

TOPIC: SYSTEMS OF LINEAR INEQUALITIES

Graphing Linear Inequalities

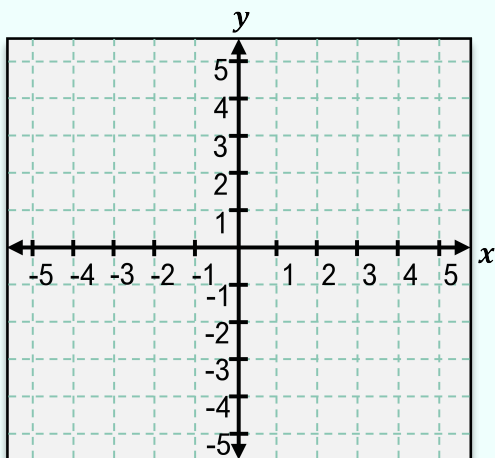
◆ You'll have to plot inequalities on a **2D graph** instead of a **1D number line**.

► To graph an inequality, graph the line and _____ side of graph that make inequality _____.

Recall	1D Inequality	New	2D Linear Inequality
	$x \geq 1$		$y < x$ $x \geq 1$ For equations with $\geq$ & $\leq$, draw a SOLID line ↗ For equations with $>$ & $<$, draw a DASHED line ↗

EXAMPLE

Graph $y > 2x - 4$



HOW TO: Graph Linear Inequalities

- 1) Graph the solid/dashed line by switching inequality symbol with an sign
- 2) Test a point on either side of line by (x, y) into inequality
(Best to use a point on x or y axis)
- 3) If point makes ineq. [**TRUE** | **FALSE**], shade side that point
If point makes ineq. [**TRUE** | **FALSE**], shade side that point

◆ Shortcut: Isolate y to the left side of inequality, then:

- If $y > \dots$ or $y \geq \dots$ shade [**ABOVE** | **BELOW**] line
- If $y < \dots$ or $y \leq \dots$ shade [**ABOVE** | **BELOW**] line

TOPIC: SYSTEMS OF LINEAR INEQUALITIES

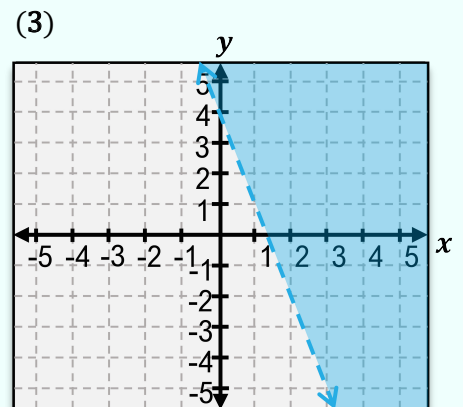
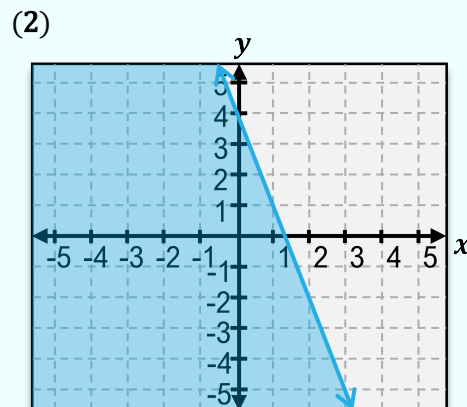
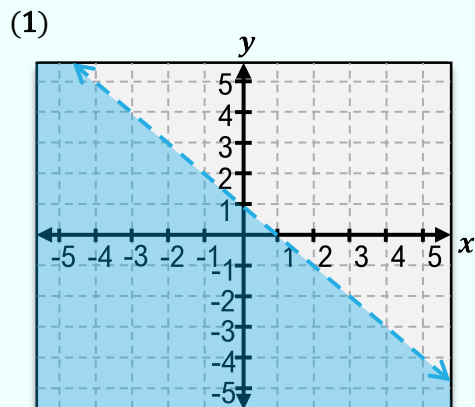
EXAMPLE

Match the inequality with its graph.

