Intermediate Algebra Test #1 Print Full Name:_____
Brewer 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.

j 1. distributive property
a 2. conditional equation
m 3. union
c 4. additive identity
e 5. mutiplicative identity
f 6. additive inverse
h 7. associativity
i 8. multiplicative inverse
l 9. commutativity
n 10. motion formula

a. true for only some x
b. $\cap$
c. 0
d. the set containing no elements
e. 1
f. $-a$
g. not true for any x
h. $a + (b + c) = (a + b) + c$
i. $1/a$
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. $3(1-4) - |5-7| + |-4|$

$3(-3) - |-2| + 4$

$-9 - 2 + 4$

$\boxed{-7}$

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

$3\left(\frac{5}{6} - \frac{4}{6}\right) + 2$

$3\left(\frac{1}{6}\right) + 2$

$\frac{1}{2} + 2 = \boxed{\frac{5}{2}}$

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

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

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

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

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

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

$-8 = 4x$

$\boxed{-2 = x}$

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

$3x+8-4x=1-2(x+5-3x-6)$

$8-x=1-2(-2x-1)$

$8-x=1+4x+2$

$8-x=3+4x$

$5=5x$

$x=1$

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 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* $-3\le 2x+1$

$4+5>3x$

$9>3x$

$3>x$

$x<3$

or

$-3-1\le 2x$

$-4\le 2x$

$-2\le x$

$x\ge -2$

$4-3x>-5$

$-3x>-9$

$x<3$

$(-\infty,\infty)$

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	2/60	80(2/60)
car 2	90	2/60	90(2/60)

$$X = 80\left(\frac{2}{60}\right) + 90\left(\frac{2}{60}\right)$$

$$= \frac{8}{3} + 3 = \boxed{\frac{17}{3}\text{ mi}}$$

3.2

81. $f(x) = 2x^2 - 2x + 2$

domain: $\{-4, -2, 0, 4\}$

$f(-4) = 2(-4)^2 - 2(-4) + 2$

$= 32 + 8 + 2 = 42$

$f(-2) = 2(-2)^2 - 2(-2) + 2$

$= 8 + 4 + 2 = 14$

$f(0) = 2$

$f(4) = 2(4)^2 - 2(4) + 2 = 32 - 8 + 2 = 26$

$\{42, 14, 2, 26\}$

3.2

61. $f(x) = 3x + 2$

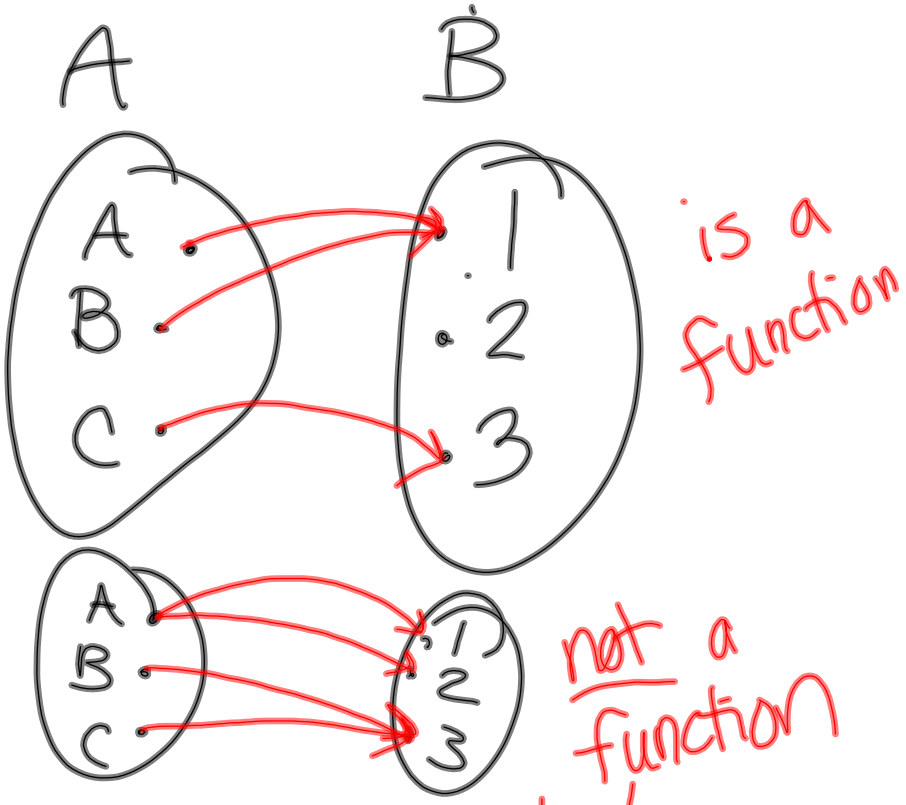
none

domain: $\mathbb{R}$

43. $s(t) = t^3 - 3t + 4$

$s(a) = \boxed{a^3 - 3a + 4}$

Function: each x has only one y



* each X can only be mapped to one y.
* any # of X's can be mapped to the same y

3.3, 3.4 Linear Functions

$f(x) = mx + b$ or $y = mx + b$

slope-intercept form

m = slope of line

$(0, b)$ = y-intercept of the line

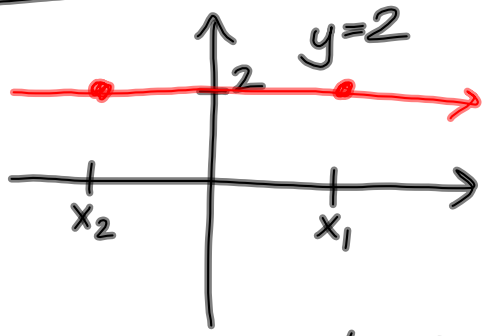
(point where graph crosses y-axis)

