

Advanced Algebra

Name _____

Garrity

Date _____

Linear Equations/Slope

Hour _____

1. Write the equation of a line in standard form: _____
2. Write the equation of a line in point-slope form: _____
3. Write the equation of a line in slope-intercept form: _____

3.a. Slope $m =$ _____

4. Write the equation of a line in **slope-intercept form** if the slope is -5 and y intercept is 7 .
5. Write the equation of a line in **point-slope form** that passes through the point $(-1,2)$ and has a slope of 3 .
6. Write the equation of a line in **standard form** passing through point $(-4,3)$ with a slope of -2 .
7. Write the equation of a line in slope-intercept form whose slope is -4 and y intercept is 0 .
8. Write in slope-intercept form the equation of a line passing through the point $(5,-2)$ and a slope of -4 .

9. Given the points: $(-4,3)$ and $(-1,-6)$

a) Find the slope:

b) Write in point-slope form:

c) Write in slope-intercept form:

d) Write in standard form:

10. Determine whether the two lines are perpendicular. Show work to support your answer.

a) $y = -\frac{1}{4}x + 5$ and $y = -4x - 2$

b) $y = \frac{3}{5}x + 6$ and $y = -\frac{5}{3}x - 6$

11. A line has a slope of $\frac{5}{7}$, what is the slope of the line that is:

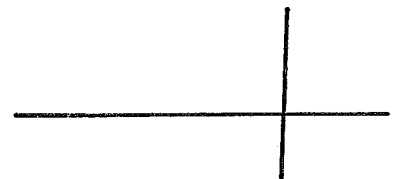
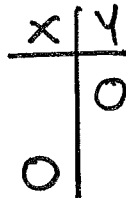
a) perpendicular _____

b) parallel _____

12. Find the x and the y intercept of the line: $-2x + 7y = 14$

x intercept: _____

y intercept: _____



13. Find the slope of the line passing through the points: $(-3,5)$ and $(-3,-1)$

For #'s 14-21, tell whether the equation is in **slope-intercept form**, **standard form**, **point-slope form**, or **none**.

14. $y + 2 = -\frac{1}{2}(x - 5)$

15. $2x + 3y - 6 = 0$

16. $y - 7 = \frac{1}{3}x + 2$

17. $y = 2x - 5$

18. $3x - y = 2$

19. $4y = 2x - 1$

20. $y - 10 = 3(x + 7)$

21. $x - y = -1$

For #'s 22-28, give the **slope (m)** and the **y-intercept (b)**
(You may have to rewrite the equation)

22. $y = \frac{3}{5}x - 4$

m = _____

b = _____

23. $5x + 2y = 10$

m = _____

b = _____

24. $y = -2$

m = _____

b = _____

25. $y = -x + 6$

m = _____

b = _____

26. $y - 5 = \frac{1}{4}(x + 12)$

m = _____

b = _____

pt _____

27. $x = 3$

m = _____

b = _____

28. $y = \frac{1}{4}x$

m = _____

b = _____

For # 29-30, give the point and the slope:

29. $y - 3 = \frac{1}{5}(x + 2)$

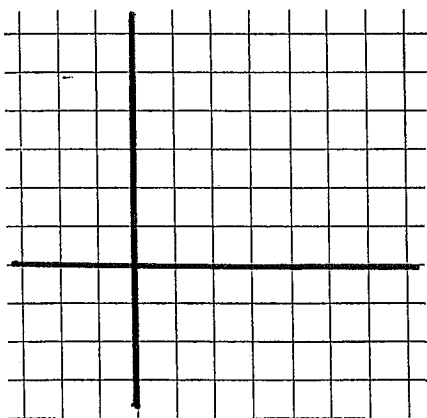
slope: _____ point: _____

30. $y - 1 = -3(x - 4)$

slope: _____ point: _____

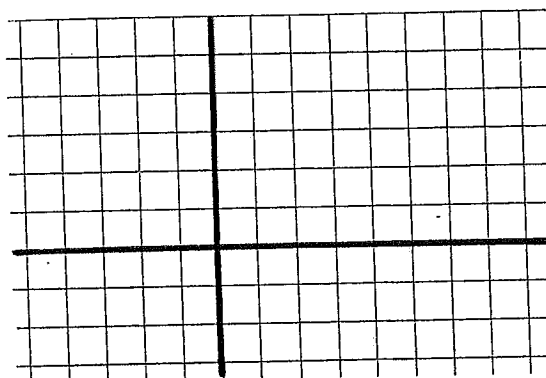
Graph the following equation. (use any method you wish)

31. $5x + 4y = 20$

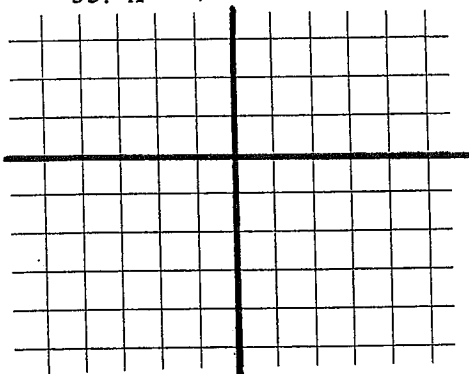


X	Y
0	5
4	0

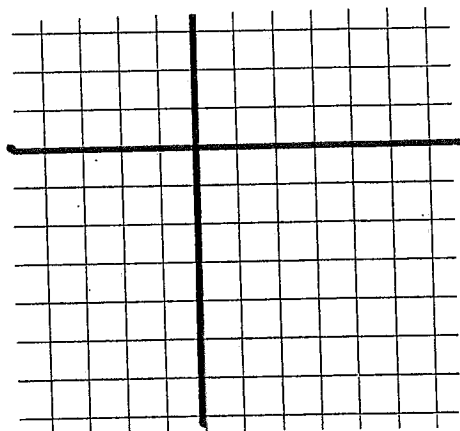
32. $y = -\frac{2}{5}x + 4$



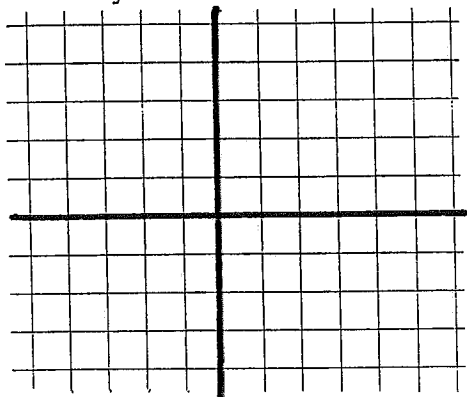
33. $x = -4$



34. $y = x - 3$

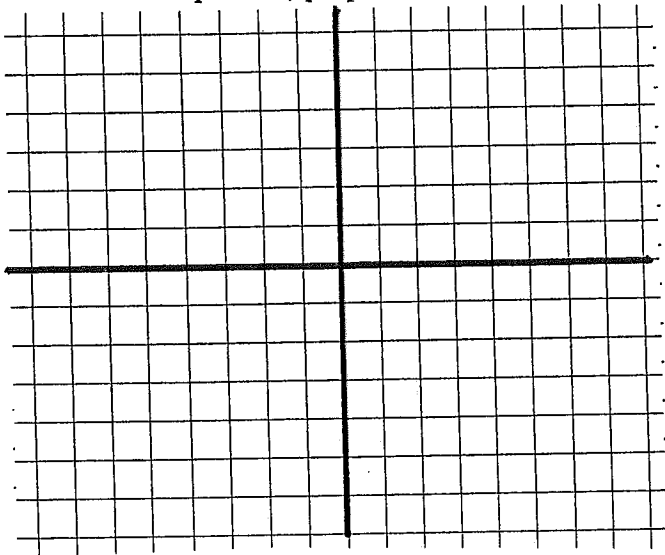


35. $y = 2$



36. Graph the two lines in the same coordinate plane: $y = \frac{3}{2}x + 1$ and $y = -\frac{2}{3}x - 2$

Are the lines parallel, perpendicular or neither?



