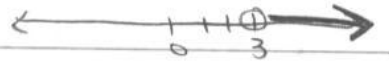
Lesson 9: Graphing Linear Inequalities

recall graphing in 1 dimension

ex: $x > 3$



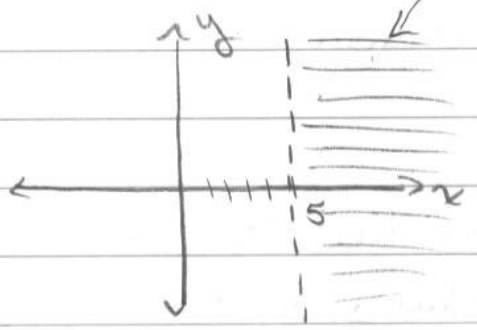
didn't want to shade the 3, so we used an open circle where x would equal 3, and shaded in the direction of points that work

ex $x \leq -1$

did want to shade the -1, so we used a closed (shaded) circle where x would be equal to -1, and shaded in the direction where the points in our solution lie.

In 2 dimensions, instead of an open circle, we use a dotted line, and instead of a closed circle, we use a solid line in the area that would be our graph had we an equal sign, and then we shade in the direction of our solutions.

ex: $x > 5$

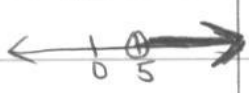


to pick direction of shading, take a test point on one side of the line (not on the line) and plug it in. $(\overset{x}{0}, \overset{y}{0})$ is easiest if it is not on the line. So in $(0,0)$, $x=0$ and $y=0$, but we have no y to plug in, so just plug in the x:

$0 > 5$? NO!

So $(0,0)$ is not in our solution. Thus, that side of the $x=5$ line should not be shaded. So, shade the other side.

notice if you squish this graph to one dimension, you get



since 5 is not included (>), use a dotted line for where $x=5$

ex: $y + 3x \leq 9$

Because of the $\leq$, we know our "endpoint" is included, so we need a solid line for where $y + 3x = 9$.

So: y-int: $x=0$

$y + 3(0) = 9$

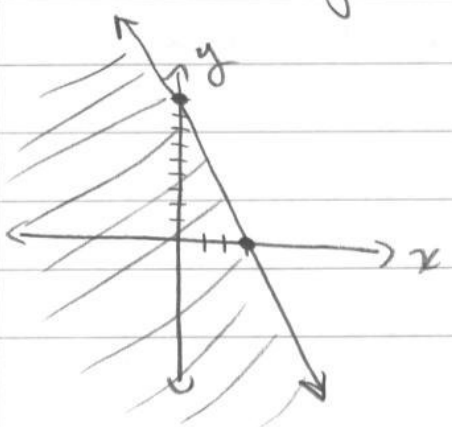
$y = 9 \Rightarrow (0,9)$

x-int: $y=0$

$0 + 3x = 9$

$\frac{3x}{3} = \frac{9}{3}$

$x = 3 \Rightarrow (3,0)$



to shade, try $(0,0)$ again

$x=0, y=0$

$0 + 3(0) \leq 9$?

$0 \leq 9$? yes! So shade on the side of the line where $(0,0)$ is.