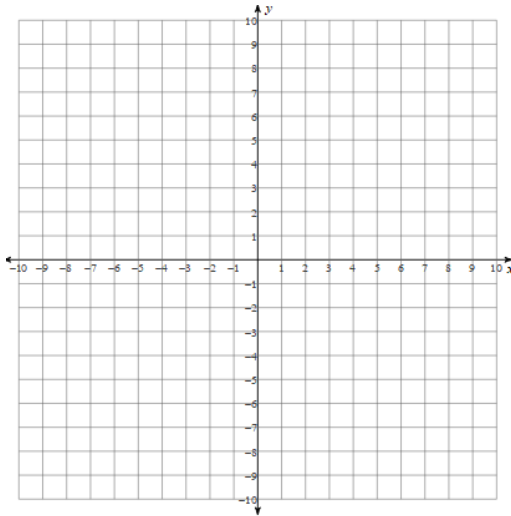


Graph each equation. Plug in  $x = -3, -2, -1, 0, 1, 2, 3$  into an x-y chart. You may know other ways to graph some of these **but I ONLY want them done using an x-y chart. You must show the x-y chart.**

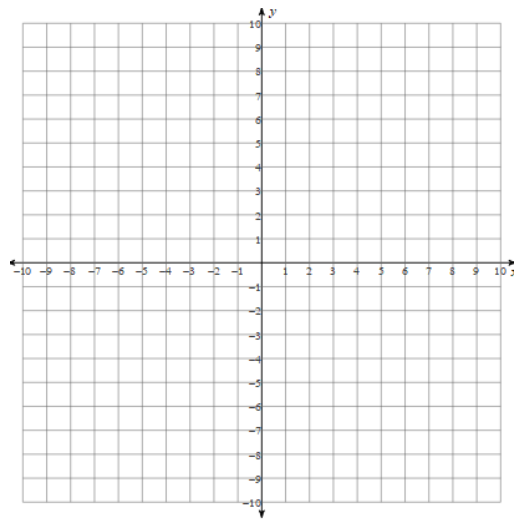
12.  $y = x^2 - 9$  (you may know another way but follow directions!)



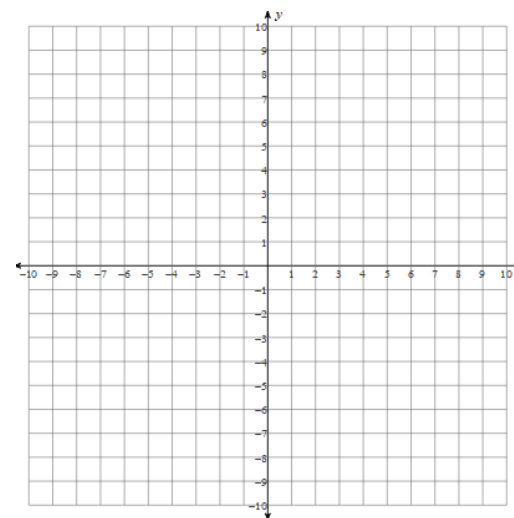
15.  $y = 2x + 1$  (you probably know another way to graph this but I want an x-y chart)



18.  $y = -\frac{1}{2}x + 2$  (you probably know another way to graph this but I want an x-y chart)

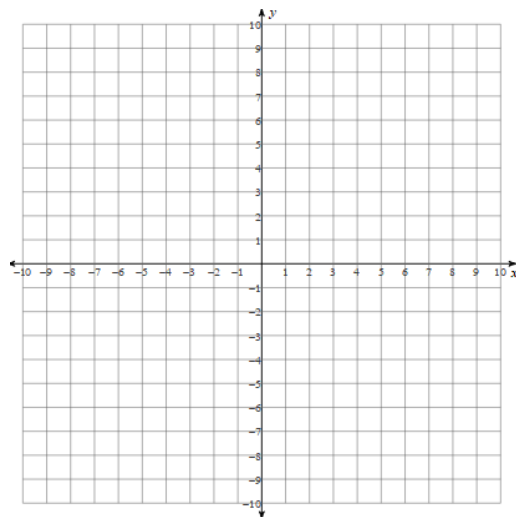


21.  $y = 2|x|$  (you might know another way to graph this but I want an x-y chart)

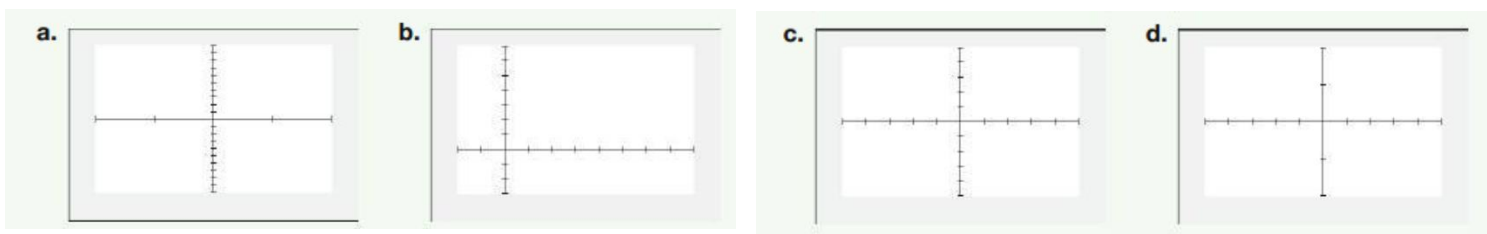




24.  $y = -\frac{1}{2}x^2$  (you might know another way to graph this but I want an x-y chart)



Match the viewing rectangle with the correct figure.