Solve the following equations:

37. $5x + 3(x + 4) = 28$

38. $11x - 21 = 17 - 8x$

39. $6(x + 3) + 3x = 3(x - 2)$

40. $20 - 3x = 2x$

1

NAME: _____

GRAPH

FUNCTION

$$y = 3x$$

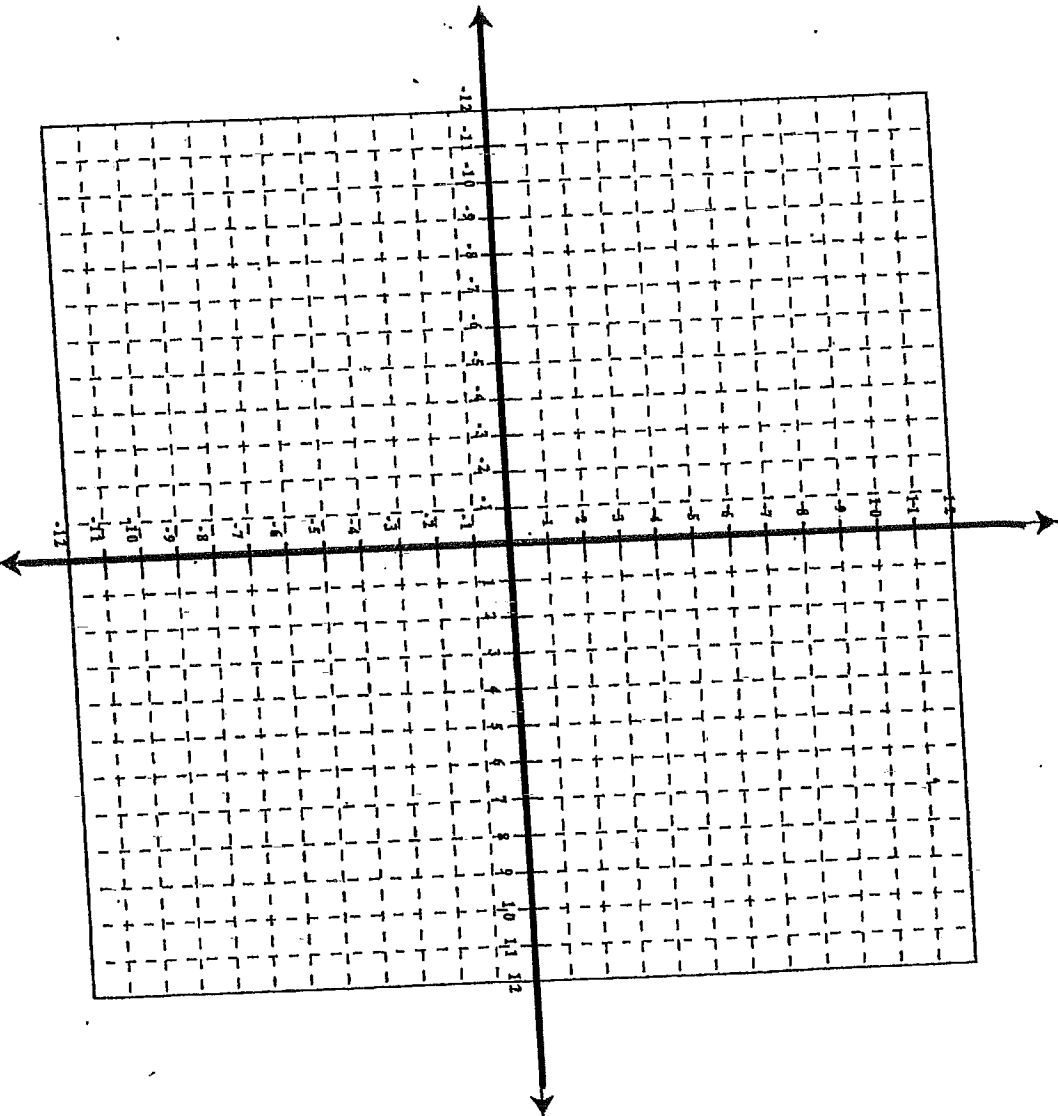
Slope: _____

y-intercept: _____

TABLE

x	y
-2	
-1	
0	
1	
2	
3	

Slope $\frac{\text{rise}}{\text{run}}$ _____



Order of Operations

Step 1: Do operations that occur
within the grouping symbols

$$1 + 7^2 \cdot (5 - 3)$$

Step 2: Evaluate Powers

$$1 + 7^2 \cdot (2)$$

Step 3: Do multiplication and division
from left to right

$$1 + 49 \cdot 2$$

Step 4: Do subtraction and addition from
left to right

$$1 + 98$$

Practice Problems:

1. $3 - 2 \cdot 5$

2. $4 \cdot (-3^3)$

3. $-(-3 + 5)^2$

4. $21 \div (2^2 + 3) - 10$

5. $4 \cdot (-5^3)^2$

6. $12 \div 3 - 4$

7. $1 + (5^2 - 10) \div 5$

8. $(-6)^3$

9. -2^5

10. $(6 - 5)^3 + 14 \div (2 + 5)$

Knowing Properties

Properties of Addition and Multiplication:

Addition:

Commutative property: $a + b = b + a$

Example: $3 + 5 = 5 + 3$

Associative property: $(a + b) + c = a + (b + c)$

Example: $(4 + 2) + 1 = 4 + (2 + 1)$

Inverse property: $a + (-a) = 0$

Example: $1 + (-1) = 0$

Identity property: $a + 0 = a, 0 + a = a$

Example: $5 + 0 = 5, 0 + 5 = 5$

Closure: $a + b$ is a real number

Example: $2 + 1 = 3$ is a real number

Multiplication:

Commutative property: $ab = ba$

Example: $(4 \cdot 3) = (3 \cdot 4)$

Associative property: $(ab)c = a(bc)$

Example: $(2 \cdot 1)4 = 2(1 \cdot 4)$

Identity property: $a \cdot 1 = a, 1 \cdot a = a$

Example: $7 \cdot 1 = 7, 1 \cdot 7 = 7$

Inverse property: $a \cdot \frac{1}{a} = 1, a \neq 0$

Example: $8 \cdot \frac{1}{8} = 1$

Closure: ab is a real number

$6 \cdot 3 = 18$ is a real number

Distributive Property: $a(b+c) = ab + ac$
(this can be applied to both multiplication and addition)

