

SOLUTIONS...

PUZZLE WORKSHEET:

What Did the Toothless Old Termite Say When He Entered a Tavern?

Graph each pair of inequalities below and indicate the solution set of the system with crosshatching or shading. The crosshatching or shading, if extended, would cover a set of three letters. Print these letters in the three boxes at the bottom of the page that contain the exercise number.

① $y < x - 1$
 $y > -3$

② $x < 2$
 $y < \frac{2}{3}x - 1$

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

④ $y < x$
 $3x + 2y > 4$

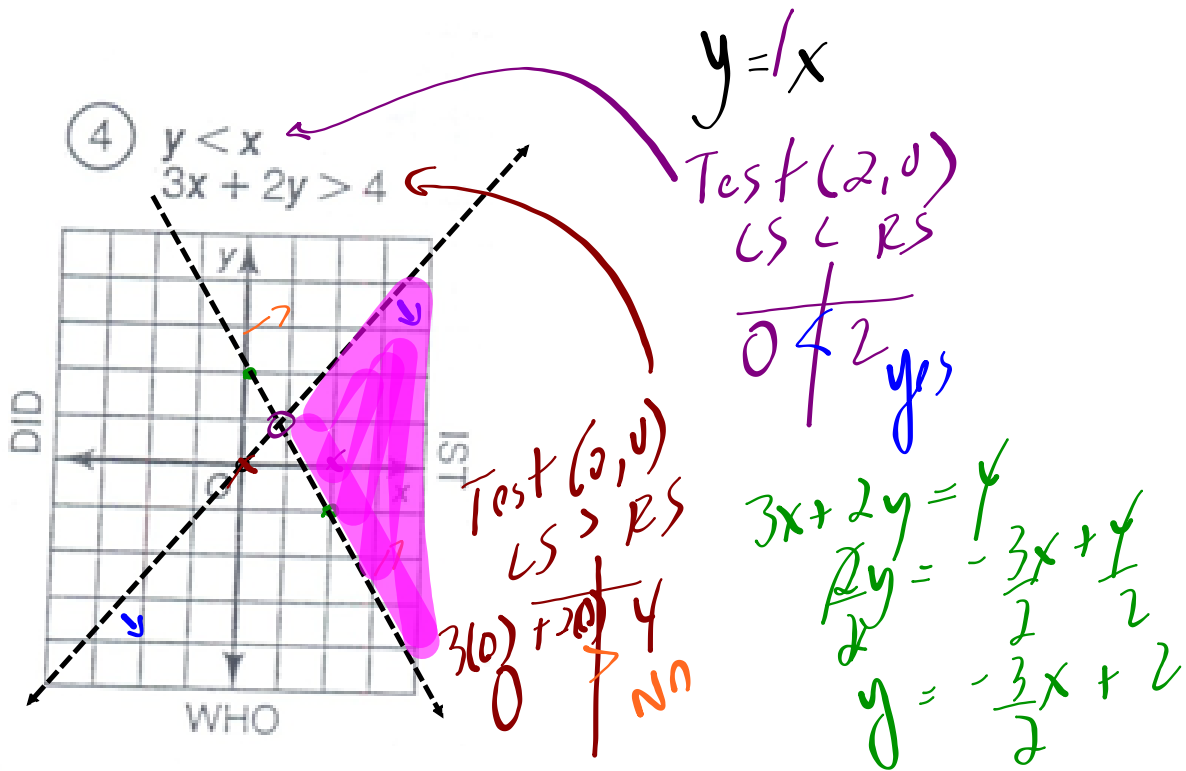
⑤ $x - 3y < 12$
 $x > 2$

⑥ $y < 1$
 $2x + y < 1$

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 4 | 4 | 3 | 3 | 3 | 6 | 6 | 6 | 1 | 1 | 1 | 5 | 5 | 5 | 2 | 2 | 2 |
| I | S | T | H | E | B | A | R | T | E | N | D | E | R | H | E | R | E |

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COLLECTOR'S: This book contains 1000
inequalities. It has variables in 10,000 places.

