

Sec. 2.8 Two-Variable Inequalities

Vocabulary

- linear inequality: inequality in two variables whose graph is a region of the coordinate plane bounded by a line
- half-plane: the boundary separates the coordinate plane into two half-planes
- test point; cannot be on the boundary

TO SHADE: ① Choose a test point
(0,0)

② Plug in test point

Ⓐ Statement TRUE
Shade that half-plane

Ⓑ Statement FALSE
Shade the other half-plane

BOUNDARY: $<, >$ $\leftarrow \text{-----} \rightarrow$ dashed
 \leq, \geq $\leftarrow \text{—————} \rightarrow$ solid

Problem 1: Graph

a. $y > 2x - 3$ $m = \frac{2}{1}$

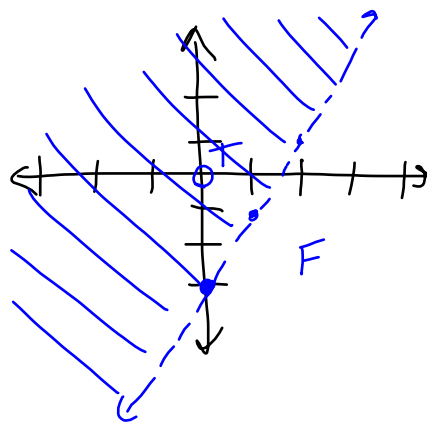
$y = 2x - 3$

$>$ \rightarrow Dashed

Test point: (0,0)

$0 > 2 \cdot 0 - 3$

$0 > -3$ T



$y >$	or	$y \geq$	Shade above
$y <$	or	$y \leq$	shade below

Problem 2:

You put up a new shelf that is 1 foot wide. Each book takes up 1 inch and each trophy takes up 3 inches. What is a graph showing how many books and trophies will fit on the shelf.

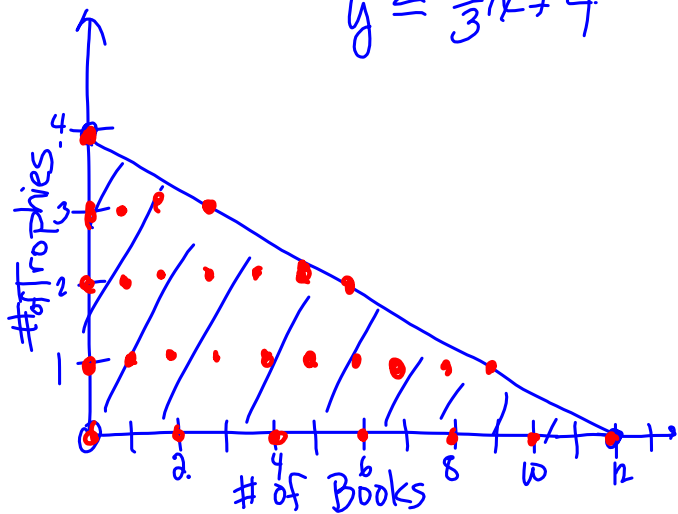
$\leq 1 \text{ ft.}$

$y \leq -\frac{1}{3}x + 4$

$1x + 3y \leq 12$

$3y = 12 \quad 1x = 12$
 $y = 4 \quad x = 12$
 $(0, 4) \quad (12, 0)$

Test $(0,0) \quad 0 + 0 \leq 12$
 $0 \leq 12 \text{ True}$



Problem 3: Graph

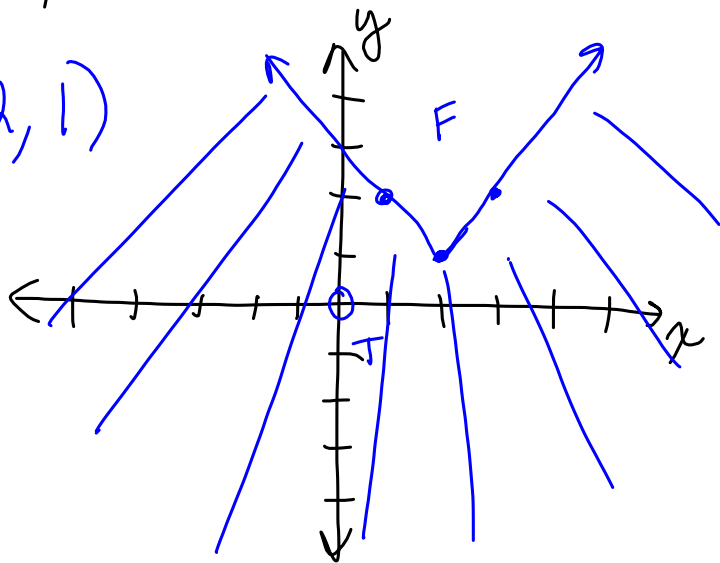
$y = a|x - h| + k$

$y \leq |x - 2| + 1$ (Solid)

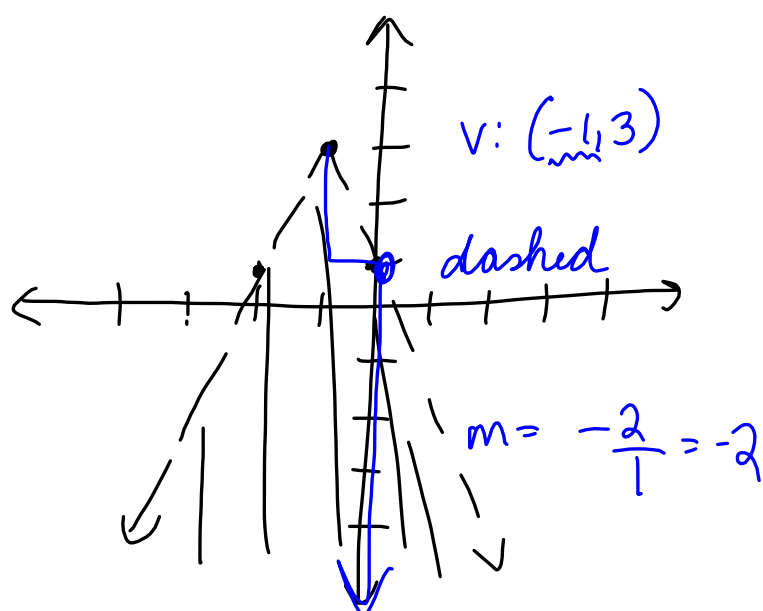
vertex: $(h, k) (2, 1)$

$m_R: a = 1$
 $m_L: a = -1$

Test: $(0,0)$
 $0 \leq |0 - 2| + 1$
 $0 \leq |-2| + 1$
 $0 \leq 2 + 1$
 $0 \leq 3 \text{ T}$



Problem 4: Write the inequality



$$y < -2|x+1|+3$$

$$a|x-h|+k$$