Day 1 – Graphing Linear Inequalities – Notes

Learning Target: *I can graph a linear inequality and determine if a coordinate point is a solution.*

A **linear inequality** is similar to an equation as you learned before, but the equal sign is replaced with an inequality symbol. A **solution** to an inequality is any ordered pair that makes the inequality true.

Ex. Tell whether the ordered pair is a solution to the inequality.

(7, 3); $y < 2x - 3$

$3 < 2(7) - 3$

$3 < 11$

True → Solution

(4, 5); $y < x + 1$

$5 < 4 + 1$

$5 < 5$

False → Not a Solution

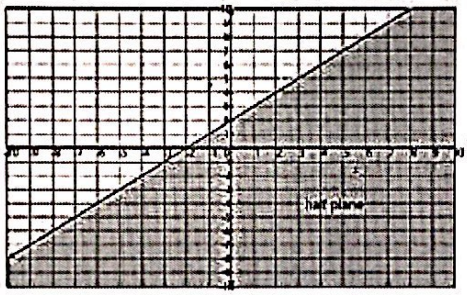
(4, 5); $y \leq x + 1$

$5 \leq 4 + 1$

$5 \leq 5$

True → Solution

A linear inequality describes a region of a coordinate plane called a **half-plane**. All the points in the shaded region are solutions of the linear inequality. The **boundary line** is the line of the equation you graph.



Symbol	Type of Line	Shading
<	Dashed	Below boundary line
>	Dashed	Above boundary line
≤	Solid	Below boundary line
≥	Solid	Above boundary line

Graphing Linear Inequalities

Step 1: Solve the inequality for y (if necessary).

Step 2: Graph the boundary line using a solid line for ≤ or ≥ OR a dashed line for < or >.

Step 3:

If the inequality is > or ≥, shade **above** the boundary line

If the inequality is < or ≤, shade **below** the boundary line

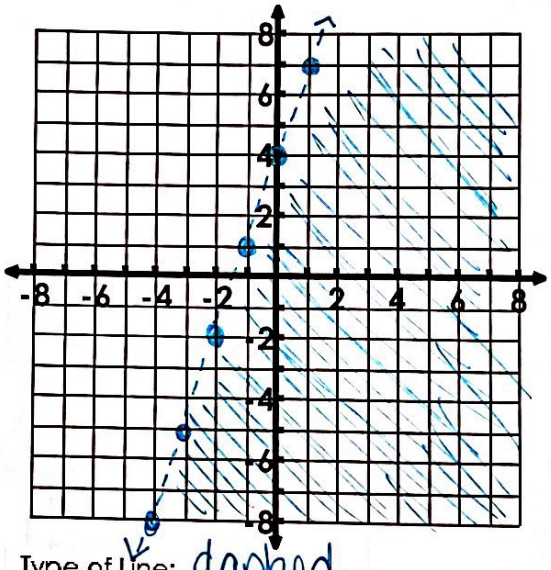
OR

Select a test point and substitute it into linear inequality.

- If the test point gives you a **true** inequality, you shade the region where the test point is located.
- If the test point gives you a **false** inequality, you shade the region where the test point is NOT located.

Practice Graphing Linear Inequalities

a. $y < 3x + 4$



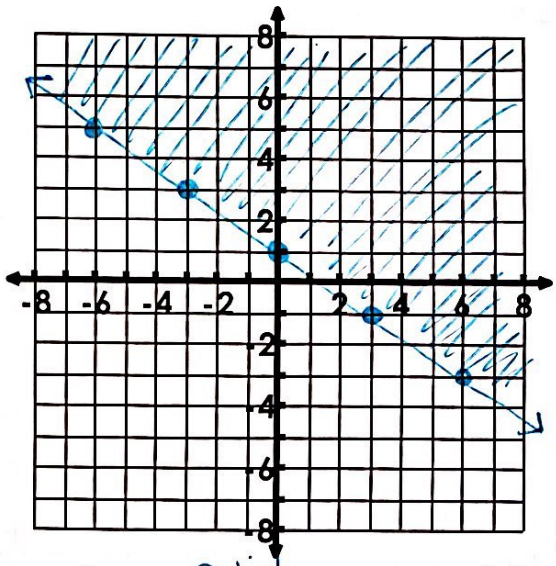
Type of Line: dashed

Slope: 3 Y-int: (0,4)

Shade: below

Test Point:

b. $y \geq -\frac{2}{3}x + 1$



Type of Line: Solid

Slope: -2/3 Y-int: (0,1)

Shade: above

Test Point:

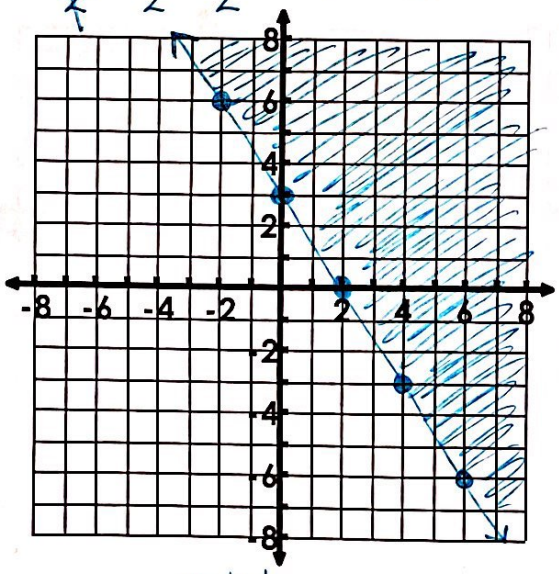
Ex. Graph the inequality:

a. $3x + 2y \geq 6$

$-3x \quad -3x$

$\frac{2y}{2} \geq \frac{-3x}{2} + \frac{6}{2}$

$y \geq \frac{-3}{2}x + 3$



Type of Line: Solid

Slope: -3/2 Y-int: (0,3)

Shade: above

Test Point:

Ex. Graph the inequality:

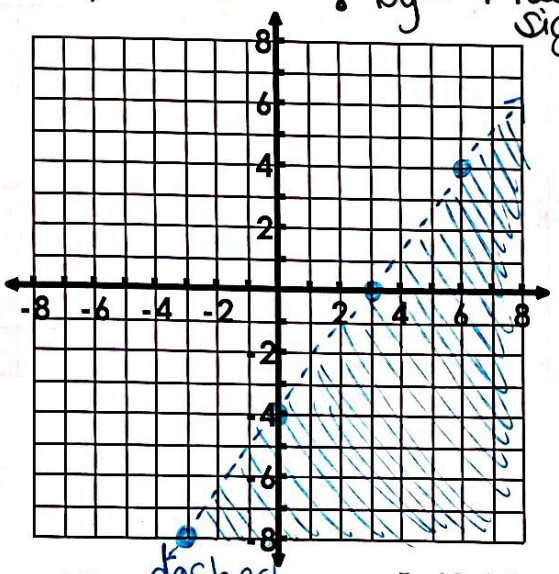
b. $4x - 3y > 12$

$-4x \quad -4x$

$\frac{-3y}{-3} > \frac{-4x}{-3} + \frac{12}{-3}$

$y < \frac{4}{3}x - 4$

÷ by − → flip sign



Type of Line: dashed

Slope: 4/3 Y-int: (0,-4)

Shade: below

Test Point: