N: Key D:_____ P: 1 2 3 4 5 6

Algebra 2: **Topic 3: Review Worksheet A** *Mission Hills Math 2013*

► **Directions: No Calculators. Use scratch paper to show your work.**

HW1 ↓

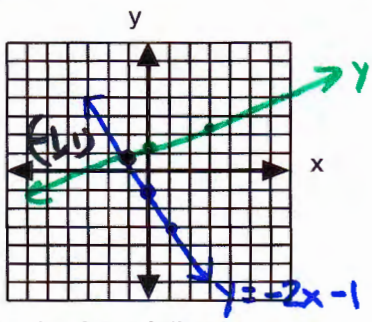
1) Solve the system $\begin{cases} -x+3y=4 \\ y=-2x-1 \end{cases}$ by graphing. Approximate the intersection point.

$-x+3y=4$

$+x \quad +x$

$\frac{3y}{3} = \frac{x}{3} + \frac{4}{3}$

$y = \frac{1}{3}x + \frac{4}{3}$



looks close to

(-1, 1) ↵

2) How many solutions do each of the following systems have:

A) $\begin{cases} 4x-2y+5=0 \\ y-2x=3 \end{cases}$ no solution.

B) $\begin{cases} y=-x+7 \\ 3x+3y=21 \end{cases}$ ∞ many solutions.

C) $\begin{cases} y=-\frac{1}{4}x+1 \\ 8y=2x+8 \end{cases}$ one solution.

3) Which of the following points is a solution to the system: $\begin{cases} 2x+y=-1 \\ 3x-4y=15 \end{cases}$

A) (2, -5) B) (1, -3) C) (-1, 1) D) (-1, -3)

4) Solve each of the following systems for x and y, if possible. Use either the substitution or addition method. Show your work.

A) $\begin{cases} 2x+y=7 \\ -2x+3y=5 \end{cases}$ (2, 3)

B) $\begin{cases} -3x+4y=-8 \\ x+3y=7 \end{cases}$ (4, 1)

C) $\begin{cases} x-4y=6 \\ 2x-8y=12 \end{cases}$ ∞ many

D) $\begin{cases} 5x-10y=-5 \\ x=y+2 \end{cases}$ (5, 3)

E) $\begin{cases} 17x+18y=1 \\ 7x+18y=11 \end{cases}$ (-1, 1)

F) $\begin{cases} 3x-2y=12 \\ y=2x-7 \end{cases}$ (2, -3)

G) $\begin{cases} 10x-5y=5 \\ 3x-2y=4 \end{cases}$ (-2, -5)

H) $\begin{cases} 3x+9y=2 \\ x=1-3y \end{cases}$ No solution.

► **For problems 5-8, set up the heading and the system of two equations only. Do not solve.**

5) The sum of two numbers is 35. The larger number is 15 more than the smaller number. What are the numbers?

6) Tim has quarters and dimes in his toy bank. He has a total of 20 coins with a total value of $3.20. How many coins of each kind does he have?

► **For problems 9-10, set up the heading and the system of two equations. Then solve.**

9) Dan spends $22 to buy a total of 10 hamburgers - some regular and some deluxe. If deluxe hamburgers cost $3 each and regular hamburgers cost $2 each, how many deluxe hamburgers did Dan buy?

2 hamburgers

10) For a wedding, Maria bought several bundles of roses and several bundles of carnations. The roses cost $12 per bundle, and the carnations cost $5 per bundle. Maria bought a total of 8 bundles of flowers and paid a total of $75. How many bundles of roses did she buy?

5 bundles

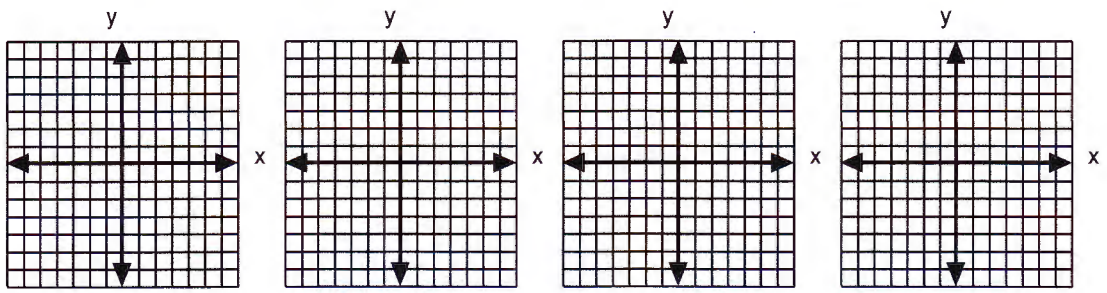
11) Solve the following systems of inequalities by graphing.

