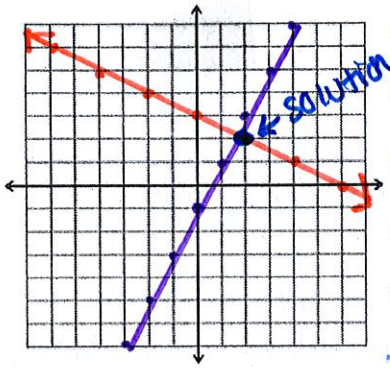
Unit 3 Review

1. $y = 2x - 1$

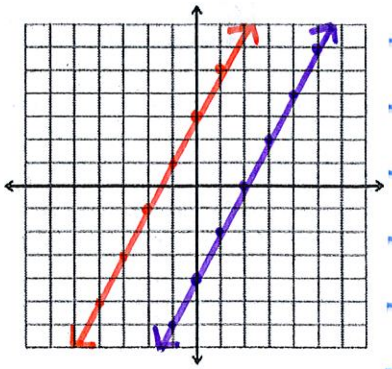
$y = -\frac{1}{2}x + 3$



(1.6, 2.2)

2. $2x - y = 4 \rightarrow y = 2x - 4$

$y = 2x + 3$



No solution parallel lines!

3. $2x + 2y = 8$ $\quad x = y$

$2y + 2y = 8$

$4y = 8$

$y = 2 \quad x = 2$

4. $x + 6y = -2$ $\quad y = 2 - x$

$x + 6(2 - x) = -2$

$x + 12 - 6x = -2$

$-5x + 12 = -2$

$-5x = -14$

$x = 2.8 \quad y = -0.8$

$y = 2 - 2.8$

$y = -0.8$

5. Substitution

6. $x = 1^{st}$ #

$y = 2^{nd}$ #

$x + y = 27$

$x - y = 19$

$2x = 46$

$x = 23$

$23 + y = 27$

$y = 4$

7. $4x + y = 14$ $\quad -2 \rightarrow -8x - 2y = -28$

$3x + 2y = 8$

$3x + 2y = 8$

$-5x = -20$

$x = 4$

$4(4) + y = 14$

$16 + y = 14$

$y = -2$

8. $4x + y = -1$
$-5x - y = 0$
$-1x = -1$
$x = 1$

$4(1) + y = -1$
$4 + y = -1$
$y = -5$

$x = 1$
$y = -5$

9. $y = 3x - 2$

$2x + 5y = 7$
$5y = -2x + 7$
$y = -\frac{2}{5}x + \frac{7}{5}$

Different slopes = intersection, so 1 solution.

10. x = pencils
y = pens

$(3x + 2y = 6) \cdot -2$
$2x + 4y = 8$
$-6x - 4y = -12$
$2x + 4y = 8$
$-4x = -4$
$x = 1$

$3(1) + 2y = 6$
$3 + 2y = 6$
$2y = 3$
$y = 1.50$

pencils = \$1
pens = \$1.50

11. x = # of nickels
y = # of dimes

$(x + y = 15) \cdot -5$
$5x + 10y = 125$
$-5x - 5y = -75$
$5y = 50$
$y = 10$

5 nickels
10 dimes

12. x = # 2 seat bikes
y = # 1 seat bikes

$$\begin{cases} x + y = 42 \\ 2x + 1y = 84 \end{cases}$$

DO NOT SOLVE!

13. x = # of months
y = savings

Jason: $y = 60 + 20x$
Jacob: $y = 45 + 40x$

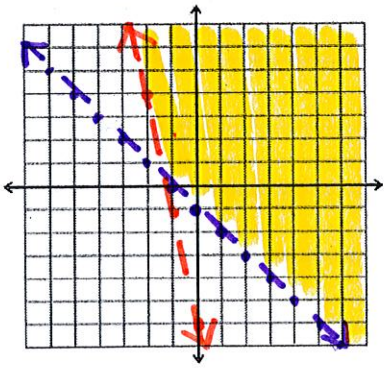
$60 + 20x = 45 + 40x$
$15 + 20x = 40x$
$15 = 20x$
$x = 0.75$ months

14. $(5x + 7y = 3)2 \rightarrow 10x + 14y = 6$
$(2x + 3y = 1)-5 \rightarrow -10x - 15y = -5$
$-1y = 1$
$y = -1$

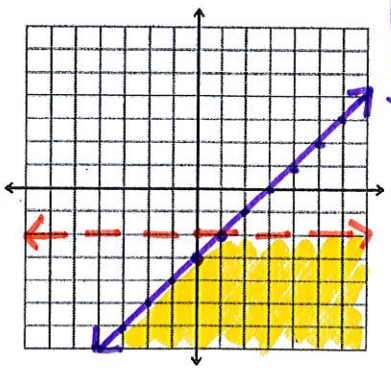
$5x + 7(-1) = 3$
$5x - 7 = 3$
$5x = 10$
$x = 2$

