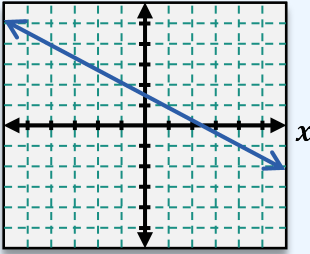
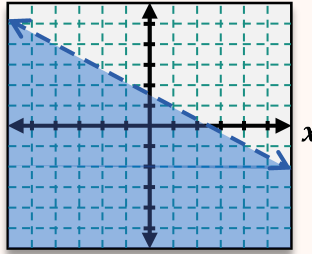


## TOPIC: LINEAR INEQUALITIES IN TWO VARIABLES

### Intro to Linear Inequalities in Two Variables

◆ Recall: An ordered pair  $(x, y)$  is a solution to a 2-variable *equation* if it makes the eqn true when plugged in.

► We can also plug  $(x, y)$  into a 2-var *inequality*. If the inequality holds true, the ordered pair \_\_\_\_ a solution.

| Recall | Solutions to 2-Var Equations                                                                                                                                                                                                                                                                                                                                                                                             | New | Solutions to 2-Var Inequalities                                                                                                                                                                                                                           |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        | <p>Solutions: Points on the LINE</p> <div><math>Ax + By = C</math><br/><math>2x + 3y = 5</math></div>  <p><math>(4, -1)</math>: <math>2(4) + 3(-1) = 5</math><br/><math>8 + (-3) = 5</math><br/><math>5 = 5</math> ✓</p> <p><math>(2, 4)</math>: <math>2(2) + 3(4) = 5</math><br/><math>4 + 12 = 5</math><br/><math>16 = 5</math> ✗</p> |     | <p>Solutions: Points in the _____</p> <div><math>Ax + By &lt; C</math><br/><math>2x + 3y &lt; 5</math></div>  <p><math>(-1, 0)</math>:</p> <p><math>(5, 3)</math>:</p> |

**TOPIC: LINEAR INEQUALITIES IN TWO VARIABLES**

**PRACTICE**

Graph the given linear inequality  $4x + \frac{2}{3}y \geq 6$ , determine if the following ordered pair is a solution to the inequality.

(*A*)  
(2, 3)

(*B*)  
(-2, 3)

(*C*)  
(0, 9)

**PRACTICE**

Graph the given linear inequality  $4y < 3x - 2$ , determine if the following ordered pair is a solution to the inequality.

(*A*)  
(0, -2)

(*B*)  
 $\left(3, \frac{3}{4}\right)$

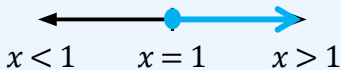
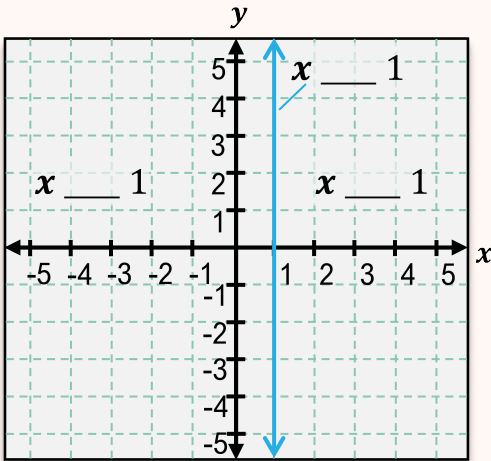
(*C*)  
 $\left(\frac{2}{3}, \frac{1}{8}\right)$

## TOPIC: LINEAR INEQUALITIES IN TWO VARIABLES

### Graphing Linear Inequalities in Two Variables

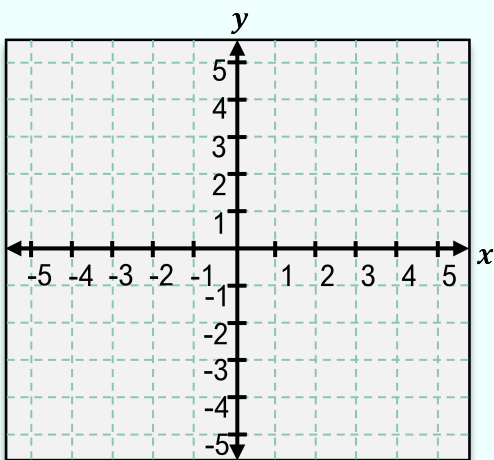
◆ You'll have to plot inequalities on a **2D graph** instead of a **1D number line**.