Example: $4(x + 3) = (4 \cdot x) + (4 \cdot 3)$

#2

NAME: _____

FUNCTION

$y = 2x - 3$

Slope: _____

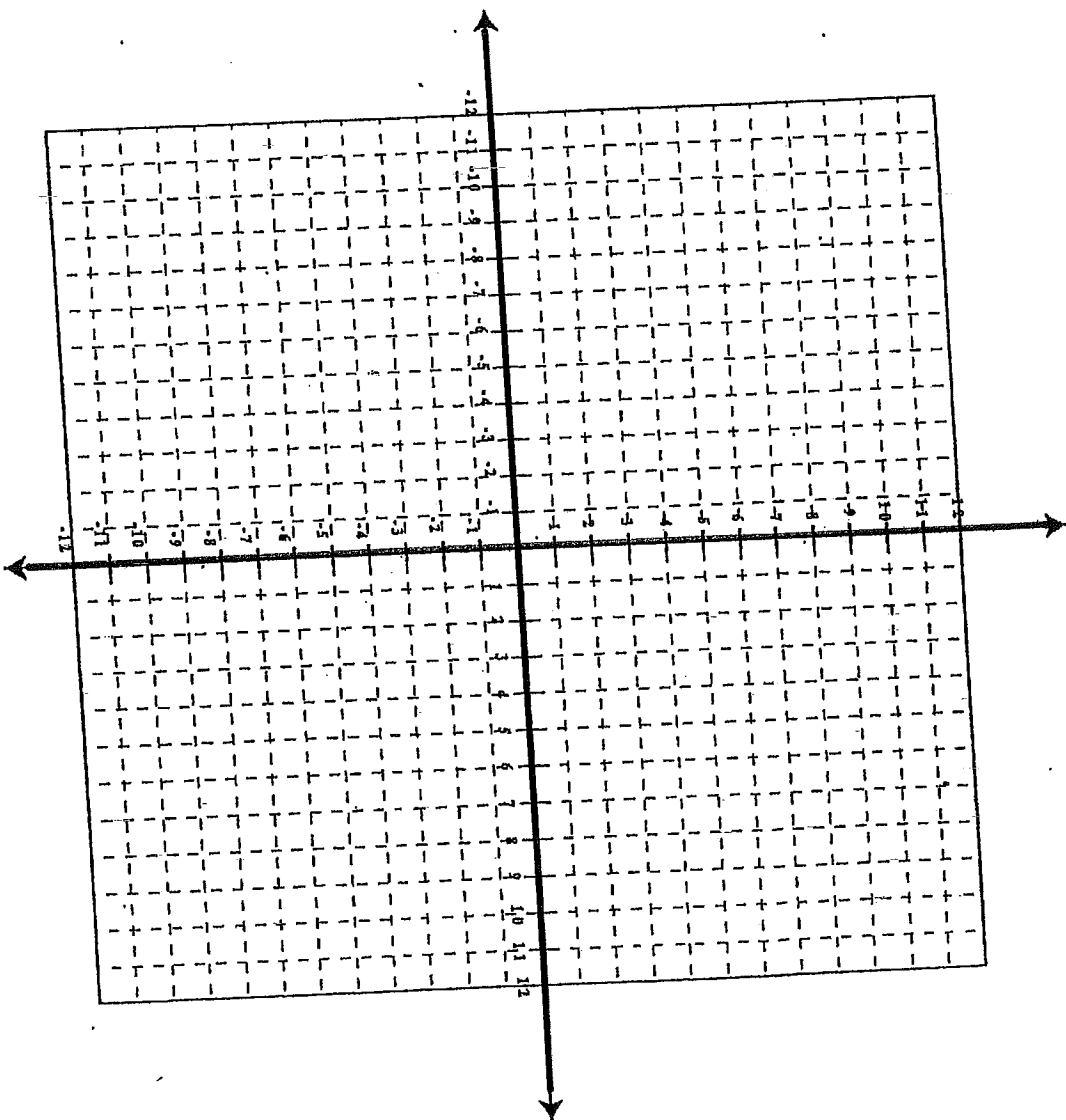
y-intercept: _____

TABLE

x	y
-1	
0	
1	
2	
3	
4	

GRAPH

Slope $\frac{\text{rise}}{\text{run}}$ _____



Notes

NAME: _____

DISTRIBUTIVE PROPERTY PRACTICE #2

1.) $4x(x + 8)$

2.) $(-2t)(12 - t)$

3.) $(3y - 2)5y$

4.) $(-2x)(x - 8)$

5.) $(-9)(-t - 3)$

6.) $(6 - 3w)(-w^2)$

7.) $5(\frac{1}{12}x - \frac{2}{13})$

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

Notes #2

9.) $y(1 - y)$

10.) $(1 + 2x)8$

11.) $5(w - 8)$

12.) $(y + 19)7$

13.) $(12 - x)y$

14.) $-4(u + 2)$

15.) $(b - 6)(-\frac{5}{16})$

16.) $(-\frac{2}{13})(t - 24)$

Algebra II Chapter 1 Notes

1. Use a real number line to order the numbers: $-\frac{7}{2}$, $\frac{1}{2}$, 3, $\sqrt{5}$, π



2. Evaluate $4v + 6w$ for $v = 3$ and $w = -2$.
3. Evaluate the power. $(-3)^5$
4. Evaluate $\frac{42 - z}{-2z + 4}$ when $z = -2$.
5. Evaluate $2a^3 + (2a)^2$ when $a = -2$.
6. Tickets for a show cost \$10 each. You have \$105 to spend. Write an expression for the money you have left after purchasing t tickets. Evaluate the expression to find the amount of money left after purchasing 8 tickets.
7. Solve the equation. $4(2x - 3) = 6 - (3 - 2x)$
8. Solve for v in the equation $t = \frac{u + v}{v}$.

Convert the value into the given units.

9. 15 meters into centimeters

10. 2.5 yards into feet

Evaluate the power.

11. -5^2

12. $(-8)^2$

13. -10^4

14. $(-4)^3$

Simplify the expression.

15. $16c - 10d + 3d - 5c$

16. $2m^2 - 5n^2 + 6n^2 - 8m$

17. $8(s - t) + 16(t - s)$

18. $3(x^2 - y) + 9(x^2 + 2y)$

19. Complete the table on properties.

<u>Property</u>	<u>Addition</u>	<u>Multiplication</u>
Closure	is a real number	is a real number
Commutative	$a + b =$	$ab =$
Associative	$(a+b)+c =$	$(ab)c =$
Identity	$a+0 =$	$a \cdot 1 =$
Inverse	$a +$	$a \cdot$

The following property involves both addition and multiplication.

Distributive $a(b + c) =$

H.W.

NAME: _____

DISTRIBUTIVE PROPERTY PRACTICE #1

1.)

$$3(x + 4)$$

2.) $(w + 6)4$

3.)

$$5(y - 2)$$

4.) $(7 - m)4$

5.)

$$-(y - 9)$$

6.) $-3(r + 8)$

7.)

$$-4(t - 8)$$

8.) $(x + 6)(-2)$

HW #1

9.)

$$x(x + 1)$$

10.) $(3 - y)y$

11.)

$$-r(r - 9)$$

12.) $-s(7 + s)$

13.)

$$2(3x - 1)$$

14.) $(4 + 3y)5$

15.)

$$(2x - 4)(-3)$$

16.) $-9(a + 6)$

HW

Solving Equations

Practice Problems:

1. $4x - 12 = 12$

2. $10(4 - 2x) = 80$

3. $\frac{2}{5}r + 9 = 1$

4. $\frac{3}{2}q + 9 = 3$

5. $x(2 + 3) + 7 = 22$

6. $10x - 2(x + 5) = 25$

7. $25x + 5 = 10$

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

9. $7n + 9 = 44 - 6n$

10. $3x - (x + 2) = 15$

11. $\frac{7}{5}x + \frac{3}{10} = \frac{4}{5}$

12. $4x + 16 = -5x - 8$

HW

Algebra II

Name _____

Date _____ Hour _____

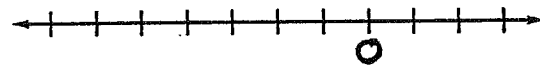
1.1-1.3

Graph the numbers on a number line.

