

Intermediate Algebra
Brewer

Test #1

Print Full Name: _____
6 September 2012

Part I (1 point each) Match the term on the left with the formula/description on the right.

Print letter answers NEATLY (if I can't read it or your letters are ambiguous, you don't get credit).

Not all letter answers will be used, but none will be used more than once.

- | | |
|-------------------------------------|-----------------------------------|
| <u>j</u> 1. distributive property | a. true for only some x |
| <u>a</u> 2. conditional equation | b. \cap |
| <u>m</u> 3. union | c. 0 |
| <u>c</u> 4. additive identity | d. the set containing no elements |
| <u>e</u> 5. multiplicative identity | e. 1 |
| <u>f</u> 6. additive inverse | f. $-a$ |
| <u>h</u> 7. associativity | g. not true for any x |
| <u>i</u> 8. multiplicative inverse | h. $a + (b + c) = (a + b) + c$ |
| <u>L</u> 9. commutativity | i. $1/a$ |
| <u>n</u> 10. motion formula | j. $a(b + c) = ab + ac$ |
| | k. true for all x |
| | l. $a + b = b + a$ |
| | m. \cup |
| | n. $d = r \cdot t$ |

Part II (6 points each) Read each problem carefully. You must show all work in order to receive full credit.

Circle your final answers.

11. $A = \{2, 3, 5, 7, 11, 13\}$, $B = \{1, 3, 5, 7, 9, 11\}$ Find $A \cup B$.

$$\{1, 2, 3, 5, 7, 9, 11, 13\}$$

12. $A = \{2, 3, 5, 7, 11, 13\}$, $B = \{1, 3, 5, 7, 9, 11\}$ Find $A \cap B$.

$$\{3, 5, 7, 11\}$$

13. Write in set-builder notation: $[-2, 5)$

$$\{x \mid -2 \leq x < 5\}$$

14. Write in interval notation: $\{x|x \geq -4\}$

$$[-4, \infty)$$

15. Simplify. $3(1-4) - |5-7| + |-4|$

$$\begin{aligned} & 3(-3) - |-2| + 4 \\ & -9 - 2 + 4 \\ & \boxed{-7} \end{aligned}$$

16. Simplify. Give any fractional answers as improper fractions, NOT mixed numbers. $3\left(\frac{5}{6} - \frac{2}{3}\right) + \frac{5}{2} \cdot \frac{4}{5}$

$$\begin{aligned} & 3\left(\frac{5}{6} - \frac{4}{6}\right) + 2 \\ & 3\left(\frac{1}{6}\right) + 2 \\ & \frac{1}{2} + 2 = \boxed{\frac{5}{2}} \end{aligned}$$

17. Evaluate the variable expression when $a = 2$, $b = 3$, $c = -1$, and $d = -4$.

$$\frac{c^2 - ad}{b} + \frac{d}{a} \div \frac{c}{b} \quad \frac{(-1)^2 - 2(-4)}{3} + \frac{-4}{2} \div \frac{-1}{3} =$$

$$= \frac{1+8}{3} + (-2)(-3) = 3+6 = \boxed{9}$$

18. Translate into a variable expression. Do not simplify.

half the total of the square of a number and three less than the number

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

19. Solve for x . $6\left(\frac{2}{3}x - \frac{5}{6}x - 1\right) = \left(\frac{1}{2}x + \frac{1}{3}\right) \cdot 6$

$$4x - 5x - 6 = 3x + 2$$

$$-6 - 2 = 3x - 4x + 5x$$

$$-8 = 4x$$

$$\boxed{-2 = x}$$

20. Solve for x . $3x + 4(2 - x) = 1 - 2[x + 5 - 3(x + 2)]$

$$\begin{aligned}
 3x + 8 - 4x &= 1 - 2(x + 5 - 3x - 6) \\
 8 - x &= 1 - 2(-2x - 1) \\
 8 - x &= 1 + 4x + 2 \\
 8 - x &= 3 + 4x \\
 5 &= 5x
 \end{aligned}$$

$$x = 1$$

21. Find three consecutive odd integers such that three times the difference between the first and third integers is five less than the second integer.

