5.2 Linear Inequalities

Friday, February 19, 2016   10:13 AM

Pre-Calculus 11
5.2 Graphing Linear Inequalities in Two Variables Notes
Name_____ _____

When graphing a Linear Inequality:

< and > are represented by a _dotted_ – – – – – line on a coordinate grid.

≤ and ≥ are represented by a _solid_ ——————— line on a coordinate grid.

Steps to Graph a Linear Inequality:

$slope = \frac{rise}{run}$

1. Graph the line on the coordinate grid using $y = mx + b$ form of the line. Make sure you identify if a
   dotted or solid line is required.

   ↑ y-intercept

2. Choose a test point that is not on the line. I suggest picking (0,0) unless it is on the line.

3. Substitute the test point into the original equation:

   - If it satisfies the inequality shade on the side of the line where the test point is.

   - If it does not satisfy the inequality shade on the opposite side of the line.

Example 1: Graph the inequality $x - 3y > 6$

① $y = mx + b$

$x - 3y > 6$
$-x \qquad -x$

sign flips

$\frac{-3y}{-3} > \frac{-x + 6}{-3}$

$\boxed{y < \frac{x}{3} - 2}$

$\frac{1}{3}x$
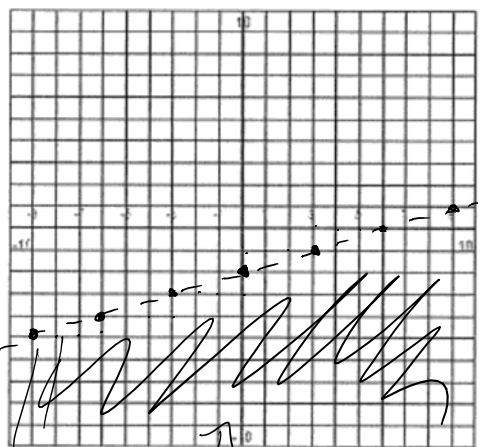
do we shade above or below?

② Test point (0,0)

put (0,0) into the original equation.

$x - 3y > 6$
$0 - 3(0) > 6$
$0 > 6$ False!

Shade the opposite side
of (0,0)

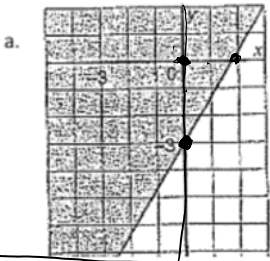*Note If I picked a point
from this region it
will satisfy $x - 3y > 6$
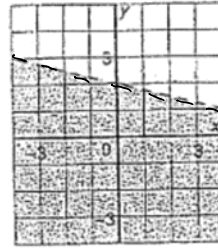
of (0,0)

$-5 \ -3 \ -1 \ 0$

Example 2: Write an inequality to describe the following graphs

YOU TRY

a.

① Find $y = mx + b$
$m = \frac{3}{2}$ $b = -3$

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

② choose an inequality
$\geq$ or $\leq$
pick and check.

$\boxed{y \geq \frac{3}{2}x - 3}$
use $(0,0)$
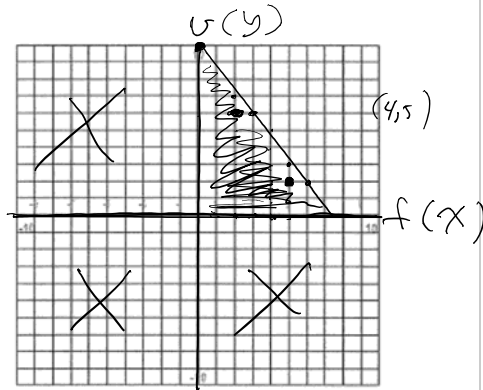
$0 \geq \frac{3}{2}(0) - 3$

$0 \geq -3$ True!

b.

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

$<$ $>$

Try $y > -\frac{x}{4} + 2$
Test $(0,0)$

$0 > \frac{-1}{4}(0) + 2$

$0 > 2$ False

means → $\boxed{y < -\frac{x}{4} + 2}$

Example 3: Carmen has up to $15 to buy seeds. A package of vegetable seeds cost $1.50 and a package of flower seeds costs $2.
let v = # of veg. seeds f = # of flower seeds.

a. Write an inequality to represent the total cost of the seeds.

$1.50v + 2f \leq 15$

$v \geq 0 \ f \geq 0$

v (y)

(4,5)

f (x)

b. Graph the inequality   isolate for v

$1.5v + 2f \leq 15$

$\frac{1.5v}{1.5} \leq \frac{-2f + 15}{1.5}$

$v \leq -\frac{4}{3}f + 10$ check $(0,0)$ $0 + 0 \leq 15$
which side to $0 \leq 15$
shade?

c. Use the graph to determine 2 possible ways Carmen can spend up to $15.

$(2, 6)$ $(5, 2)$

2 flower veg.   3 flower 2 veg.

d. Can Carmen buy 5 packages of vegetable seeds and 4 packages of flower seeds?

looking $(4,5)$ No! Test $1.5(5) + 2(4) \leq 15$

$7.5 + 8 \leq 15$

$15.50 \leq 15$ X

e. What is the most money Carmen can spend and still have change from $15?

look for points really close to the line, but not
on the line. $(2,7)$ $(5,3)$ plug in and check.
          f v

Assignment p. 360-368 #4, 5ab, 6, 7, 11, 13ab, 15