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: $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2-2}{x_2 - x_1}$

$= \frac{0}{x_2 - x_1} = 0$

- have 0 slope

equation: $y = mx + b$

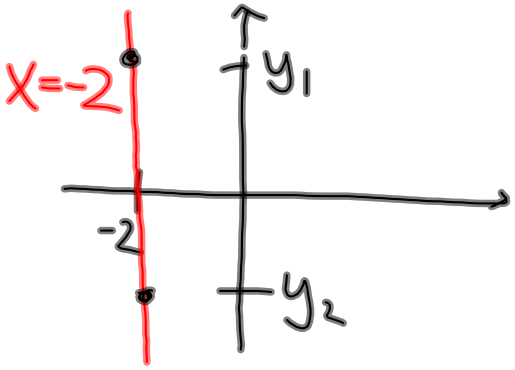
$y = 0 \cdot x + b$

$y = b$

- equation is $y = b$ where b is y-intercept

Vertical Lines

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



vertical lines have no slope

~~$y = mx + b$~~

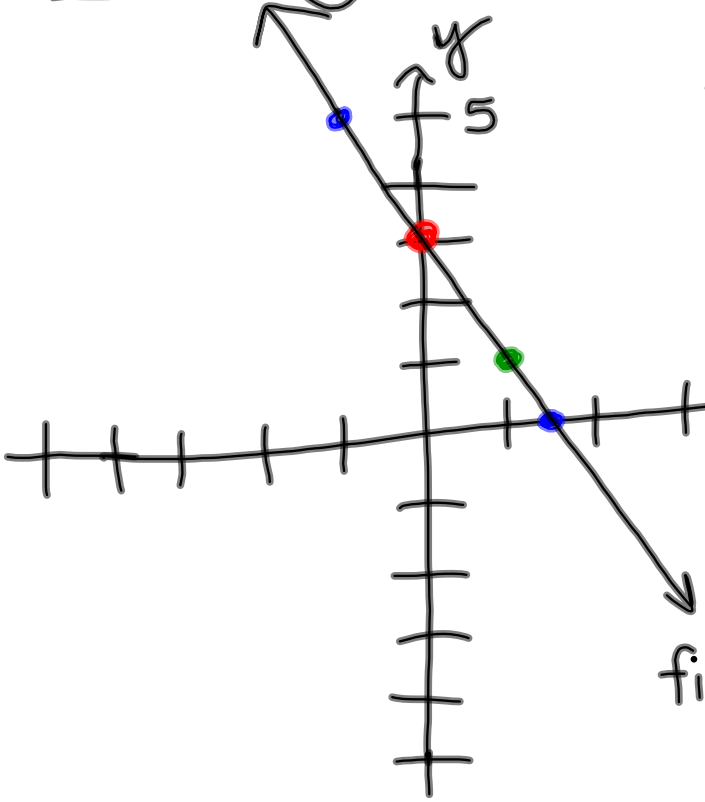
equation is of the form $x = a$, where $(a, 0)$ is the x-intercept (point where graph crosses x-axis)

Standard Form

$Ax + By = C$

A, B, C - constants

Graphing a Line



$y = -2x + 3$

y-int: $(0, 3)$

slope: -2

$= \frac{-2}{1}$ down 2 right 1

$= \frac{2}{-1}$ up 2 left 1

x-intercept? $(x, 0)$

find by plugging 0 in for y

$0 = -2x + 3$

$-3 = -2x$

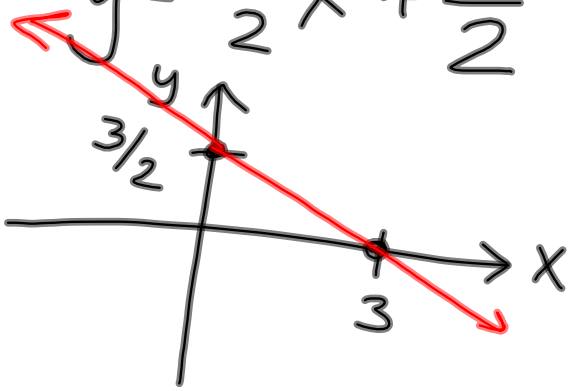
$\frac{3}{2} = x$

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:

$2x+4(0)=6$

$2x=6$

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

3.3

3-11 $y=mx+b$ & graph

14-22 $Ax+By=C$ rewrite & graph

23-34 $Ax+By=C$ find x- & y-intercepts & graph