$$x, x+2, x+4$$

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

$$3(x - x - 4) = x - 3$$

$$-12 = x - 3$$

$$-9 = x$$

$$-9, -7, -5$$

also acceptable:

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

...

$$15, 17, 19$$

22. 50 pounds of delicious Jamaican Blue Mountain coffee that costs \$30 per pound are mixed with Fakin' Blue Discount Coffee that costs \$5 per pound. How much Fakin' Blue is needed to make a coffee blend that costs \$15 per pound?

	cost/ pound	quantity	total cost
Jamaican Blue	30	50	$50(30)$
Fakin'	5	x	$5x$
Blend	15	$50+x$	$15(50+x)$

$$50(30) + 5x = 15(50+x)$$

$$1500 + 5x = 750 + 15x$$

$$750 = 10x$$

$$75 = x$$

$$75 \text{ pounds of Fakin' Blue}$$

23. Two airplanes are 2300 miles apart and traveling toward each other. One plane is traveling 150 miles per hour faster than the other plane. The planes meet in 2 hours. Find the speed of each plane.

	rate	time	distance
plane 1	x	2	$2x$
plane 2	$x+150$	2	$2(x+150)$

$2x + 2(x+150) = 2300$
 $2x + 2x + 300 = 2300$
 $4x = 2000$

$x = 500$

plane 1: 500 mi/h
plane 2: 650 mi/h

24. How much water must be evaporated from 5 gallons of 12% fruit juice in order to obtain 20% fruit juice?

	% conc.	quantity	total amt
12% juice	.12	5	.12(5)
water	0	x	0
20% juice	.2	$5-x$.2(5-x)

$.12(5) + 0 = .2(5-x)$
 $.6 = 1 - .2x$

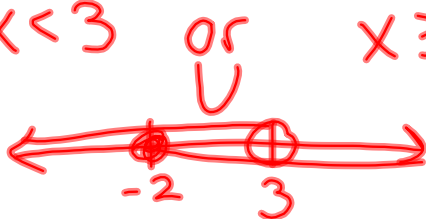
$0.2x = 0.4$
 $x = 2$

2 gal

25. Solve. Write the solution set in interval notation. $4 - 3x > -5$ or $-3 \leq 2x + 1$

$4 + 5 > 3x$ $-3 - 1 \leq 2x$
 $9 > 3x$ $-4 \leq 2x$
 $3 > x$ $-2 \leq x$
 $x < 3$ or $x \geq -2$

$4 - 3x > -5$
 $-3x > -9$
 $x < 3$



$(-\infty, \infty)$

Bonus: Two cars are headed directly toward each other at rates of 80 miles per hour and 90 miles per hour. How many miles are apart are they 2 minutes before impact?

	rate	time	distance
car 1	80	$\frac{2}{60}$	$80\left(\frac{2}{60}\right)$
car 2	90	$\frac{2}{60}$	$90\left(\frac{2}{60}\right)$

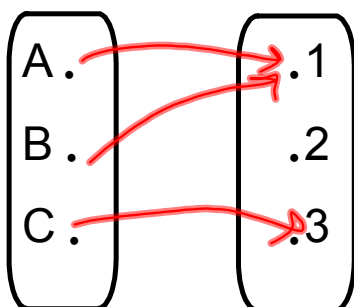
$$X = 80\left(\frac{2}{60}\right) + 90\left(\frac{2}{60}\right)$$
$$= \frac{8}{3} + 3 = \boxed{\frac{17}{3} \text{ mi}}$$

3.2 Review of Functions

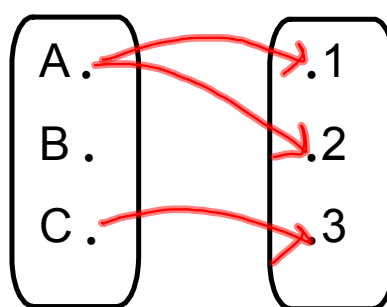
Recall that a function is a relation in which each x (input) can only be mapped to one y (output).

Note that any number of x 's can be mapped to the same y .