1. $\frac{7}{2}, -4, 1, -\sqrt{7}, \frac{5}{4}$



2. $\frac{2}{3}, \frac{11}{4}, -7, \sqrt{5}, -\frac{7}{2}$



Identify the property that the statement illustrates.

3. $3(9 + 4) = 3(9) + 3(4)$

4. $(-3 + 2) + 6 = -3 + (2 + 6)$

Perform the indicated conversion.

★ 2000 lbs = 1 ton

5. 45 yards to feet

6. 11,000 pounds to tons

Evaluate the power.

7. -5^3

8. $(-11)^2$

9. 7^1

10. $(-3)^3$

Evaluate the expression for the given value of the variable(s).

11. $-5k + 9$ when $k = 2$

12. $(11 - r)^3 - 6s$ when $r = 8$ and $s = 2$

Simplify the expression.

13. $4r^2 + 9r - 5r^2 + 3r$

14. $5(x - 2y) + 9(3 - y)$

15. Tickets for a concert cost \$25 each. You have \$180 to spend. Write an expression for the money that you have left after purchasing t tickets. Evaluate the expression to find the amount of money left after purchasing 6 tickets.

Sections 1.3 – 1.5

Solve the equation.

1. $7n + 9 = 44$

2. $2(8 - 3q) = 4q - 9$

3. $\frac{8}{9}z - \frac{1}{2} = -\frac{2}{3}z + \frac{1}{6}$

Solve the equation for y .

4. $4x + y = 17$

5. $xy - 7y = 49$

Solve the equation for y . Then find the value of y for the given value of x .

6. $32x - 16y = 96; x = 15$

7. $13y - xy = 17; x = -4$

Use the formula $d = rt$ for the distance traveled to solve for the missing variables.

8. $d = \underline{\hspace{2cm}}$, $r = 35 \text{ mi/h}$, $t = 5 \text{ h}$

9. $d = 520 \text{ mi}$, $r = \underline{\hspace{2cm}}$, $t = 8 \text{ h}$

Look for a pattern in the table. Then write an equation that represents the table.

10.

x	0	1	2	3
y	1500	1250	1000	750

11.

x	0	1	2	3
y	-22	-11	0	11

12. A recent Daytona 500 race was won by Dale Earnhardt, Jr. He completed the 500 mile race in 3.2 hours. What was his average racing speed?

13. A scuba diver is returning to the surface from a depth of 165 feet. The safe ascent rate for a diver is 30 feet per minute. How many minutes will it take for the diver to return to the surface?

14. You buy 15 articles of clothing at a local clothing store. Each shirt costs \$3 and each pair of pants costs \$10. The total cost is \$94. How many shirts and how many pants did you buy?

pants =

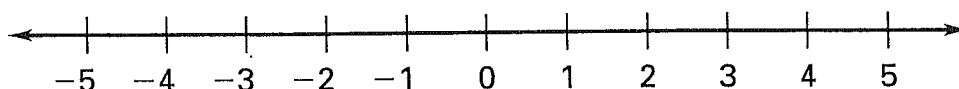
shirts = _____ *pants*

_____ *shirts*

Section 1.6 Solving Linear Inequalities

YOU WILL NEED: • colored pencils

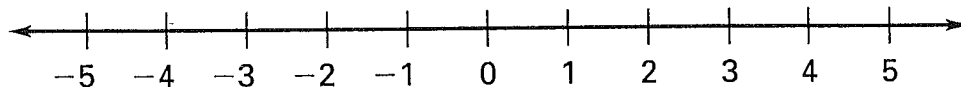
1. Shade the number line with a colored pencil to show $x < 2$. Leave the dot for the endpoint open (not shaded) since $x = 2$ is not included in the solution.



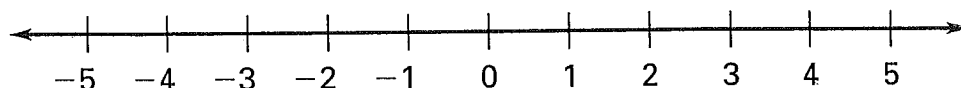
2. Use a different color pencil to show $x \geq -1$ on the same number line. Is -1 included in the solution? Should the dot for the endpoint be open or closed?
3. The solution to $x < 2$ **and** $x \geq -1$ is the part that is shaded both colors. Describe the solution.
4. Is 0 a solution to $x < 2$ **and** $x \geq -1$? Is -2 a solution?
5. The solution to $x < 2$ **or** $x \geq -1$ is the part that is shaded either color. Describe the solution.

Shade the number line and describe the solution to each compound inequality.

6. $x \leq -3$ and $x < 1$



7. $x < -3$ or $x < 1$



Practice with Examples

For use with pages 41–47

GOAL

Solve simple inequalities and compound inequalities

VOCABULARY

Inequalities such as $x \leq 1$ and $2n - 3 > 9$ are examples of **linear inequalities** in one variable.

A **solution** of an inequality in one variable is a value of the variable that makes the inequality true.

A **compound inequality** is two simple inequalities joined by “and” or “or.”

The **graph** of an inequality in one variable consists of all points on a real number line that corresponds to solutions of the inequality.

- Reverse sign when multiplying/dividing by a negative number.

EXAMPLE 1 *Solving an Inequality with a Variable on One Side*

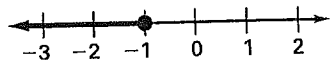
Solve $3 - 2x \geq 5$. Then graph the solution.

SOLUTION

$$3 - 2x \geq 5$$

$$-2x \geq 2$$

$$x \leq -1$$



Write original inequality.

To isolate $-2x$, subtract 3 from each side.

Divide each side by -2 and reverse the inequality.

Graph the solution.

Exercises for Example 1

Solve the inequality. Then graph your solution.

1. $-4x \leq -4$

2. $3x \geq -6$

3. $-2x > 6$



4. $-x - 1 < -1$



5. $6 \leq 3x - 3$



6. $-5 > 2x + 13$



Practice with Examples

For use with pages 41–47

EXAMPLE 2**Solving an Inequality with a Variable on Both Sides**Solve $-n + 4 > -5n + 8$. Then graph the solution.**SOLUTION**

$$-n + 4 > -5n + 8$$

Write original inequality.

$$4n + 4 > 8$$

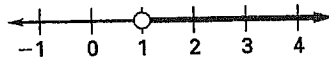
To collect the variable terms, add $5n$ to each side.

$$4n > 4$$

Subtract 4 from each side.

$$n > 1$$

Divide each side by 4.



Graph the solution.

Exercises for Example 2

Solve the inequality. Then graph your solution.

7. $3x + 5 > x + 7$

8. $-5x + 9 \leq 2(x - 6)$

9. $-x \leq -4x + 3$

**EXAMPLE 3****Solving an "And" Compound Inequality**Solve $-2 < 1 - 3x < 10$. Then graph the solution.**SOLUTION**

$$-2 < 1 - 3x < 10$$

Write the original inequality.

$$-3 < -3x < 9$$

To isolate $-3x$, subtract 1 from each expression.

$$1 > x > -3$$

Divide each expression by -3 and reverse the inequality.

