Part 1: Introduction: The sports boosters club is selling t-shirts and blankets at the football games to afford the charter busses that the team uses when traveling. T-shirts cost $10 and blankets cost $25.

The booster club has set a goal of making $2000 at each home game.

How many T-shirts and blankets does the club need to sell in order to meet their goal?

a. Let x = # OF T-SHIRTS

a. Write an expression for the amount of money raised from T-shirt sales: *10x*

b. Let y = # OF BLANKETS

a. Write an expression for the amount of money raised from blanket sales: *25y*

c. Write an equation that represents the sales goal: $10x + 25y = 2000$

d. Determine if the club will meet their goal if they sell 50 T-shirts and 50 blankets. Explain.

NOPE- $250 SHORT! $50(10) + 50(25)$; $500 + 1250 \neq 2000$; $1750 \neq 2000$.

e. Determine if the club will meet their goal if they sell 100 T-shirts and 40 blankets. Explain.

Yep! It meets their goal exactly. $10(100) + 25(40)$; $1000 + 1000 = 2000$ ✓ (100, 40)

f. Calculate two additional ordered pairs which would be solutions.

g. Label the axes and graph the equation (use the ordered pairs or rewrite part c in function form).

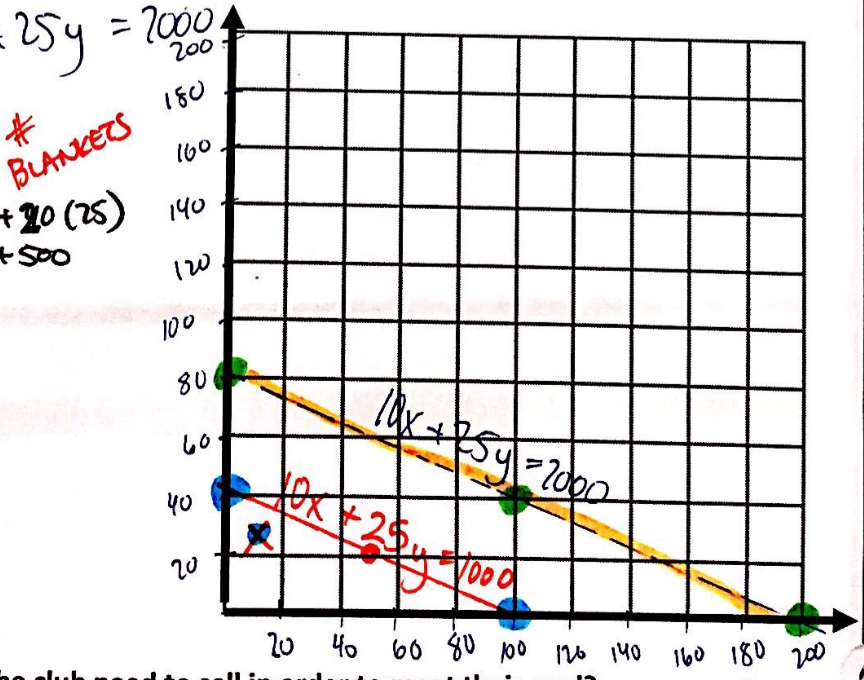
SHIRT x	BLANKET y
100	40
200	0
0	80

$10x + 25y = 2000$

$50(10) + 20(25)$
$500 + 500$

$10x + 25y = 1,000$
$10(100) + 25(0) = 1000$ ✓

x	y
100	0
50	25
0	40



So how many T-shirts and blankets does the club need to sell in order to meet their goal?

MULTIPLE COMBINATIONS OF SHIRTS & BLANKETS.

Part 2

a. At the away games, the club has a goal of earning $1000. Create an equation that represents this goal.

