

Sec. 3.3 Systems of Inequalities

Problem 1:

Assume that x and y are whole numbers. What is the solution of the system of inequalities?

$$\underline{x + y \geq 5}$$

$$2x + 3y \leq 15$$

- ① Start with \leq inequality
- ② Make a table of values that satisfy the \leq inequality

$$\begin{array}{r} 0 + 3y \leq 15 \\ 3y \leq 15 \\ \frac{3y}{3} \leq \frac{15}{3} \\ y \leq 5 \end{array}$$

$$\begin{array}{r} 2 + 3y \leq 15 \\ -2 \quad -2 \\ \hline 3y \leq 13 = 4\frac{1}{3} \\ \frac{3y}{3} \leq \frac{13}{3} \\ y \leq 4\frac{1}{3} \end{array}$$

x	y
0	0,1,2,3,4,5 (0,5)
1	0,1,2,3,4 (1,4)
2	0,1,2,3 (2,3)
3	0,1,2,3 (3,2) (3,3)
4	0,1,2 (4,1) (4,2)
5	0,1 (5,0) (5,1)
6	0,1 (6,0) (6,1)
7	0 (7,0)

$$\begin{array}{r} 4 + 3y \leq 15 \\ -4 \quad -4 \\ \hline 3y \leq 11 \\ \frac{3y}{3} \leq \frac{11}{3} \\ y \leq \frac{11}{3} = 3\frac{2}{3} \end{array}$$

$$\begin{array}{r} 6 + 3y \leq 15 \\ -6 \quad -6 \\ \hline 3y \leq 9 \\ \frac{3y}{3} \leq \frac{9}{3} \\ y \leq 3 \end{array}$$

$$\begin{array}{r} 8 + 3y \leq 15 \\ -8 \quad -8 \\ \hline 3y \leq 7 \\ \frac{3y}{3} \leq \frac{7}{3} \\ y \leq 2\frac{1}{3} \end{array}$$

$$\begin{array}{r} 10 + 3y \leq 15 \\ -10 \quad -10 \\ \hline 3y \leq 5 \\ \frac{3y}{3} \leq \frac{5}{3} \\ y \leq \frac{5}{3} = 1\frac{2}{3} \end{array}$$

$$\begin{array}{r} 12 + 3y \leq 15 \\ -12 \quad -12 \\ \hline 3y \leq 3 \\ \frac{3y}{3} \leq \frac{3}{3} \\ y \leq 1 \end{array}$$

$$\begin{array}{r} 14 + 3y \leq 15 \\ -14 \quad -14 \\ \hline 3y \leq 1 \\ \frac{3y}{3} \leq \frac{1}{3} \end{array}$$

$$\begin{array}{r} 16 + 3y \leq 15 \\ -16 \quad -16 \\ \hline \times \quad 3y \leq -1 \\ \frac{3y}{3} \leq \frac{-1}{3} \\ y \leq -\frac{1}{3} \end{array}$$

Problem 2:

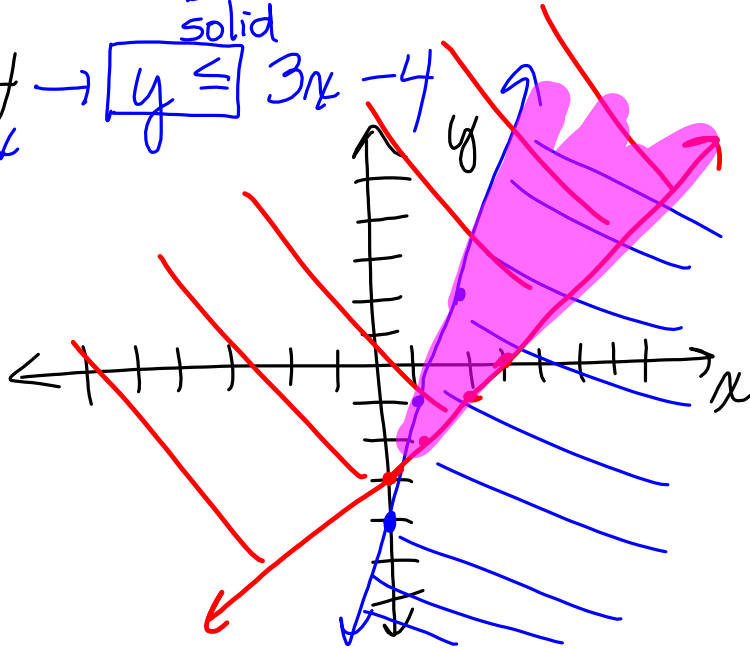
What is the solution of the system of inequalities?

$$y - 3x \leq -4 \rightarrow \boxed{y \leq 3x - 4}$$

below solid

$$\boxed{y \geq x - 3}$$

solid above



Problem 3: Solve $(-3, 1)$, $m_R = -3$

$$y < -3|x + 3| + 1$$

DB

$$y \geq -x - 5$$

SA