Graph the solution.

1-6 (3)

Practice with Examples

For use with pages 41-47

Exercises for Example 3

Solve the inequality. Then graph your solution.

10. $4 < 2x < 8$

11. $2 \leq 3 - x \leq 8$

12. $-4 < x + 1 < 6$



Chapter 1

EXAMPLE 4 Solving an "Or" Compound Inequality

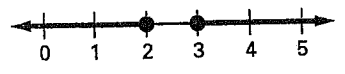
Solve $2x - 5 \geq 1$ or $2x - 5 \leq -1$. Then graph the solution.

SOLUTION OF FIRST INEQUALITY

$2x - 5 \geq 1$ Write first inequality.
 $2x \geq 6$ Add 5 to each side.
 $x \geq 3$ Divide each side by 2.

SOLUTION OF SECOND INEQUALITY

$2x - 5 \leq -1$ Write second inequality.
 $2x \leq 4$ Add 5 to each side.
 $x \leq 2$ Divide each side by 2.



Graph the solutions.

Exercises for Example 4

Solve the inequality. Then graph your solution.

13. $3x \leq -3$ or $x - 1 \geq 0$

14. $5x + 6 \leq 11$ or $-3x \leq -12$



15. $4x - 3 > 9$ or $-2x > 2$



16. $x > 0$ or $5x - 4 < -14$



1-6 Advanced Algebra

Pages 45-46

Solve the inequality. Then graph your solution.

29) $\frac{3}{2}x - 7 < 2$

33) $4.7 - 2.1x > -7.9$

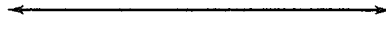
35) $2(4 - x) > 8$



37) $-2 \leq x - 7 \leq 11$

39) $-5 \leq -n - 6 \leq 0$

41) $-7 < 6x - 1 < 5$



43) $x + 2 \leq 5$ or $x - 4 \geq 2$

45) $-5x - 4 < -1.4$ or $-2x + 1 > 11$



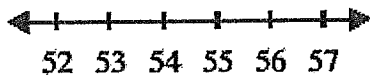
Page 44 Example 7

You are a state patrol officer who is assigned to work traffic enforcement on a highway. The posted minimum speed on the highway is 45 mph and the posted maximum speed is 65 mph. You need to detect vehicles that are traveling outside the posted speed limits. Write these conditions as a compound inequality.

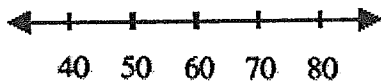
Algebra II

Worksheet 1-6

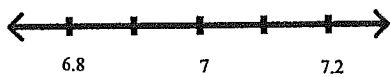
1. Connie takes at least 54 seconds to recite a poem. Write and graph an inequality to describe this interval.



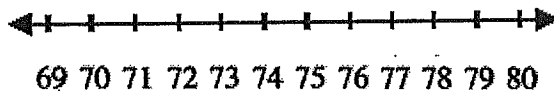
2. Tina can type at least 50 words per minute. Write and graph an inequality to describe this statement.



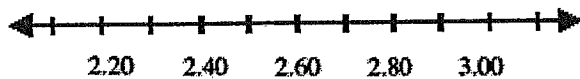
3. Jack can run a mile in less than 7 minutes. Write and graph an inequality to describe this statement.



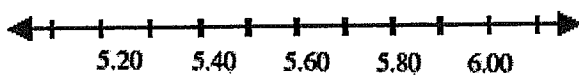
4. The width, w , of a piece of wood ranges from 70 mm to 79 mm. Write and graph an inequality to describe this interval. Does this graph represent a *discrete* or *continuous* data set?



5. The cost of a box of stationery ranges from \$2.25 to \$2.95. Write and graph an inequality to describe this statement.



6. The cost of a 5 pound bag of dog food ranges from \$5.25 to \$5.95. Write and graph an inequality to describe this statement.



7. On a road in the city of Hinkley, the maximum speed is 50 miles per hour and the minimum speed is 20 miles per hour. If x represents speed, which sentence best expresses this condition?

- a. $50 \leq x \leq 20$
 b. $50 \geq x \leq 20$
 c. $50 \geq x \geq 20$
 d. $x - 20 < 50$

8) **Cal Ripken Jr.** Cal Ripken Jr. played in major league baseball for over 20 years with the Baltimore Orioles. The most home runs Ripken hit was 34 during the 1991 season. The fewest number of home runs he hit during a season was 13 in 1994. Write an inequality that represents the various home runs Ripken hit during a season in his career.

9) **Moons of Jupiter** Thanks to Galileo in 1610, we know that Jupiter has at least 4 moons orbiting its massive circumference. Recent discoveries indicate that Jupiter actually has 63 moons although some may be asteroids trapped by the planet's intense gravity. Write an inequality that represents the various numbers of moons of Jupiter since 1610.

10) **Earth Temperatures** The minimum and maximum surface temperatures on Earth are -126°F and 136°F respectively. Write an inequality that represents the various surface temperatures on Earth.

Section 1.7 Solve Absolute Value Equations and Inequalities
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GOAL Solve absolute value equations and inequalities and use absolute value equations and inequalities to solve real-life problems

VOCABULARY

The **absolute value** of a number x , written $|x|$, is the distance the number is from 0 on a number line. The absolute value of a number is always nonnegative.

EXAMPLE 1 *Solving an Absolute Value Equation*

Solve $|\frac{1}{2}x + 5| = 7$.

SOLUTION

$|\frac{1}{2}x + 5| = 7$

Write original equation.

$\frac{1}{2}x + 5 = 7$ or $\frac{1}{2}x + 5 = -7$ Expression can be 7 or -7 .

$\frac{1}{2}x = 2$ or $\frac{1}{2}x = -12$ Subtract 5 from each side.

$x = 4$ or $x = -24$ Multiply each side by $\frac{2}{1}$.

The solutions are 4 and -24 .

When $x = 4$: $|\frac{1}{2}(4) + 5| = |7| = 7$

When $x = -24$: $|\frac{1}{2}(-24) + 5| = |-7| = 7$

Exercises for Example 1

Solve the equation.

1. $|r - 8| = 2$

2. $|2m + 5| = 9$

3. $|8 - 3n| = 16$

EXAMPLE 2 *Solving an Inequality of the Form $|ax + b| < c$*

Solve $|2x + 3| < 7$.

SOLUTION

$|2x + 3| < 7$ Write original inequality.

$-7 < 2x + 3 < 7$ Write equivalent compound inequality.

$-10 < 2x < 4$ Subtract 3 from each expression.

$-5 < x < 2$ Divide each expression by 2.

The solutions are all real numbers greater than -5 and less than 2.

Practice with Examples

For use with pages 50–56

Exercises for Example 2*Compound inequality and*

Solve the inequality.

4. $|x - 5| < 3$

5. $|2x + 1| \leq 3$

6. $|10 - 4x| < 2$

**EXAMPLE 3 Solving an Inequality of the Form $|ax + b| \geq c$** Solve $|\frac{2}{3}t + 2| \geq 10$.**SOLUTION OF
FIRST INEQUALITY**

$$\frac{2}{3}t + 2 \leq -10$$

$$\frac{2}{3}t \leq -12$$

$$t \leq -18$$

Write inequality.

