## Essential Question: How do we graph systems of linear inequalities?

## Do Now:

Which inequality represents the graph shown here?
(1) $y<2 x-4$
(2) $y>2 x-4$
(3) $y \geq 2 x-4$
(4) $y \leq 2 x-4$


## Systems of Linear Inequalities

Suppose two or more inequalities were graphed on the same set of axes. Where would the points that satisfy all the inequalities be located? What is the possible number of solutions to a system of linear inequalities?
(0) Let's Investigate...

1) Solve the following system of inequalities graphically. Mark the solution area with a capital S.

$$
y \leq 2 x-3 \quad y<-3 x+1
$$



State one point that is part of the solution set. State one point that is not part of the solution set.
2) Solve the following system of inequalities graphically. State a point in the solution set.

$$
x>2 \quad y \leq 5
$$


3) Solve the following system graphically. Is $(1,4)$ a solution to the system?

$$
y>-2 x+6 \quad 3 x-3 y \geq-9
$$



Graphing Inequalities on the Graphing Calculator
Example: Graph $y \geq 2 x+1$

- Enter $2 x+1$ into $Y_{1}$
- Arrow to the far left side of $Y_{1}$
- Press ENTER until the "shade above" symbol is displayed.
- If necessary, press ZOOM \#6:ZStandard (for a $10 \times 10$ window)
- Graph

NOTE: You will have to determine whether to draw a solid line or a dotted line. The calculator will display a solid line at all times.

A solution to a system of linear inequalities is a that
makes both inequalities true. The solution set is the area where the linear inequalities $\qquad$ on the graph.

State whether the ordered pair is a solution to the system of inequalities.

1) $(0,1)$

2) $(0,-1)$

3) $(1,4)$


Solve the following systems of inequalities graphically. Mark the solution area with a capital $S$.
4)

$$
y<\frac{3}{4} x+2
$$

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


5) $-2 y \geq-3 x-6 \quad x<-3$