Function:



Not a function:



3.2

$$57. f(x) = \frac{1}{x-1}$$

 $\{1\}$ domain: $\{x \mid x \neq 1\}$

3.3, 3.4 Linear Functions

$$f(x)=mx+b \quad \text{or} \quad y=mx+b$$

slope-intercept form



m = slope of line

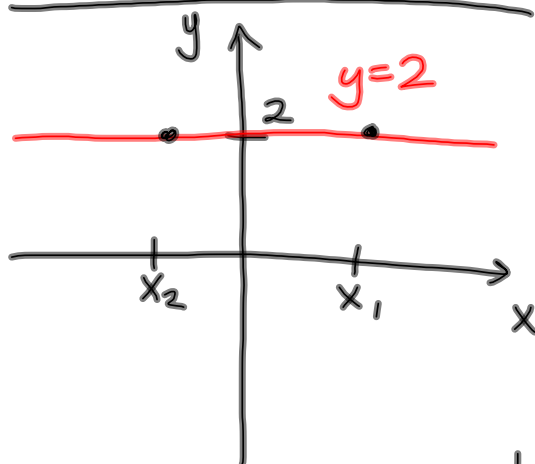
$(0,b)$ = y -intercept of line
(point where graph crosses the y -axis)

Slope

$$m = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

Δ = "change"

Horizontal Lines



slope: $m = \frac{y_2 - y_1}{x_2 - x_1}$

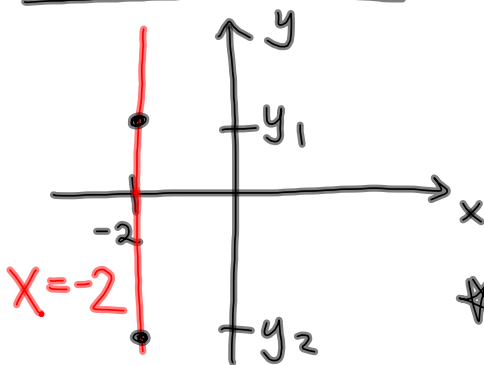
$m = \frac{2 - 2}{x_2 - x_1} = \frac{0}{x_2 - x_1} = \boxed{0}$

* all horizontal lines have slope 0

equation: $y = mx + b$
 $y = 0 \cdot x + b$

$y = b$, where b is the y -intercept

Vertical Lines



slope: $m = \frac{y_2 - y_1}{x_2 - x_1}$

$m = \frac{y_2 - y_1}{-2 - (-2)} = \frac{y_2 - y_1}{0}$

* vertical lines have no slope

~~$y = mx + b$~~

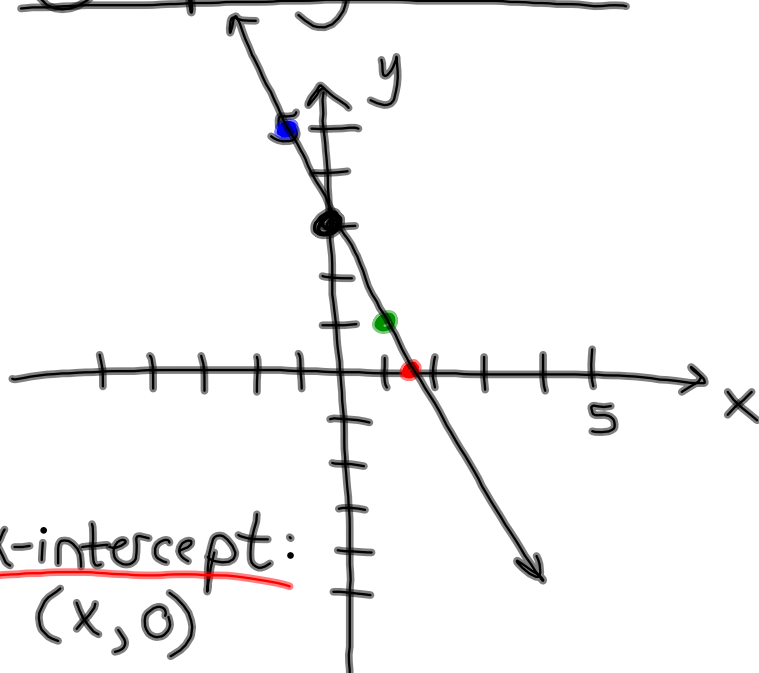
* vertical lines always have the equation $x = a$, where $(a, 0)$ is the x -intercept (point where graph crosses x -axis)