Subtract 2 from each side.

Multiply each side by $\frac{3}{2}$.**SOLUTION OF
SECOND INEQUALITY**

$$\frac{2}{3}t + 2 \geq 10$$

$$\frac{2}{3}t \geq 8$$

$$t \geq 12$$

The solutions are all real numbers less than or equal to -18 or greater than or equal to 12 .**Exercises for Example 3***Compound or*

Solve the inequality.

7. $|y + 3| > 5$

8. $|x - 4| \geq 14$

9. $|4n + 7| > 1$



Algebra II 1-7 Absolute Value

Example Solve $|x - 5| = 7$



Solve the equation.

10) $|30 - 7x| = 4$

11) $|\frac{2}{3}x + 2| = 10$

Remember

greater than or equal to

greater

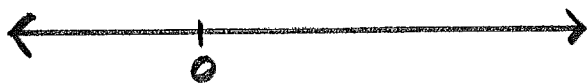
less than or equal to

less than

Solve the inequality. Then graph the solution.

12) $|8 - 3n| \leq 18$

13) $|3x + 2| < 7$



Solve the inequality. Then graph the solution.

14) $|2x - 1| \geq 12$

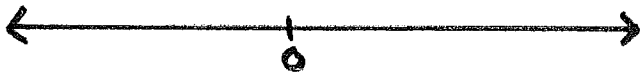
15) $|4n - 12| > 16$



16) $|x + 1| < 8$



17) $|x - 8| \leq 5$



18) $|14 - 3x| > 18$



19) $|8x + 28| \geq 32$



Problem Solving

- 1) A student has a debit card with a prepaid amount of \$270 to use for school lunches. The cafeteria charges \$4.50 per lunch. Write an expression for the balance on the card after buying x lunches. How many lunches can the student purchase?

- 2) The bill for the repair of your bicycle was \$180. The cost of parts was \$105. The cost of labor was \$25 per hour. How many hours did the repair work take?

- 3) You have two summer jobs. In the first job, you work 25 hours per week and earn \$7.75 per hour. In the second job, you earn \$6.25 per hour and can work as many hours as you want. Your goal is to earn \$250 per week. How many hours must you work at the second job?

- 4) The formula for converting temperatures from degrees Celsius to degrees Fahrenheit is $F = \frac{9}{5}C + 32$. Solve the formula for C . Then find the temperature in degrees Celsius that corresponds to 50 degrees Fahrenheit.

- 5) You have a piece of wood that is 72 inches long. You cut the wood into three pieces. The second piece is 6 inches longer than the first piece. The third piece is 6 inches longer than the second piece. Draw a diagram, then write and solve an equation to find the length of the three pieces.

- 6) A moving company weighs 20 boxes you have packed that contain either books or clothes and says the total weight is 404 pounds. You know that a box of books weighs 40 pounds and box of clothes weighs 7 pounds. Write and solve an equation to find how many boxes of books and how many boxes of clothes you packed.

Let $x = \#$ boxes of books

Books

Clothes

Algebra

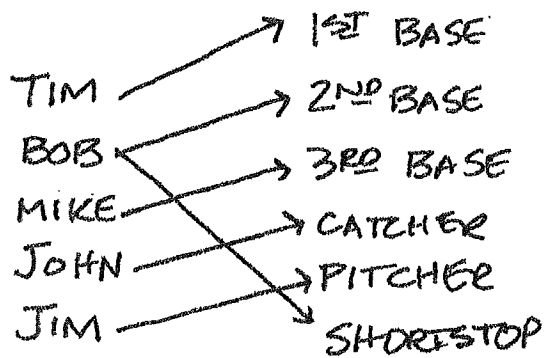
NAME

HOOR

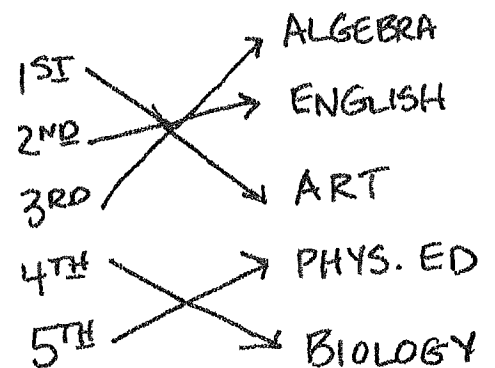
WARM-UP

DETERMINE WHETHER THE FOLLOWINGS ARE FUNCTIONS.
EXPLAIN YOUR ANSWER.

1.)



2.)



3.) $(2, -5)$ $(3, 0)$ $(-1, 4)$ $(0, 12)$ $(3, -5)$

4.) $y = 3 + 2x$

Relations and Functions

Goal: Represent relations and functions, graph and evaluate linear functions.

Plotting Real Numbers on a Coordinate Plane in the form (x, y) .

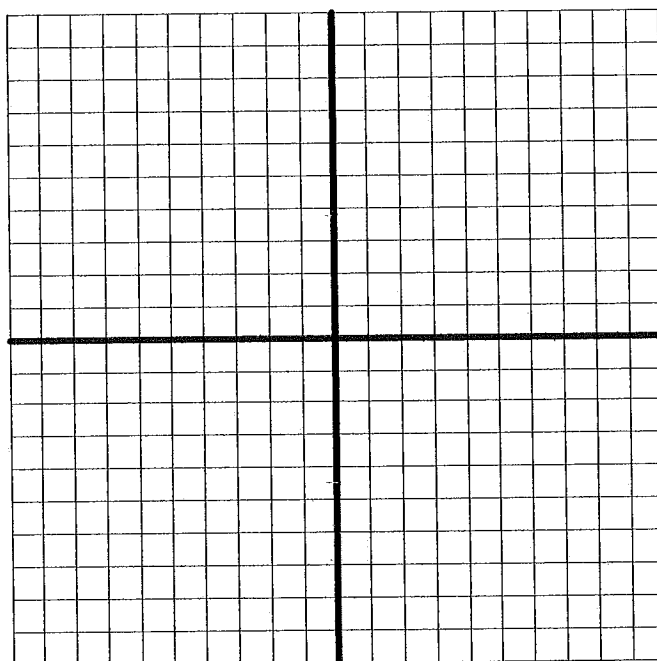
The first value in an ordered pair is the _____.

It moves the point _____. The second value in an ordered pair is the _____. It moves the point _____.

Create a **coordinate plane** (using a straight edge) by creating a perpendicular intersection of two real number lines.

Label:

- The **x- and y-axes**
- The **quadrants** formed by the intersection
- The sign of the ordered pairs plotted in those quadrants, for example $(+, -)$



A **relation** is a mapping, or pairing, of input and output values.

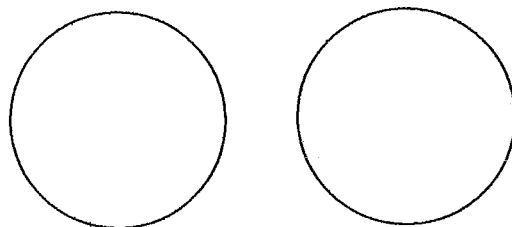
The set of input values is the **domain**, and the set of output values is the **range**.

The input variable is called the **independent variable**.

The output variable is called the **dependent variable**.

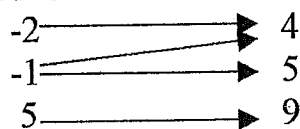
A relation is a **function** provided there is exactly one output for each input.
It is not a function if an input has more than one output.

*A graph must pass the **vertical line test** in order to be considered a function.
Points cannot be stacked on top of each other.*



Identify the domain and range. Decide whether the relation is a function.

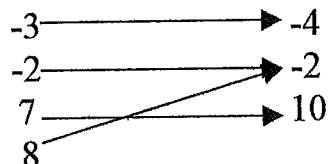
1. INPUT OUTPUT



D = { } Function

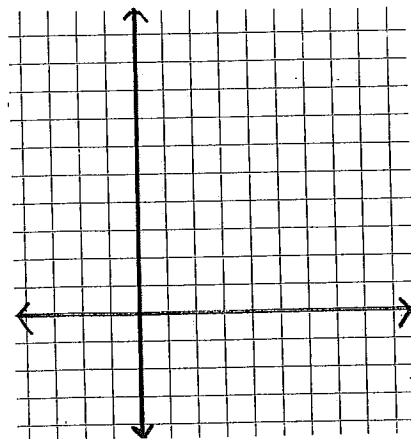
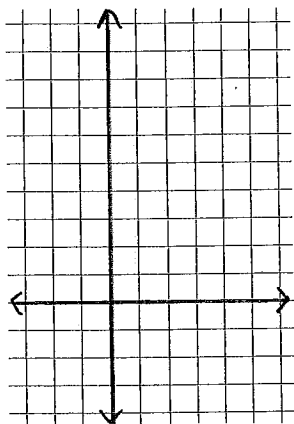
R = { } yes or no

2. INPUT OUTPUT



D = { } Function

R = { } yes or no



3. Consider the relationship between the time and the temperature.
Assume that the temperature starts at 10°C at 8 a.m. and rises 2°C every hour over the next 5 hours of the day.

a) Find the temperatures during the next 5 hours.

8 a.m. _____ ($t = 0$)

9 a.m. _____

10 a.m. _____

11 a.m. _____

12 p.m. _____

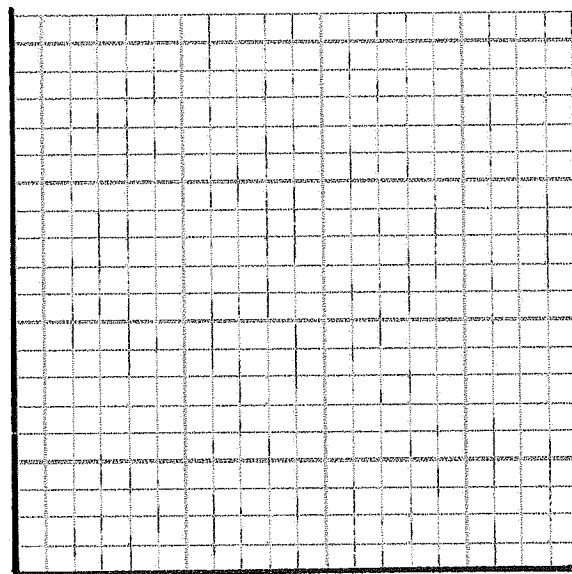
1 p.m. _____

Does the temperature depend on the time of day? Or does the time of day depend on the temperature? Decide if time, t , or temperature, T , is the independent variable.

Independent Variable _____

Dependent Variable _____

b) Label the axes. Decide on the scale of the axes. Plot the values.
Draw a line of best fit.

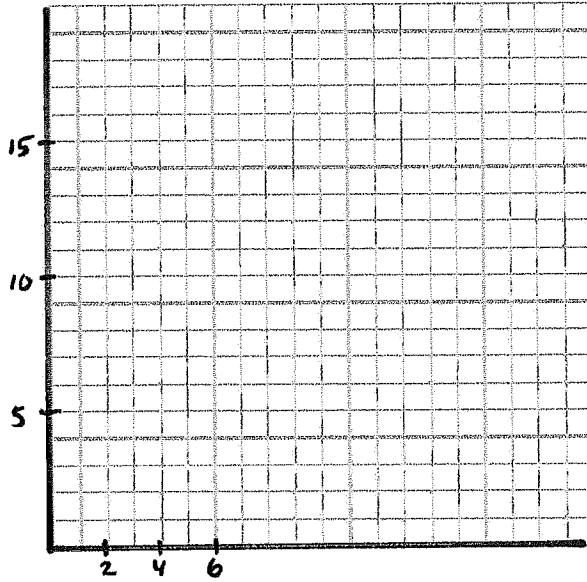


c) If $t = 0$ when it is 8 a.m., write an equation that represents the line of best fit. (Find the slope and the y-intercept.)

Equation: _____

4. a) Plot the given ordered pairs: $(0,8)$, $(1,10)$, $(2,10)$, $(3,11)$, $(4,13)$, $(5,13)$

b) Label the x-axis, t , *hours since 8 a.m.* and label the y-axis *temperature, T. ($^{\circ}\text{C}$)*
Draw a line of best fit, write the equation of the line.



Equation: _____

c) Describe what the value of the ordered pair $(2,10)$ is telling you in relation to the variables.

d) Now plot the ordered pair $(2, 11)$. Describe the temperature when $t = 2$.

Using Function Notation

Decide if the given function is linear. Evaluate the value of the functions for the given value of x .

5. $f(x) = x^3 + 7; x = -2$ 6. $f(x) = -\frac{4}{3}x + 5; x = 6$

7. $f(x) = 7 - \frac{2}{5}x; x = 12$ 8. $f(x) = |x + 2| - 3; x = -6$

2.1 Practice B

Name _____ Date _____

Identify the domain and range of the given relation.
Then tell whether the relation is a function.

1. $(0, 3), (1, 1), (2, 2), (3, 4), (4, 2)$

2. $(-2, -3), (-1, -1), (0, 1), (0, 3), (1, 5)$

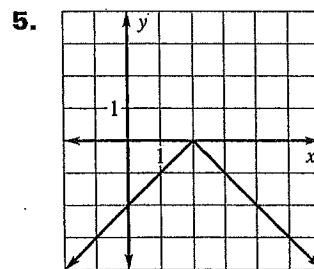
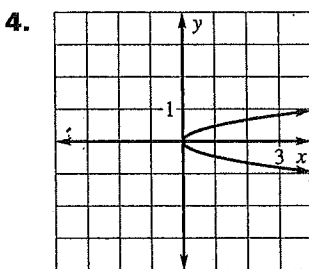
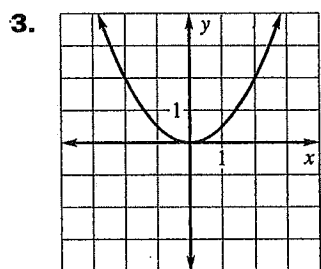
D:

D:

R:

R:

Use the vertical line test to determine whether the relation is a function.

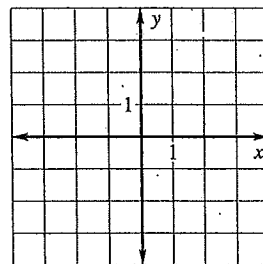
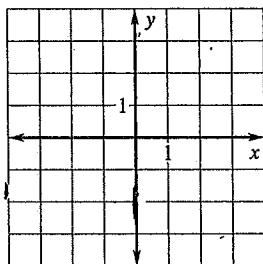
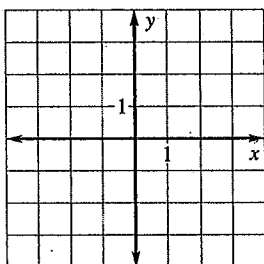


Graph the equation.