(A) $y > -3x + 4$

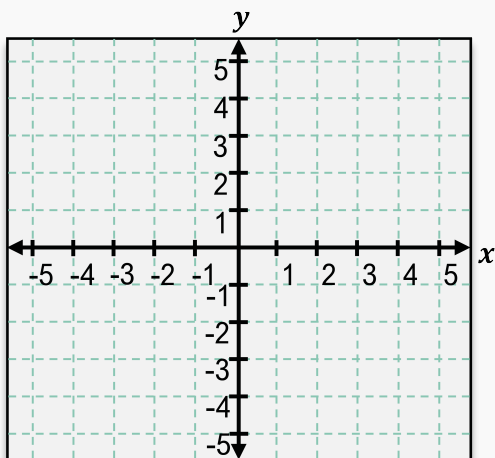
(B) $x + y < 1$

(C) $-3x - y \geq -4$



PRACTICE

Graph the inequality $2x + 3y < 6$.



HOW TO: Graph Linear Inequalities

- 1) Graph the solid/dashed line by switching inequality symbol with an **=** sign
- 2) Test a point on either side of line by _____ (x, y) into inequality
(Best to use a point on x or y axis)
- 3) If point makes ineq. **TRUE**, shade side **WITH** that point
If point makes ineq. **FALSE**, shade side **WITHOUT** that point

TOPIC: SYSTEMS OF LINEAR INEQUALITIES

Graphing Systems of Linear Inequalities

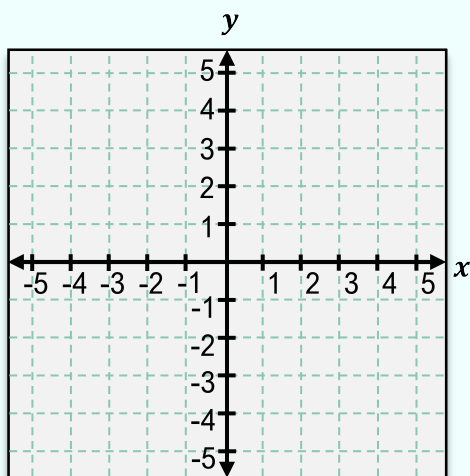
◆ To graph **Systems of Linear Ineqs**, plot ALL lines & shade _____ region that makes _____ ineqs true.

EXAMPLE

Graph the system of inequalities.

$$y \leq -x + 4$$

$$y > 2x + 1$$



HOW TO: Graph Systems of Linear Inequalities

For each inequality: (use different colors or shading styles)

- 1) Graph solid/dashed line by replacing inequality with an $=$ sign
- 2) Test a point on one side of line by plugging (x, y) into inequality
(Best to use $(0, 0)$ or a point on x or y axis)
- 3) If point makes ineq. **TRUE**, *lightly* shade side **WITH** that point
If point makes ineq. **FALSE**, *lightly* shade side **WITHOUT** that point

Finally,

- 4) Shade the overlap of all regions (if no overlap, NO solution)

