C. Graphing 2-Variable Linear Inequalities

3 Steps:

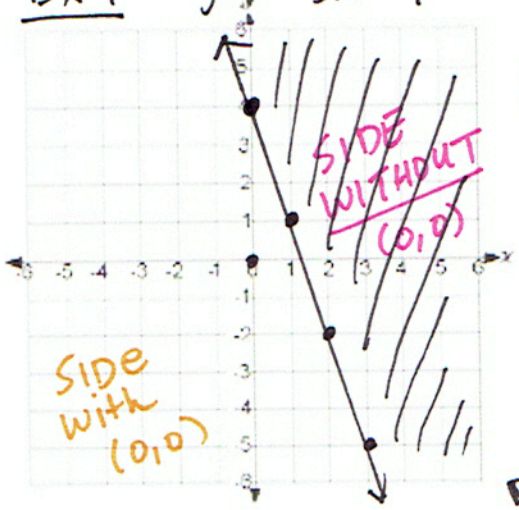
STEP 1) Solid line ($\leq$ or $\geq$) OR Dashed line ($<$ or $>$) ?

$\longleftrightarrow$ Boundary included! $\quad$ $\longleftarrow\cdots\cdots\rightarrow$ Boundary not included!

STEP 2) Graph the line (you may need to put it into slope-intercept form)

STEP 3) Use test point (0,0) to shade in the correct region.

Ex 1 $y \geq -3x+4$



① solid line! ($\geq$)

② graph $y = \frac{-3}{1}x+4$ $\quad$ y-int: 4 $\quad$ slope: $\frac{-3}{1}$ $\downarrow 3$ $\rightarrow 1$

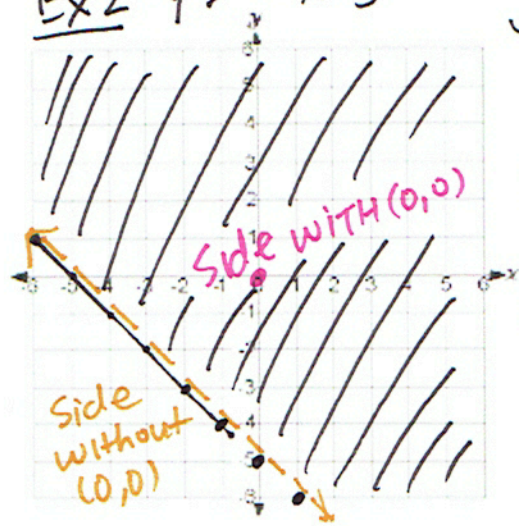
③ Plug in (0,0) (x, y)

$0 \overset{?}{\geq} -3(0)+4$

$0 \overset{?}{\geq} 4$ FALSE! $\quad$ (0,0) not a soln.

↳ shade in the side of the line WITHOUT (0,0) ∴

Ex 2 $y > -x-5$



① Dashed line! ($>$)

② $y = -\frac{1}{1}x-5$ $\quad$ $\downarrow 1$ $\rightarrow 1$

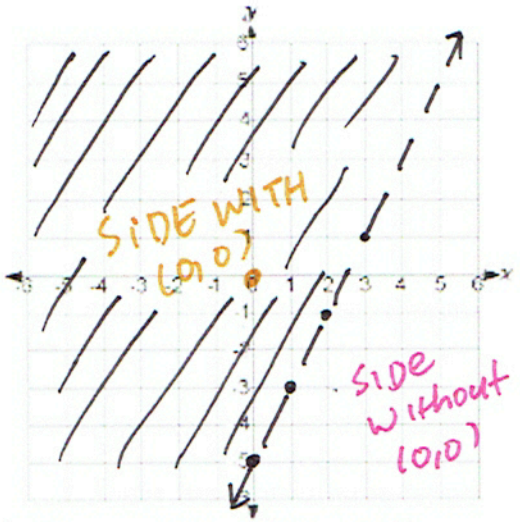
③ $0 \overset{?}{>} -0-5$

$0 \overset{?}{>} -5$

yes! (0,0) is a soln!

↳ shade in side of line WITH (0,0)

Ex 3 $y > 2x - 5$



① dashed line

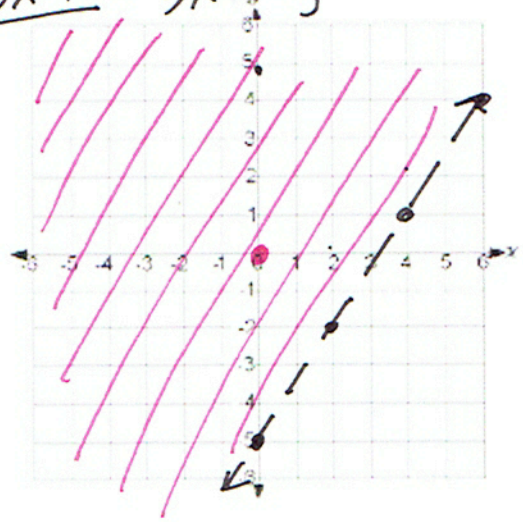
② $y = \frac{2}{1}x - 5$

③ $0 \overset{?}{>} 2(0) - 5$

$0 \overset{?}{>} -5$ yes! (0,0) IS a soln.

↳ shade in the side WITH (0,0)

Ex 4 $3x - 2y < 10$



① Dashed line

② $3x - 2y < 10$ (put into slope-int form)

$-3x \quad -3x$

$\frac{-2y}{-2} < \frac{10 - 3x}{-2}$ ← Divide by -2; Flip the sign!

$y > \frac{10}{-2} + \frac{3x}{+2}$

$$\boxed{y > \frac{3}{2}x - 5}$$

③ $0 \overset{?}{>} \frac{3}{2}(0) - 5$

$0 \overset{?}{>} -5$ True!

Shade in side WITH (0,0)