Standard Form:

$Ax + By = C$

A, B, C -
 real # constants

Graphing a Line



X-intercept:

$$(x, 0)$$

$$0 = -2x + 3$$

$$-3 = -2x$$

$$\frac{3}{2} = x$$

$$\left(\frac{3}{2}, 0\right)$$

$$y = -2x + 3$$

y-intercept:
 $(0, 3)$

slope: -2

$$-2 = \frac{-2}{1} \begin{array}{l} \text{down 2} \\ \text{right 1} \end{array}$$

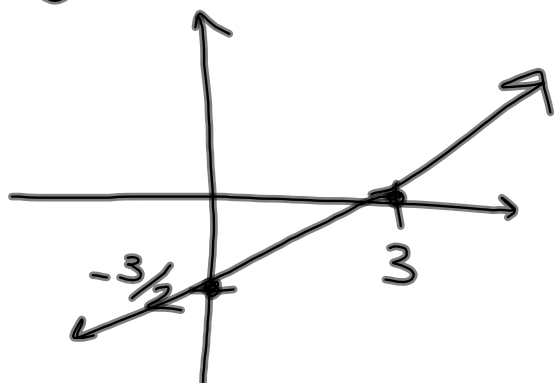
$$= \frac{2}{-1} \begin{array}{l} \text{up 2} \\ \text{left 1} \end{array}$$

Graph: $2x - 4y = 6$

$$-4y = -2x + 6$$

$$y = \frac{-2x}{-4} + \frac{6}{-4}$$

$$y = \frac{1}{2}x - \frac{3}{2}$$



y-intercept:

$$(0, -\frac{3}{2})$$

slope: $\frac{1}{2}$

x-intercept:

$$2x - 4(0) = 6$$

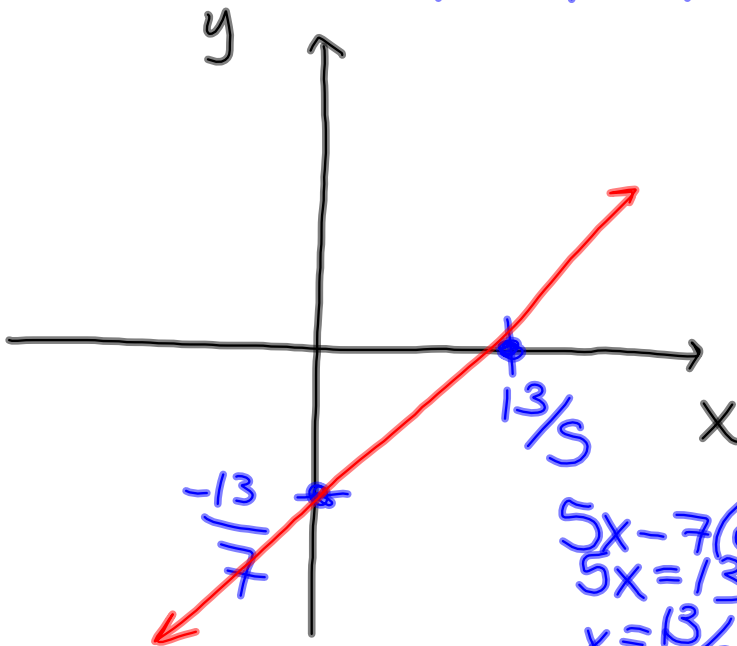
$$2x = 6$$

$$x = 3 \quad (3, 0)$$

Graph: $5x - 7y = 13$

$$\frac{-7y}{-7} = \frac{-5x + 13}{-7}$$

$$y = \frac{5}{7}x - \frac{13}{7}$$



y-intercept:
 $(0, \frac{13}{7})$

x-intercept:
 $(\frac{13}{5}, 0)$

$$\begin{aligned} 5x - 7(0) &= 13 \\ 5x &= 13 \\ x &= \frac{13}{5} \end{aligned}$$

3.3 Homework:

#3-11 graph linear functions given in $y=mx+b$ form

#14-22 graph linear equations given in $Ax+By=C$ form (need to be rewritten as $y=mx+b$ first)

#23-34 find the x- and y-intercepts of and graph linear functions of the form $Ax+By=C$