6. $y = 3x + 2$

7. $y = -2x - 2$

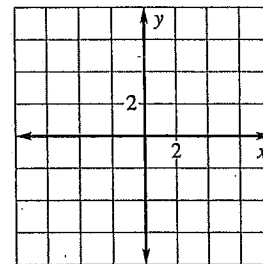
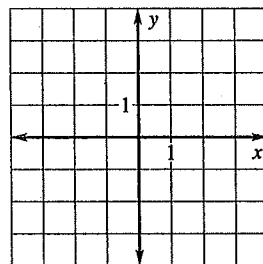
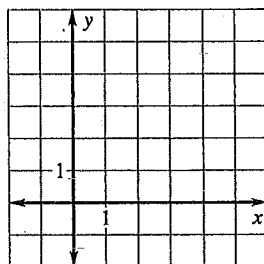
8. $y = -x$



9. $y = -x + 3$

10. $y = \frac{1}{2}x + 2$

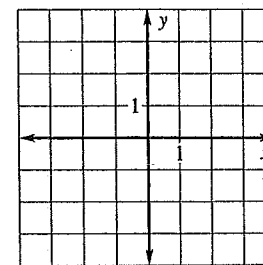
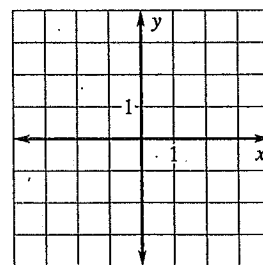
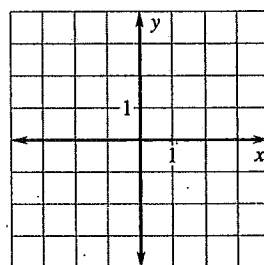
11. $y = 2x - 5$



12. $y = x + 2$

13. $y = -1$

14. $y = -\frac{1}{4}x - 1$



Tell whether the function is linear. Then evaluate the function for the given value of x .

15. $f(x) = x + 5; f(-2)$

16. $f(x) = x^2 + x - 2; f(1)$

17. $f(x) = 3 - 3x; f(2)$

18. $f(x) = |x + 2|; f(-4)$

19. $f(x) = \frac{2}{x-2}; f(6)$

20. $f(x) = \frac{2}{3}x - 5; f(9)$

In Exercises 21–23, use the following information.

PGA Money List The table below shows the top five players on the 2005 PGA Tour money list through June 5th along with the number of wins for each player.

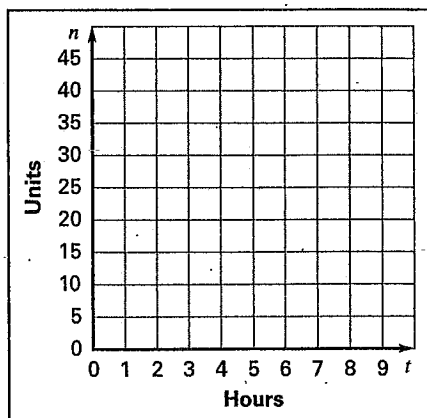
Player	Vijay Singh	Phil Mickelson	Tiger Woods	David Toms	Kenny Perry
Wins, x	3	3	3	1	2
Dollars, y (in millions)	5.3	4.2	4.1	3.3	2.5

- What is the domain of the relation?
- What is the range of the relation?
- Is the amount of money earned a function of the number of wins?

In Exercises 24–26, use the following information.

Furniture Assembly At the beginning of your 8 hour shift, there were 42 units of furniture that needed assembled. The number of units n that still need to be assembled during your shift can be modeled by $n(t) = -3t + 42$ where t is the time in hours.

- Graph the model.



- What is a reasonable domain and range of the model?
- How many units still need to be assembled after you have worked 5 hours of your shift?

Equation Solving, Proportional Equations

Solve each equation.

1. $\frac{10}{8} = \frac{n}{10}$

2. $\frac{7}{5} = \frac{x}{3}$

3. $\frac{9}{6} = \frac{x}{10}$

4. $\frac{7}{n} = \frac{8}{7}$

5. $\frac{4}{3} = \frac{8}{x}$

6. $\frac{7}{b+5} = \frac{10}{5}$

7. $\frac{6}{b-1} = \frac{9}{7}$

8. $\frac{4}{m-1} = \frac{8}{2}$

9. $\frac{5}{6} = \frac{7n+9}{9}$

10. $\frac{4}{9} = \frac{r-3}{6}$

$$11. \frac{7}{9} = \frac{b}{b-10}$$

$$12. \frac{9}{k-7} = \frac{6}{k}$$

$$13. \frac{4}{n+2} = \frac{7}{n}$$

$$14. \frac{n}{n-3} = \frac{2}{3}$$

$$15. \frac{x-3}{x} = \frac{9}{10}$$

$$16. \frac{5}{r-9} = \frac{8}{r+5}$$

$$17. \frac{p+10}{p-7} = \frac{8}{9}$$

$$18. \frac{2}{8} = \frac{n+4}{n-4}$$

$$19. \frac{n-5}{n+8} = \frac{2}{7}$$

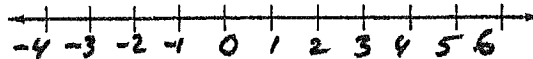
$$20. \frac{n-6}{n-7} = \frac{9}{2}$$

Graph the inequality.

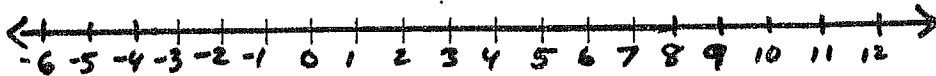
1. $x > 6$



2. $-2 \leq x < 5$



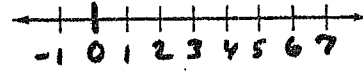
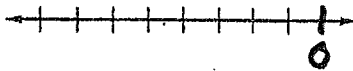
3. $x < -3$ or $x \geq 7$



Solve the inequality. Then graph the solution.

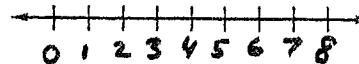
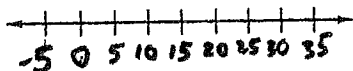
4. $-x + 5 < 12$

5. $3(x - 5) \leq 7 - 3x$



6. $-2 \leq \frac{1}{5}x - 2 < 3$

7. $2x - 6 < 4$ or $\frac{3}{2}x - 6 > 6$



Evaluate the expression for the given value of the variable.

8. $|w - 15|; w = -2$

9. $|4 - 5x|; x = 9$

Solve the equation. Two answers!!!

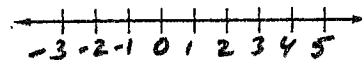
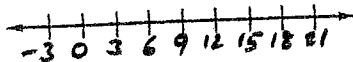
10. $|q - 13| = 5$

11. $|\frac{1}{8}x - 4| = 12$

Solve the inequality. Then graph the solution.

12. $|x - 9| \geq 6$

13. $|4x - 5| < 15$



3

NAME: _____

FUNCTION

$$y = -3x + 2$$

Slope: _____

y-intercept: _____

TABLE

x	y
-2	
-1	
0	
1	
2	
3	

GRAPH

Slope $\frac{\text{rise}}{\text{run}}$ _____