27.  $[-5, 5, 1] \text{ by } [-5, 5, 1]$

28.  $[-10, 10, 2] \text{ by } [-4, 4, 2]$

29.  $[-20, 80, 10] \text{ by } [-30, 70, 10]$

30.  $[-40, 40, 20] \text{ by } [-1000, 1000, 100]$

This table of values was generated by a graphing utility with a TABLE feature. Use the table to answer the following questions. ( you may need to re-watch the video to help with this but also remember that I am NOT taking this part of the math packet up on the first day, so you can ask questions)

| X  | Y <sub>1</sub> | Y <sub>2</sub> |  |  |
|----|----------------|----------------|--|--|
| -3 | 9              | 5              |  |  |
| -2 | 4              | 4              |  |  |
| -1 | 1              | 3              |  |  |
| 0  | 0              | 2              |  |  |
| 1  | 1              | 1              |  |  |
| 2  | 4              | 0              |  |  |
| 3  | 9              | -1             |  |  |
| 4  | 16             | -2             |  |  |
| 5  | 25             | -3             |  |  |
| 6  | 36             | -4             |  |  |
| 7  | 49             | -5             |  |  |

X = -3

33. Does the graph of  $Y_2$  pass through the origin?
34. Does the graph of  $Y_1$  pass through the origin?
36. At which point does the graph of  $Y_2$  cross the y-axis?
37. At which points do the graphs of  $Y_1$  and  $Y_2$  intersect?

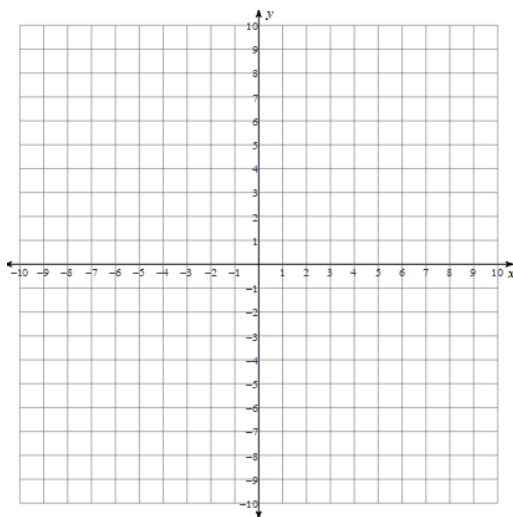
Write each English sentence as an equation in two variables.

41. The y-value is three decreased by the square of the x-value.

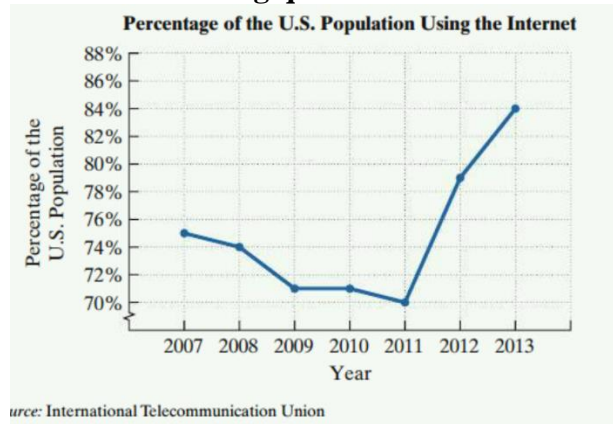
Graph each equation. Plug in  $x = -2, -1, -\frac{1}{2}, -\frac{1}{3}, \frac{1}{2}, \frac{1}{3}, 1, 2,$  into an x-y chart. You may know other ways to graph some of these but I ONLY want them done using an x-y chart. You must show the x-y chart.

45.  $y = \frac{1}{x}$  (make sure you follow the directions that are above- and don't use a calc on the fractions)

(this graph will likely look strange to you)



Use the graph below to answer the following questions.



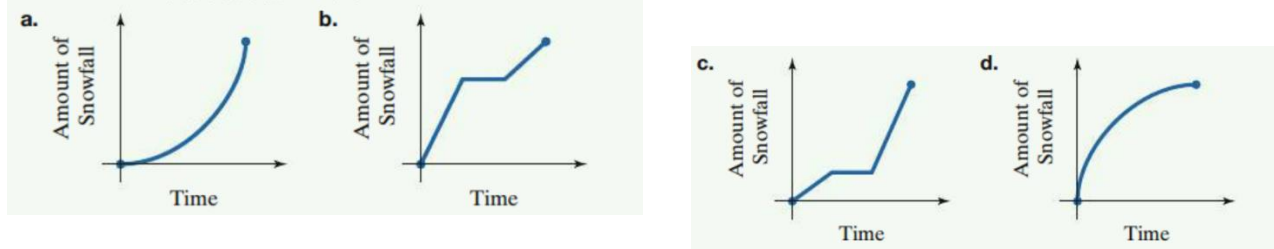
49. For the period shown, in which year did the greatest percentage of the U.S. population use the internet? What percentage of the population used the internet in that year?