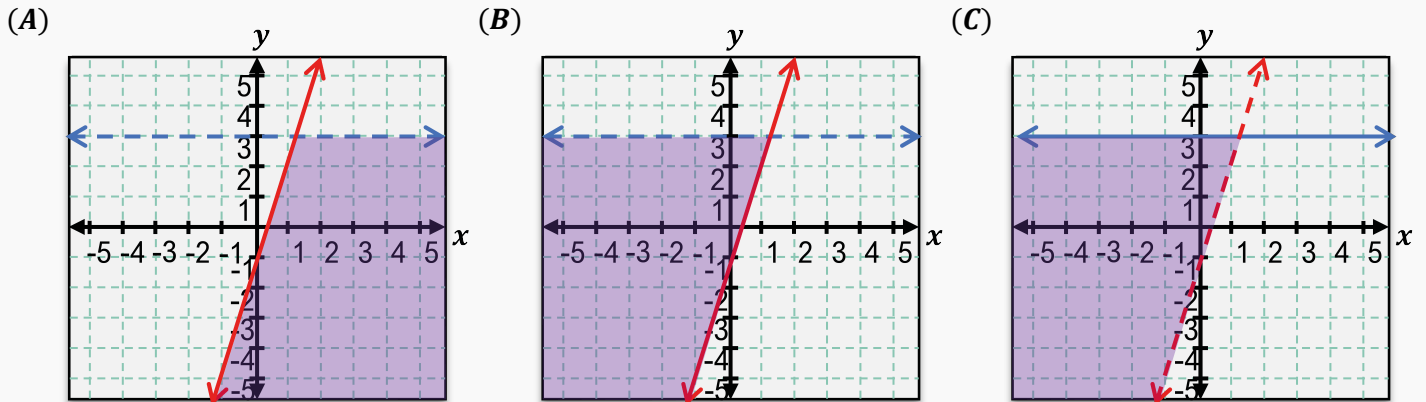
TOPIC: SYSTEMS OF LINEAR INEQUALITIES

PRACTICE

Which of the following graphs accurately represents the solution to the system of inequalities?

$$y \geq 3x - 1$$

$$y < 3$$

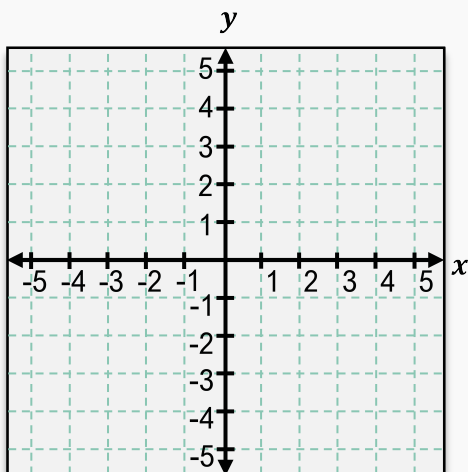


PRACTICE

Graph the system of inequalities and indicate the region (if any) of solutions satisfying all equations.

$$y \leq 2x - 2$$

$$y > 3 - x$$



HOW TO: Graph Systems of Linear Inequalities

For each inequality: (use different colors or shading styles)

- 1) Graph solid/dashed line by replacing inequality with an = sign
- 2) Test a point on one side of line by plugging (x, y) into inequality
(Best to use $(0, 0)$ or a point on x or y axis)
- 3) If point makes ineq. **TRUE**, *lightly* shade side **WITH** that point
If point makes ineq. **FALSE**, *lightly* shade side **WITHOUT** that point

Finally,

- 4) Shade the overlap of all regions (if no overlap, NO solution)

TOPIC: SYSTEMS OF LINEAR INEQUALITIES

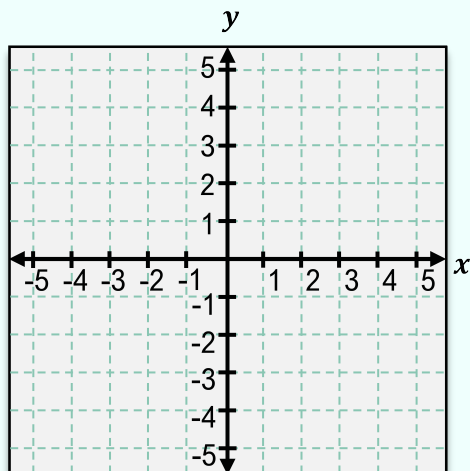
EXAMPLE

Graph the system of inequalities and indicate the region (if any) of solutions satisfying all equations.

$$x - y \geq 2$$

$$y \geq 1$$

$$x < 0$$



HOW TO: Graph Systems of Linear Inequalities

For each inequality: (use different colors or shading styles)

- 1) Graph solid/dashed line by replacing inequality with an = sign
- 2) Test a point on one side of line by plugging (x, y) into inequality
(Best to use $(0, 0)$ or a point on x or y axis)
- 3) If point makes ineq. **TRUE**, *lightly* shade side **WITH** that point
If point makes ineq. **FALSE**, *lightly* shade side **WITHOUT** that point

Finally,

- 4) Shade the overlap of all regions (if no overlap, NO solution)