1. Is $(10,-5)$ a solution to $\mathbf{3 x + 4} \mathbf{4}<\mathbf{1 0}$ ? Justify your response.
$3(10)+4(-5)<10$
$30-20<10$
$10<10$
False Statement
This is not a solution to the inequality.
2. Is $(8,0)$ part of the solution set of the inequality shown here? Explain your reasoning.

A dashed boundary line indicates that none of the points on the line are solutions to the inequality. Therefore, $(8,0)$ is not part of the solution set.

3. Consider the graph pictured to the right.
a. State one point that is part of the solution set.
$(4,2)(0,0)(0,6)(-5,-3)$ Many answers possible Any point on the line or part of the shaded region.
b. State one point that is not part of the solution set. $(10,3)(6,8)(2,7)(-4,10)$ Many answers possible Any point in the non-shaded region.
c. Is the point $(4,3)$ part of the solution set? Explain. All the points on a solid boundary line are part of the
 solution set. The point $(4,3)$ is located on the solid line, therefore, it is part of the solution set.
4. Graph the inequality $2 x-4 y \geq 4$.

$$
\begin{aligned}
& \begin{array}{l}
2 x-4 y \geq 4 \\
-2 x
\end{array} \\
& \frac{-4 y}{-4} \geq \frac{-2 x+4}{-4} \\
& y \leq \frac{1}{2} x-1 \\
& m=\frac{1}{2} \quad b=-1
\end{aligned}
$$


5. Graph each system of inequalities.
a. $y-x>-3 \quad y \leq 3 x+1$
$y-x>-3 \quad y \leq 3 x+1$
$y>x-3 \quad m=\frac{3}{1}$
$m=\frac{1}{1} \quad b=1$
$b=-3$


Always indicate the solution set with the letter $\boldsymbol{S}$ unless otherwise directed. The $\boldsymbol{S}$ stands for solution.

$$
\text { b. } \begin{array}{ll}
3 y-x<12 & x \leq 4 \\
3 y-x<12 & \text { Vertical } \\
+x \quad+x & \text { line that } \\
\frac{3 y}{3}<\frac{1 x+12}{3} & \text { intercepts } \\
\text { the } x \text {-axis } \\
y<\frac{1}{3} x+4 & \text { at }(4,0) . \\
m=\frac{1}{3} & \\
b=4 &
\end{array}
$$


6. Write an inequality that represents the graph shown here.


```
\(1^{\text {st }}\) : Determine inequality symbol
-Dashed Line
-Shading is above the line Symbol: >
```

$2^{\text {nd }}:$ Determine the slope and $y$-intercept of the line
$m=-\frac{1}{2}$
$\mathbf{b}=-3 \quad(0,-3)$
$\frac{\Delta y}{\Delta x}=\frac{-3-(-5)}{0-4}=\frac{2}{-4}$
Check: Test a point from the shaded region with the equation you created.
TP: $(2,1)$
$y>-1 / 2 x-3$
$1>-1 / 2(2)-3$
$1>-1-3$
$1>-4$ True
$3^{\text {rd }}$ : Write the inequality in $\mathrm{y}>\mathrm{mx}+\mathrm{b}$ form
$y>-1 / 2 x-3$
7. Write a system of inequalities that represents the graph shown here.


Check the system by graphing both inequalities on your graphing calculator.
8. Given the system: $y \geq-3 x+1$
$y<x-2$
a. Use your graphing calculator, determine which quadrant(s) of the coordinate plane the solution is located. State the quadrant(s). Quadrants I and IV

Helpful Hint: The quadrants of a coordinate plane are pictured here.
Graphing Calculator Sketch

b. Is the point $(8,6)$ part of the solution to the system? Justify your response.

Substitute the point $(8,6)$ into both inequalities and see if it makes both statements true.

| $y \geq-3 x+1$ | $y<x-2$ | The point is not a solution to the system because it |
| :--- | :--- | :--- |
| $6 \geq-3(8)+1$ | $6<8-2$ | only makes one of the inequality statements true. |
| $6 \geq-24+1$ | $6<6$ | A solution to a system must make both statements |
| $6 \geq-23$ | False | true. |

9. Carly got a job at an ice cream shop for the summer. Her first task is to order boxes of small ice-cream cups and boxes of large ice-cream cups. Each box of small cups costs $\$ 100$ and each box of large cups costs $\$ 150$. A maximum of $\$ 1200$ has been budgeted for cups and the storage room can only hold up to 10 boxes.
a. Write a system of linear inequalities that can be used to represent the situation.

Use $\boldsymbol{x}$ to represent the number of boxes of small cups and $\boldsymbol{y}$ to represent the number of boxes of large cups.
$x$ : the number of boxes of small cups Carly orders
$y$ : the number of boxes of large cups Carly orders
$x+y \leq 10$
$100 x+150 y \leq 1200$
b. Graph the system. Remember to label all parts of your graph.
$x+y \leq 10$
$-x \quad-x$

$$
\begin{array}{ll}
100 x+150 y \leq 1200 \\
-100 x & -100 x
\end{array}
$$

$y \leq-x+10$
$\frac{150 y}{150} \leq \frac{-100 x+1200}{150}$

| $x$ | $y$ |
| :---: | :---: |
| 0 | 10 |
| 2 | 8 |
| 4 | 6 |
| 6 | 4 |
| 8 | 2 |
| 10 | 0 |

$$
y \leq-\frac{2}{3} x+8
$$

| $x$ | $y$ |
| :---: | :---: |
| 0 | 8 |
| 3 | 6 |
| 6 | 4 |
| 9 | 2 |
| 12 | 0 |

c. State one solution to the system. Explain its meaning in the context of the situation.

Answers will vary. Any point that appears in the shaded region where both graphs overlap is a solution to the system.

One solution to this system is the ordered pair $(4,3)$. In the context of the situation, Carly can order 4 boxes of small cups and 3 boxes of large cups without going over budget.

Check: 4 boxes + $\mathbf{3}$ boxes < 10 boxes
4 boxes of small cups costs $\$ 400$ and 3 boxes of large cups costs $\$ 450(\$ 850<\$ 1200)$