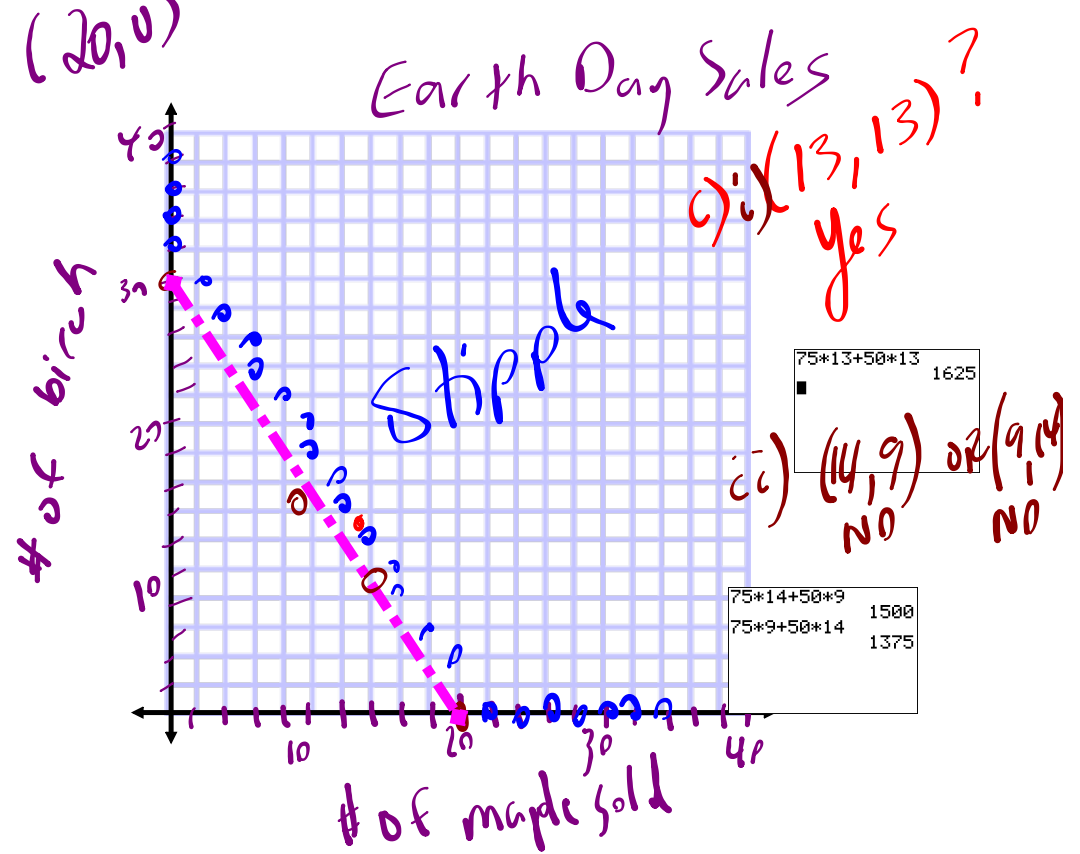


10. On Earth Day, a nursery sold more than \$1500 worth of maple and birch trees. The maple trees were sold for \$75, and the birch trees were sold for \$50.
 a) Define the variables and write a linear inequality to represent the possible combinations of trees sold. Are there any restrictions on the variables? Explain.
 b) Graph the linear inequality.
 c) Use your graph to determine:
 i) if the nursery could have sold 13 of each type of tree
 ii) if 14 of one type and 9 of the other type could have been sold

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a) x - # of maple sold $x \in \mathbb{W}$
 y - # of birch sold $y \in \mathbb{W}$
 $75x + 50y > 1500$
 $75x + 50y = 1500$

b) x -int y -int
 $\frac{75x + 50(0)}{75} = \frac{1500}{75}$
 $75(0) + \frac{50y}{50} = \frac{1500}{50}$
 $x = 20$
 $(20, 0)$
 $y = 30$
 $(0, 30)$



WARM-UP: Graph the solution and state 2 possible solutions...

$$\{(x, y) \mid 2x + y > 8, x \in W, y \in W\}$$

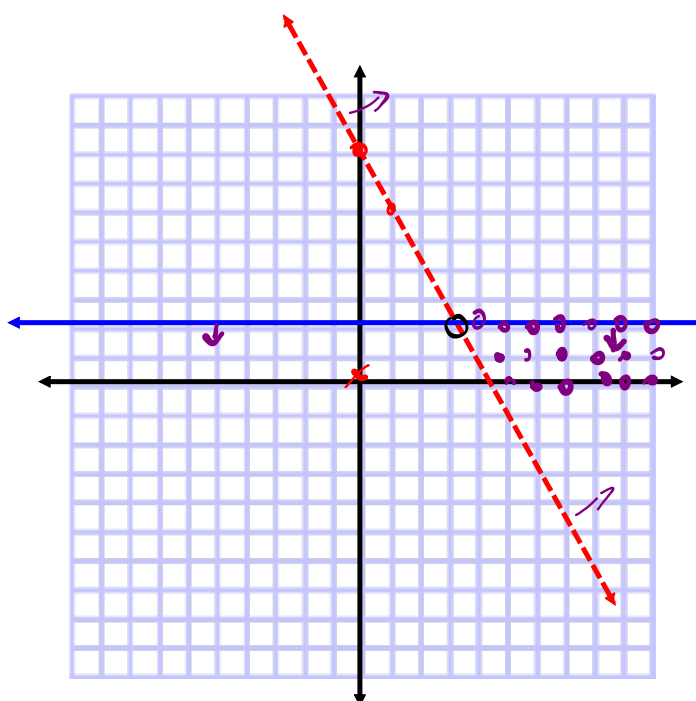
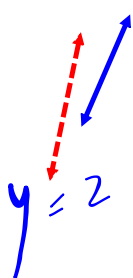
$$\{(x, y) \mid y \leq 2, x \in W, y \in W\}$$

$$2x + y = 8$$

$$y = -2x + 8$$

LS > RS

$$\begin{array}{r} 2(0) + 0 > 8 \\ 0 > 8 \end{array} \quad \text{No}$$



Applications: Systems Involving Inequalities

STEP 1 - Declare Variables
State Restrictions

STEP 2 - Create Linear Inequalities

STEP 3 - Graph Solution Set

STEP 4 - Answer question(s)

EXAMPLE #1:

To raise funds for π -day, the PI Committee has 500 T-shirts to sell.

They have two varieties:

#1. 'I 8 Sum π ' or #2. ' π - DAY 2018'.

They expect to sell at least twice as many of the first as the second. *1st depends on 2nd*

a) Define the variables and restrictions. Write a system of linear inequalities that models the situation.

x → # of π day 2018
y → # of 'I 8 Σ π '
x ∈ W *y* ∈ W

b) Graph the system of inequalities.

$$\begin{aligned} x + y &\leq 500 \\ y &\geq 2x \end{aligned}$$

c) State a combination of T-shirt sales.

Independent

↳ *x* variable
 ↳ ex: shots, time

Dependent

↳ *y* variable
 ↳ ex: goals, distance

'What depends on what?'
 ex: Goals depends on shots

at least (??)