$x = 2 \quad y = -1$

15. Solve the system of inequalities by graphing
$y > -5x - 6$
$y > -x - 1$



16. Solve by graphing $x - y \geq 3$
$y < -2$



$-y \geq -x + 3$
$y \leq x - 3$

17. $(0,1)$ $\quad 1-0 \geq 3(1)$ and $3(1)-1>2(0)$

$x \quad y$ $\quad 1 \geq 3$ $\qquad 3-1>2$

False $\qquad 2>2$ False

Not a solution

** if graphed, not located in shaded region → still not a solution

~~on separate sheet~~

18. x = amt of 40% solution

	%	Amt
Mix A	0.40	x
Mix B	0.15	$50-x$
Total	0.25	50

$0.4x + 0.15(50-x) = 0.25(50)$

$0.4x + 7.5 - 0.15x = 12.5$

$0.25x = 5$

$x = 20$ gal

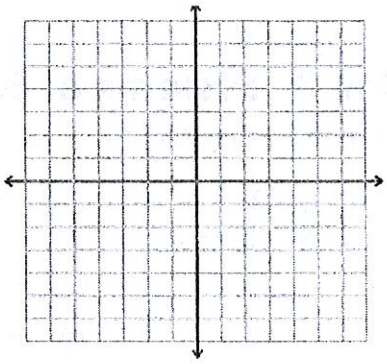
20 gal of 40% saltwater solution

30 gal of 15% saltwater solution

#19. on separate sheet

17. Is (0,1) a solution of the inequalities $1 - x \geq 3y$ and $3y - 1 > 2x$?

18. How much of a 40% saltwater solution do you need to mix with a 15% saltwater solution to make 50 gallons of a 25% saltwater solution?

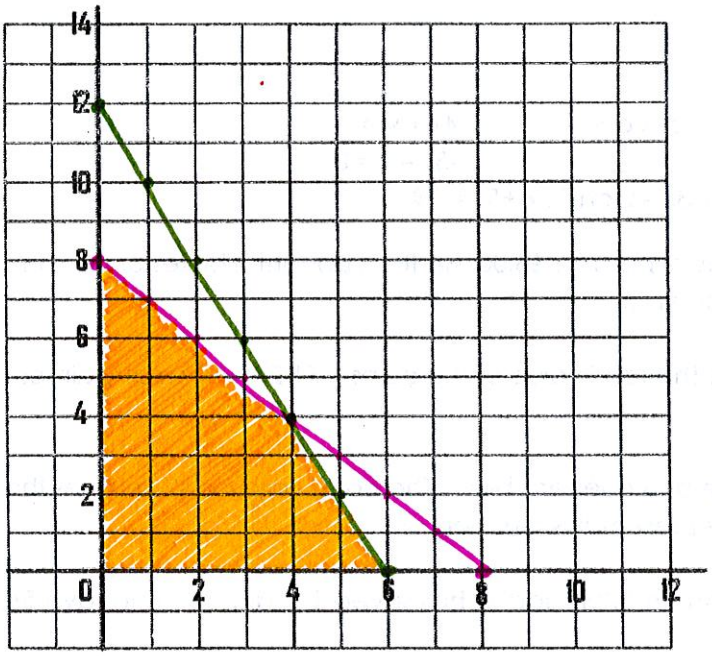


19. Mark is making cherry pie and apple pie for a fundraiser. Mark is confident that he will be able to sell all the pies that he makes. There are *two constraints* that limit his production today:

SUGAR: Each cherry pie requires 2 cups of sugar. Each apple pie requires 2 cups of sugar. Mark only has 16 cups of sugar.

Flour: Each cherry pie requires 4 cups of flour. Each apple pie requires 2 cups of flour. Mark only has 24 cups of flour.

Write two inequalities. Then, find the intersection of these inequalities to show all combinations of pies that Mark can make with the two constrains given.



Let x = # of cherry pies

y = # of apple pies

Inequality #1: $2x + 2y \leq 16$

X-intercept: (8,0) Y-intercept: (0,8)

Inequality #2: $4x + 2y \leq 24$

X-intercept: (6,0) Y-intercept: (0,12)

Suppose each cherry pie makes a profit of $5.50 and each apple pie makes a profit of $4.25. How many cherry pies and apple pies should Mark make in order to maximize his profit?

Objective Function: Profit = $5.50x + 4.25y$

Vertex 1: (0,0) = $5.50(0) + 4.25(0)$ = 0

Vertex 2: (0,8) = $5.50(0) + 4.25(8)$ = 34

Vertex 3: (4,4) = $5.50(4) + 4.25(4)$ = 39

Vertex 4: (6,0) = $5.50(6) + 4.25(0)$ = 33

Solution: Mark should make 4 cherry and 4 apple to maximize his profits!