50. For the period shown, between which two years did the percentage of the U.S. population using the internet remain constant? What percentage of the population used the internet in those years?

51. For the period shown, between which two years did the percentage of the U.S. population using the internet increase most rapidly? What was the increase in the percentage using the internet between those years?

52. Between 2007 and 2013, what was the increase in the percentage of the U.S. population using the internet?

For 57-60, match the story with correct figure. The figures are labeled (a), (b), (c), and (d).



57. As the blizzard got worse, the snow fell harder and harder.

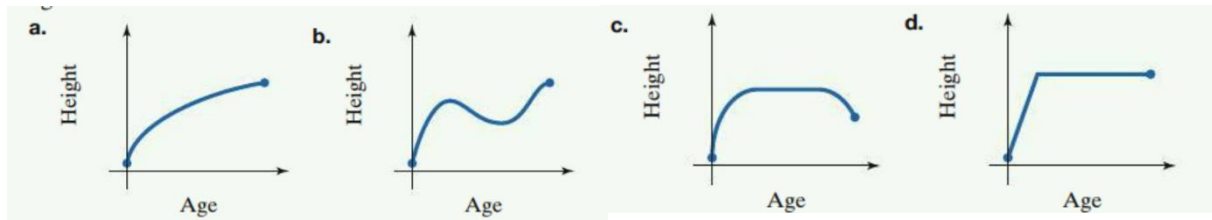
58. The snow fell more rapidly and more softly.

59. It snowed hard, but then it stopped. After a short time, the snow started falling more softly.

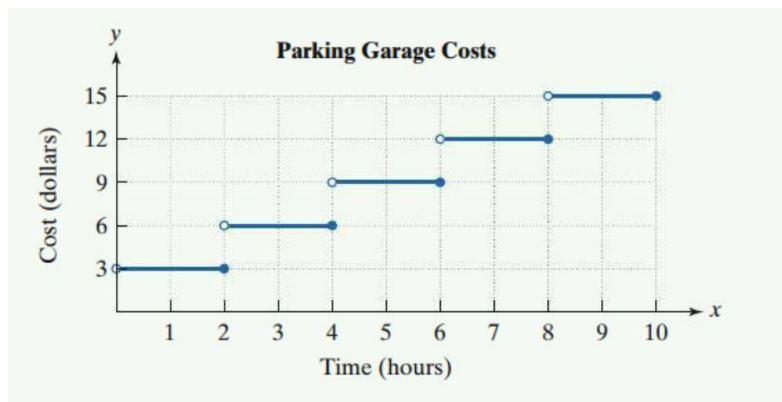
60. It snowed softly, and then it stopped. After a short time, the snow started falling hard.

For 63, select the graph that best illustrates the story.

63. Measurements are taken of a person's height from birth to age 100.



Use the graph below to answer the following questions.



81. You park your car at the garage for four hours on Tuesday and five hours on Wednesday. What are the total parking garage costs for the two days?

82. On Thursday, you paid \$12 for parking at the garage. Describe how long you were parked.

Algebra IIA  
1.4 Part 1 Notes  
Solving Equations (part 1)  
**First, take notes using the videos that are on my webpage.**  
The videos will be available at  
<https://sites.google.com/bishopkelley.org/sedmondson/home>

**Solve.**

**Examples:**

1.  $15 - 6x = 3$

2.  $6x - (10x - 2) = 8$

3.  $6(x - 2) = 4x - 12$

4.  $3(x - 5) = x + 2(x - 5)$

5.  $8(x - 2) = 5(x - 2) + 3x - 6$

$\therefore$  the equation has \_\_\_\_\_  
Which we write as \_\_\_\_\_  
An equation that is not true for even 1 real  
Number is called

$\therefore$  the solution is \_\_\_\_\_  
which we write as \_\_\_\_\_  
And an equation that is true for \_\_\_\_\_  
is called



## **Chapter 1 Lesson 4 Assignment – Part 1.**

**Using the videos, complete the 1.4 part 1 notes page FIRST, then complete these problems.**

**On the first day of class, we will go over questions you have regarding this part of the math packet.**

**Solve. When needed, state if the equation is all infinite number of solutions (All Real Numbers) or no solution.**

**3.**  $6x - 3 = 63$

**6.**  $25 - 6x = -83$

**9.**  $2x - 7 = 6 + x$

**12.**  $8x + 1 = x + 43$

**15.**  $3(x-2)+7=2(x+5)$

**18.**  $2-(7x+5)=13-3x$

**21.**  $7(x+1)=4[x-(3-x)]$

**24.**  $\frac{3}{4}(24-8z)-16=-\frac{2}{3}(6z-9)$

**42.**  $4(y+5)=21+4y$

**48.**  $3x-3(2-x)=6(x-1)$