$10x + 25y = 1000$

b. On the same coordinate plane as above in a different color, graph this equation.

c. Write each of the equations in function form:

Function 1: $10x + 25y = 2000$, $-10x$ → $\frac{25y}{25} = \frac{-10x}{25} + \frac{2000}{25}$ → $y = -\frac{2}{5}x + 80$

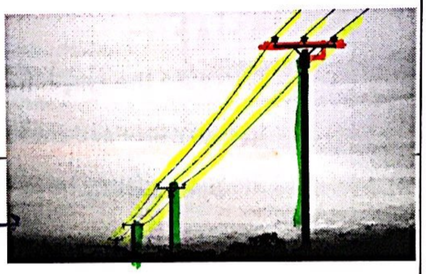
Function 2: $10x + 25y = 1000$, $-10x$ → $\frac{25y}{25} = \frac{-10x}{25} + \frac{1000}{25}$ → $y = -\frac{2}{5}x + 40$

What do you notice about these equations?

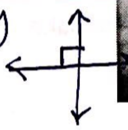
Same Slope!

Parallel Lines: *Two lines are parallel if*

- THEY HAVE THE SAME SLOPE (different y-intercepts)
- THEY WILL NEVER (ever) INTERSECT



Perpendicular Lines: *Two lines are perpendicular if* THEY INTERSECT AT A 90° ANGLE.



- SLOPES ARE OPPOSITE RECIPROCALS

Identify the kinds of lines you see in the image.

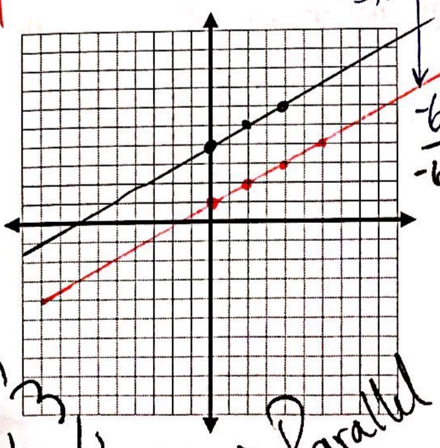
ex: if $m_1 = \frac{7}{1}$, so perpendicular line will have a slope of $-\frac{1}{7} = m_2$

Example 1: Determine whether the graphs of each pair of equations are parallel, perpendicular, or neither. Explain your reasoning. Then, graph the equations to justify your response.

a. Get in function form to compare slopes

$-2x + 4y = 4$ → $y = \frac{1}{2}x + 1$

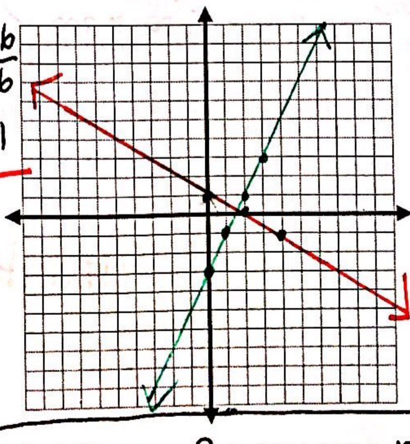
$3x - 6y = -24$, $-3x$ → $\frac{-6y}{-6} = \frac{-3x}{-6} - \frac{24}{-6}$ → $y = +\frac{1}{2}x + 4$



Same Slope! → Parallel

b. $3x + 6y = 6$, $-3x$ → $\frac{6y}{6} = \frac{-3x}{6} + \frac{6}{6}$ → $y = -\frac{1}{2}x + 1$

$-2x + y = -3$, $+2x$ → $y = 2x - 3$



SLOPES ARE OPPOSITE RECIPROCALS; $m = -\frac{1}{2}$ & $\frac{2}{1}$

⊥ PERPENDICULAR LINES

Example 2: Find the slope of the line perpendicular to the equation of the line given; then, find the slope o[f the] line that is parallel to the graph.

a. $y=\frac{3}{2}x+7$	b. $4x+y=2$	c. $x-3y-8=0$	d. $y=-x$
	$-4x$ $-4x$ $y=-4x+2$	$-x$ $+8$ $-x+8$ $\frac{-3y}{-3}=\frac{-x+8}{-3}$ $y=\frac{1}{3}x-\frac{8}{3}$	$y=-1x$
Perpendicular: $m=-\frac{2}{3}$	*Perpendicular:* $m=+\frac{1}{4}$	*Perpendicular:* $m=-\frac{3}{1}$	*Perpendicular:* $m=+$
Parallel: $m=\frac{3}{2}$	*Parallel:* $m=-4$	*Parallel:* $m=\frac{1}{3}$	*Parallel:* $m=-1$

Part 3: The sports boosters club is selling t-shirts and blankets at the football games to afford the charter busses that the team uses when traveling. T-shirts cost $10 and blankets cost $25.