A) $\begin{cases} 2x - y \geq 6 \\ y < -x + 1 \end{cases}$

B) $\begin{cases} -3x + y < 2 \\ y < -\frac{1}{2}x \end{cases}$

C) $\begin{cases} x + 2y \leq 4 \\ y \geq x - 1 \\ x \geq -2 \end{cases}$

D) $\begin{cases} x \leq 3 \\ y \geq -1 \\ y \leq x \end{cases}$



13) Solve the following systems of equations for the specified variable, if possible. Show your work

A) $\begin{cases} x + 2y - z = 17 \\ y + z = 1 \\ 3z = -9 \end{cases}$

x = 6

B) $\begin{cases} x + 2y - 5z = 5 \\ 3x - y - z = 15 \\ 4x + 2y = 4 \end{cases}$

x = 3

C) $\begin{cases} x + 2y = 0 \\ x + z = -1 \\ y - z = 2 \end{cases}$

y = -1

D) $\begin{cases} x - y + 3z = 8 \\ 2x + 4y + z = 0 \\ 3x + y - 2z = -2 \end{cases}$

z = 2

E) $\begin{cases} 3x - y + z = 5 \\ 2x + y - 2z = -2 \\ -6x + 2y - 2z = -10 \end{cases}$

y = ∞ many solutions

F) $\begin{cases} 2x - y + 3z = 8 \\ x - 6y - z = 0 \\ -6x + 3y - 9z = 24 \end{cases}$

z = No Solutions

2 How many?

A $4x-2y+5=0$

$y-2x=3$

$+2x \quad +2x$

$y=2x+3$

$4x-2(2x+3)+5=0$

$4x-4x-6+5=0$

$-1=0$

↓

not true

no solution

B $y=-x+7$

$3x+3y=21$

$3x+3(-x+7)=21$

$3x-3x+21=21$

$21=21$

↓

True

∞ many Solutions

C $y=-\frac{1}{4}x+1$

$8y=2x+8$

$8(\frac{1}{4}x+1)=2x+8$

$-\frac{8}{4}x+8=2x+8$

$-2x+8=2x+8$

$-2x \quad -8 \quad -2x \quad -8$

$\frac{-4x}{-4}=\frac{0}{-4} \rightarrow x=0$

$y=-\frac{1}{4}(0)+1$

$y=1 \quad (0,1)$

one solution

>> For 2A–2C, I used substitution for each one, but you can use elimination. The key is, if you get an answer (x,y) then you have one solution. If you get something strange, but if it is true then the system has infinitely "∞" many solutions. That is because the are the same line, so cross ∞ times. If you get something strange and it is not true, then it has no solution. That is because, they are parallel and never cross (intersect).

3 Which? $4(2x+y=-1) \rightarrow 8x+4y=-4$

$3x-4y=15 \rightarrow 3x-4y=15$

$\frac{11x}{11}=\frac{11}{11} \rightarrow x=1$

$2x+y=-1$

$2(1)+y=-1$

$2+y=-1$

$-2 \quad -2$

$y=-3 \quad (1,-3)$

B

>> Could I have just plugged in and check? YES. Solving was faster, I think. (It was probably safer too, as in negative signs)

4 Substitution or Elimination. True → ∞ many solutions. Not True → no solution.

A $2x + y = 7$
$-2x + 3y = 5$

$4y = 12$
$y = 3$

$2x + (3) = 7$
$2x + 3 = 7$
$-3 \quad -3$
$2x = 4$
$x = 2$

(2, 3)

B $-3x + 4y = -8$
$3(x + 3y = 7) \rightarrow 3x + 9y = 21$

$x + 3(1) = 7$
$x + 3 = 7$
$-3 \quad -3$
$x = 4$

$-3x + 4y = -8$
$13y = 13$
$y = 1$

(4, 1)

C $-2(x - 4y = 6) \rightarrow -2x + 8y = -12$
$2x - 8y = 12$
$2x - 8y = 12$
$0 = 0$

true

∞ many solutions

D $5x - 10y = -5$
$x = y + 2$
$5(y+2) - 10y = -5$
$5y + 10 - 10y = -5$
$-5y + 10 = -5$
$-10 \quad -10$
$-5y = -15$
$y = 3$

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

(5, 3)

