

3-3: SYSTEMS OF INEQUALITIES



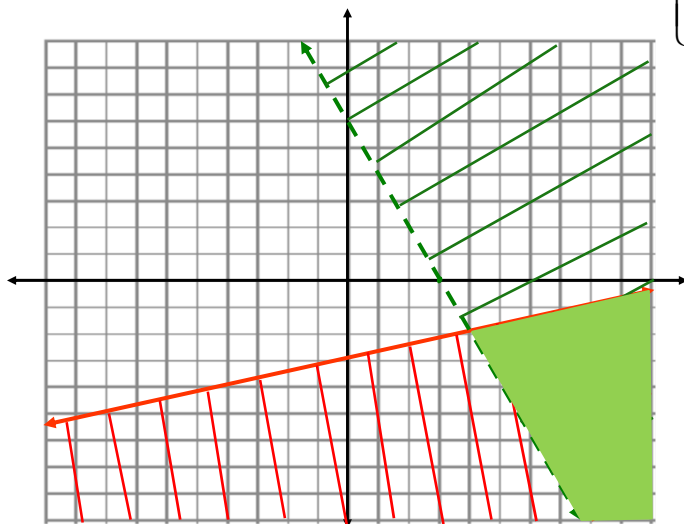
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Algebra 2

SOLVING AND GRAPHING A SYSTEM OF LINEAR INEQUALITIES

- The graph of the solution to a system of inequalities is the intersection of the half-planes.
- The set of solutions to a system of linear inequalities is often called the feasible set or feasible region for that system.
- The boundaries are always parts of lines.
- The intersections of the boundaries are called vertices of the feasible set.

What is the solution of the system of inequalities?

$$\begin{cases} y \leq \frac{1}{4}x - 3 \\ y > -2x + 6 \end{cases}$$



Test (0, 0)

$$y \leq \frac{1}{4}x - 3$$

$$0 \leq 0 - 3$$

$$0 \leq -3$$

Test (0, 0)

$$y > -2x + 6$$

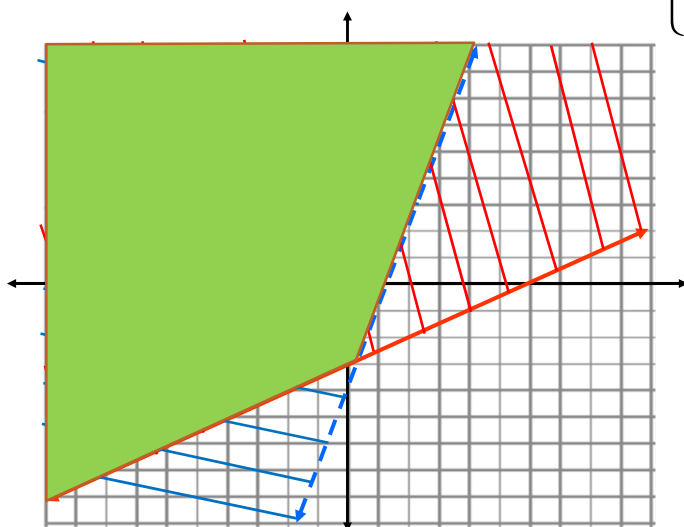
$$0 > 0 + 6$$

$$0 > 6$$



What is the solution of the system of inequalities?

$$\begin{cases} x - 2y \leq 6 \\ y > 3x - 4 \end{cases}$$



Test (0, 0)

$$x - 2y \leq 6$$

$$0 - 0 \leq 6$$

$$0 \leq 6$$

Test (0, 0)

$$y > 3x - 4$$

$$0 > 0 - 4$$

$$0 > -4$$



TICKETS TO A CONCERT COST \$70 OR \$20 WITH A STUDENT DISCOUNT. TICKET SALES MUST EXCEED \$500,000 FOR THE GROUP TO PERFORM. IF 20,000 SEATS ARE AVAILABLE, HOW MANY OF EACH TYPE MUST BE SOLD?

Relate \rightarrow

$$\begin{array}{rcl} \text{\$ from Tickets} & + & \text{\$ from Student Tickets} & \geq & 500,000 \\ \text{\# of Tickets} & + & \text{\# of Student Tickets} & \leq & 20,000 \end{array}$$

Define \rightarrow

$$T = \text{\# of Tickets} \qquad S = \text{\# of Student Tickets}$$

Write \rightarrow

$$\begin{array}{rcl} 70T & + & 20S & \geq & 500,000 \\ T & + & S & \leq & 20,000 \end{array}$$

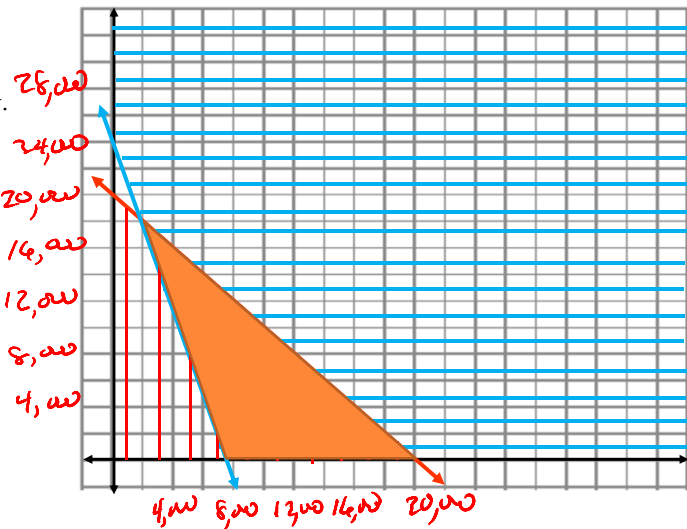


1. Treat the inequalities as equalities and graph the boundary lines.

$$\begin{array}{rcl} 70T & + & 20S & \geq & 500,000 \\ T & + & S & \leq & 20,000 \end{array}$$

2. Shade the solution for each inequality.

3. Shade the solution for the system of inequalities.



WHAT IS THE SOLUTION TO THIS SYSTEM OF INEQUALITIES?

$$\begin{cases} y < -3|x+3|+1 \\ y \geq -x-5 \end{cases}$$

x	y
-5	-5
-4	-2
-3	1
-2	-2
-1	-5



HOMEWORK: P. 153 # 11-29 ODD, 36-54 EVEN, 62-68
EVEN