The booster club has set a goal of making at least $2000 at each home game.

How many T-shirts and blankets does the club need to sell in order to meet their goal?

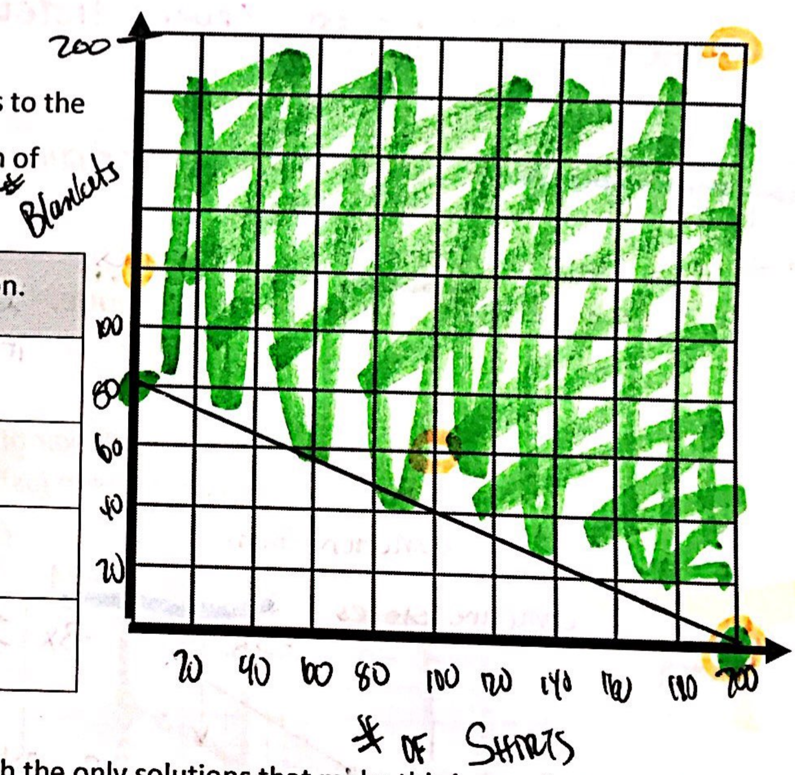
a. Compare the set up to part 1 to the set up of part 3.

$10x+25y \geq 2000$

b. How would this be represented algebraically? Do so.

c. Recreate the graph from the previous page.

d. Identify four ordered pairs that are solutions to the *inequality* (they have to make a minimal sum of 2000).



x	y	Calculations that justify it's a solution.
0	120	$10(0)+25(120)\geq 2000$ $3000\geq 2000$ ✓
200	(0)	$10(200)+25(0)\geq 2000$ $2000\geq 2000$ ✓
100	60	$10(100)+25(60)$ $1000+1500\geq 2000$ ✓
200	200	$10(200)+25(200)$ $2000+5000\geq 2000$ ✓

e. Are the points that you identified on the graph the only solutions that make this inequality true? How many solutions are there?

Infinite!

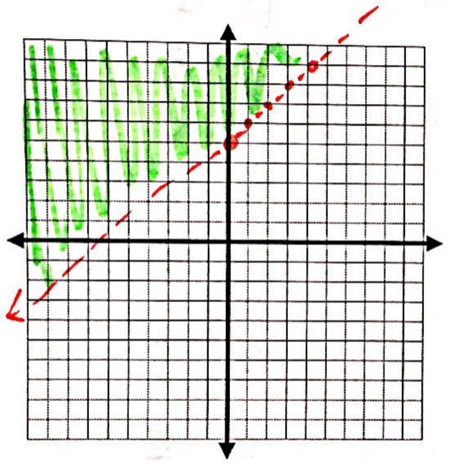
Graphing a two-variable linear inequality on a coordinate plane is similar to graphing a two-variable linear equation on a coordinate plane, except...