E $17x + 18y = 1$
$-1(7x + 18y = 11) \rightarrow -7x - 18y = -11$

$10x = -10$
$x = -1$

$7(-1) + 18y = 11$
$-7 + 18y = 11$
$+7 \quad +7$
$18y = 18$
$y = 1$

(-1, 1)

F $3x - 2y = 12$
$y = 2x - 7$

$3x - 2(2x - 7) = 12$
$3x - 4x + 14 = 12$
$-x + 14 = 12$
$-14 \quad -14$
$-x = -2$
$x = 2$

$y = 2(2) - 7$
$y = 4 - 7$
$y = -3$

(2, -3)

4

G $2(10x - 5y = 5) \rightarrow 20x - 10y = 10$

$-5(3x - 2y = 4) \rightarrow -15x + 10y = -20$

$\frac{5x}{5} = \frac{-10}{5}$

$x = -2$

$3(-2) - 2y = 4$

$-6 - 2y = 4$

$+6 \quad +6$

$\frac{-2y}{-2} = \frac{10}{-2}$

$y = -5$

$(-2, -5)$

H $3x + 9y = 2$

$x = 1 - 3y$

$3(1 - 3y) + 9y = 2$

$3 - 9y + 9y = 2$

$0 = 2$

Not True

No Solution

▼ Just Set Up. Do not Solve.

5 $x + y = 35$

$x = y + 15$

6 $q + d = 20$ ← "number" of things

$.25q + .10d = \$3.20$ ← keep the "money" together

or

$q + d = 20$

$25q + 10d = 320$

▼ Set up + Solve!

9 $-2(r + d = 10) \rightarrow -2r - 2d = -20$

$\$2r + \$3d = \$22 \quad 2r + 3d = 22$

$d = 2$

Dan bought 2 deluxe hamburgers

10 $-5(c + r = 8) \rightarrow -5c - 5r = -40$

$\$5c + \$12r = \$75 \quad 5c + 12r = 75$

$\frac{7r}{7} = \frac{35}{7}$

Maria bought $r = 5$ S bundles of roses

↑ Be careful. Question is written to trick you. keep $ together.

↑ Be Careful. Make sure you answer the correct question! It asked for roses. not carnations.

>> Did you notice that there is no #7 + #8? me too. too late to fix it now ☺

II Graphing. Solve for y, then graph.

>> if you multiply or divide by a negative, the switch the sign.

A $2x - y \geq 6$

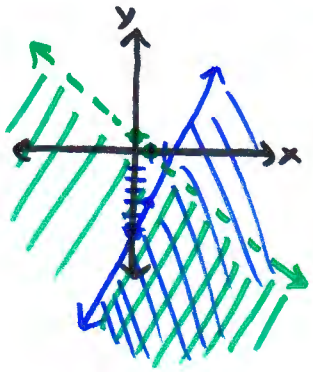
$y < -x + 1$ ✓

$2x - y \geq 6$

$-2x \quad -2x$

$(-1)\ -y \geq -2x + 6\ (-1)$

$y \leq 2x - 6$ ✓



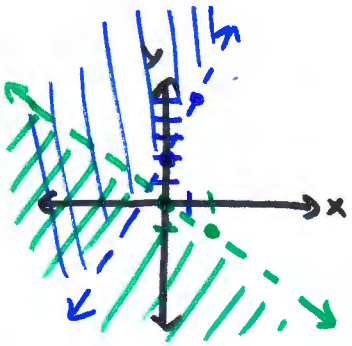
B $-3x + y > 2$

$y < -\frac{1}{2}x$ ✓

$-3x + y > 2$

$+3x \quad +3x$

$y > 3x + 2$ ✓



C $x + 2y \leq 4$

$y \geq x - 1$ ✓

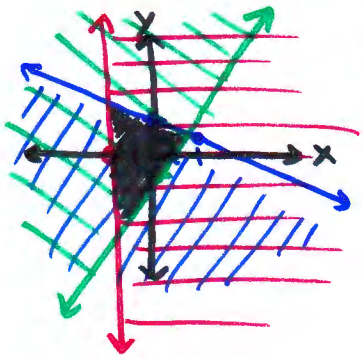
$x \geq -2$ ✓

$x + 2y \leq 4$

$-x \quad -x$

$\frac{2y}{2} \leq \frac{-x}{2} + \frac{4}{2}$

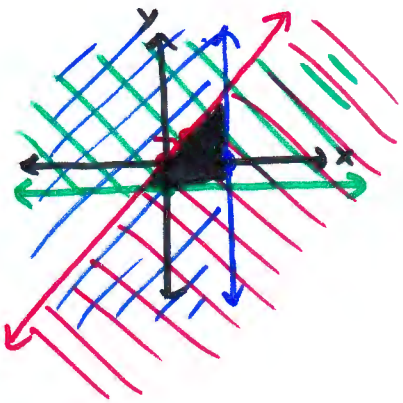
$y \leq -\frac{1}{2}x + 2$ ✓



D $x \leq 3$ ✓

$y \geq -1$ ✓

$y \leq x$ ✓



↑ Be Careful. Solid or Dashed? Shade Up or Down?