► To graph an inequality, graph the line and \_\_\_\_\_ side of graph with points that make inequality \_\_\_\_\_.

| Recall | 1D Inequality                                                                                       | New | 2D Linear Inequality                                                                                                                                                                                                                                                                                                   |
|--------|-----------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        | $x \geq 1$<br><br> |     | $y < x$ $x \geq 1$<br><br> <p>For equations with <math>\geq</math> &amp; <math>\leq</math>, draw a <b>SOLID</b> line ↗<br/>           For equations with <math>&gt;</math> &amp; <math>&lt;</math>, draw a <b>DASHED</b> line ↗</p> |

#### 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 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: LINEAR INEQUALITIES IN TWO VARIABLES

### EXAMPLE

Match inequality with its graph.

(A)

$$y > -3x + 4$$

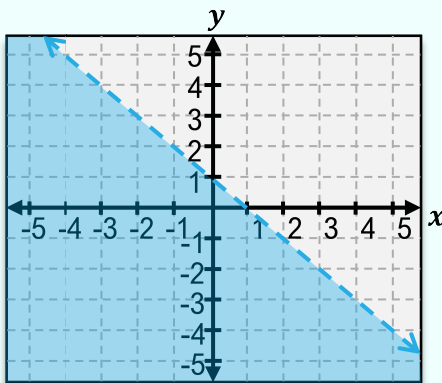
(B)

$$x + y < 1$$

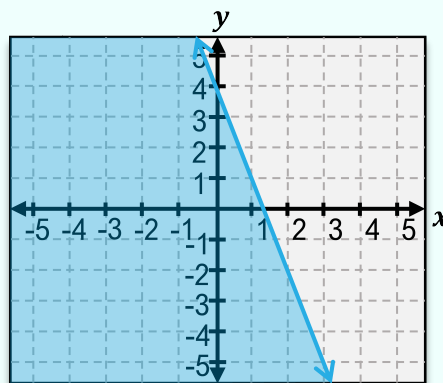
(C)

$$-3x - y \geq -4$$

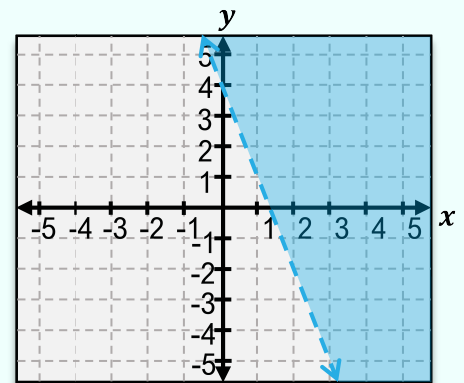
(1)



(2)

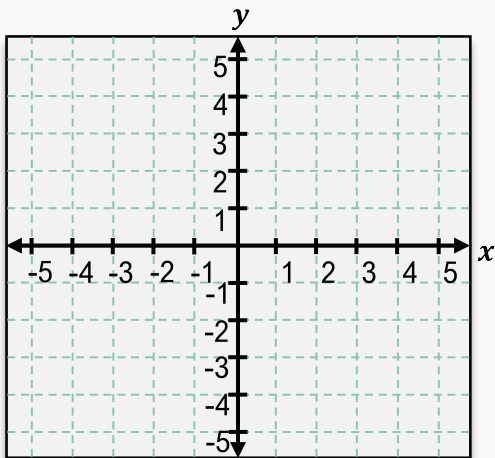


(3)



### 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 plugging  $(x, y)$  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