- *Depending on the inequality symbol, the line could be...*
  - $>$ or $<$ → A DASHED LINE
  - $\geq$ or $\leq$ → A SOLID LINE
- *Depending on the inequality symbol, the region that represents the solutions....*
  - $>$ or $\geq$ ← GREATER-THAN SHADE ABOVE
  - $<$ or $\leq$ "LESS THAN" SHADE BELOW

How to graph a linear inequality in two variables:

a. $y > x + 5$

M=1 B=5

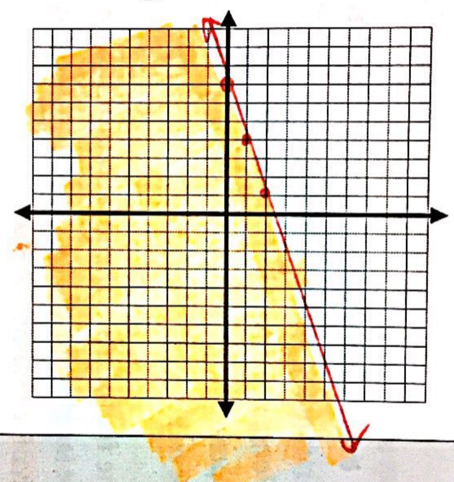


1. If necessary, rewrite the inequality in FUNCTION FORM. y=___
2. Identify the SLOPE and Y-INTERCEPT.
3. Plot the points for the boundary line.
4. According to the INEQ. sign, connect points with a DASHED or SOLID line.
5. Shade the SOLUTION region.
   > shade above
   < shade below

b. $3x + y \leq 7$

-3x -3x

$y \leq -3x + 7$



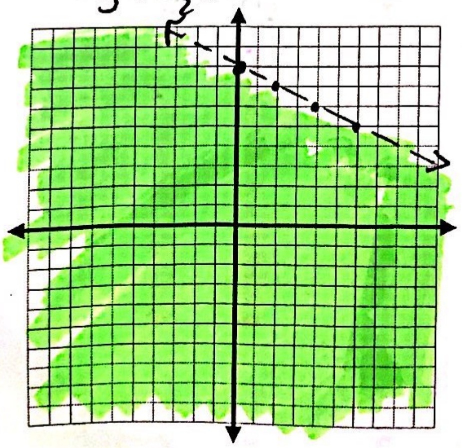
Examples: *Graph the following inequalities.*

1. $2x + 2y < 16$

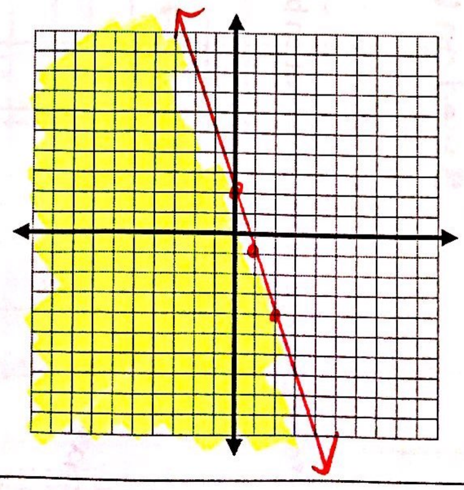
-2x -2x

$\frac{2y}{2} < \frac{-2x}{2} + \frac{16}{2}$

$y < -\frac{1}{2}x + 8$



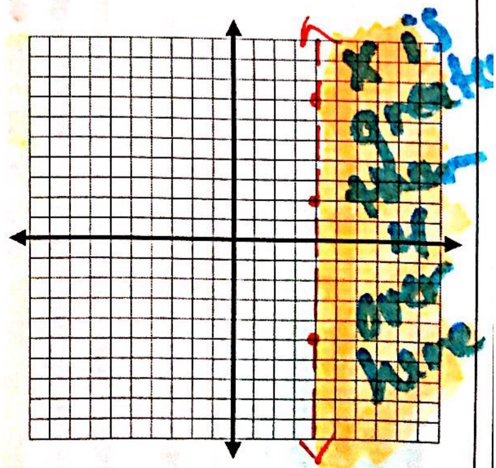
2. $y \geq -3x + 2$



3. $x > 4$

x=4

x	4	4	4
y	2	7	-5



Exit Ticket: Compare $y > \frac{3}{2}x + 4$ and $3y + 2x = 6$.