>> #12... gone too? hey... maybe 7 8 12? [seven ate twelve?] elol

13 Solve for given variable.

>> Hints: (1) Take your time! (2) Stay Organized (3) Be careful!

A

① $x+2y-z=17$

② $y+z=1$

③ $3z=-9$

$\frac{3z}{3}=\frac{-9}{3}$

$z=-3$

$y+z=1$

$y+(-3)=1$

$y-3=1$

$+3 \quad +3$

$y=4$

$x+2y-z=17$

$x+2(4)-(-3)=17$

$x+8+3=17$

$x+11=17$

$-11 \quad -11$

$x=6$

$\boxed{x=6}$

B

① $x+2y-5z=5$

② $3x-y-z=15$

③ $4x+2y=4$

I used ① + ② to get rid of z, so that it would match up with ③.

① $x+2y-5z=5$

② $-5(3x-y-z=15) \rightarrow -15x+5y+5z=-75$

$x+2y-5z=5$

$2(-14x+7y=-70) \rightarrow -28x+14y=-140$

$-7(4x+2y=4) \rightarrow -28x-14y=-28$

$\frac{-56x}{-56}=\frac{-168}{-56}$

$x=3$

$4(3)+2y=4$

$12+2y=4$

$-12 \quad -12$

$\frac{2y}{2}=\frac{-8}{2}$

$y=-4$

Aaargh! I didn't read the directions ∴. Only x was asked for. I did too much work!

$\boxed{x=3}$

$56 \times 3 = 168$

13

tricky! 3 variables, but only 2 in each.

C

① $x + 2y = 0$

② $x + z = -1$

③ $y - z = 2$

$x \quad + z = -1$

$y - z = 2$

④ $x + y = 1$

$-1(x + 2y = 0) \rightarrow -x - 2y = 0$

$x + y = 1$

$-y = 1$

$y = -1$

instead of another elimination, I'm picking the equation that's not used already.

$y = -1$

D

$4(x - y + 3z = 8) \rightarrow 4x - 4y + 12z = 32$ ①

$2x + 4y + z = 0$ ②

$4(3x + y - 2z = -2) \rightarrow 12x + 4y - 8z = -8$ ③

① $4x - 4y + 12z = 32$

② $2x + 4y + z = 0$

④ $6x + 13z = 32$

① $4x - 4y + 12z = 32$

③ $12x + 4y - 8z = -8$

⑤ $16x + 4z = 24$

$8(6x + 13z = 32) \rightarrow 48x + 104z = 256$

$-3(16x + 4z = 24) \rightarrow -48x - 12z = -72$

$\frac{92z}{92} = \frac{184}{92}$

$z = 2$

$z = 2$

scratch work

$13 \times 8 = 104$

$32 \times 8 = 256$

$24 \times 3 = 72$

$104 - 12 = 92$

$256 - 72 = 184$

13

E

$2(3x - y + z = 5) \rightarrow$ $6x - 2y + 2z = 10$ ①

$3(2x + y - 2z = -2) \rightarrow$ $6x + 3y - 6z = -6$ ②

$-6x + 2y - 2z = -10$ $-6x + 2y - 2z = -10$ ③

① $6x - 2y + 2z = 10$

③ $-6x + 2y - 2z = -10$

$0 + 0 + 0 = 0$

$0 = 0$

True

② $6x + 3y - 6z = -6$

③ $-6x + 2y - 2z = -10$

= doesn't matter now

∞ many solutions

F

$3(2x - y + 3z = 8) \rightarrow 6x - 3y + 9z = 24$ ①

$6(x - 6y - z = 0) \rightarrow 6x - 6y - 6z = 0$ ②

$-6x + 3y - 9z = 24$ $-6x + 3y - 9z = 24$ ③

① $6x - 3y + 9z = 24$

③ $-6x + 3y - 9z = 24$

$0 = 48$

Not True

② $6x - 6y - 6z = 0$

③ $-6x + 3y - 9z = 24$

No Solution