Solution Book of Mathematic

Ssnior 2 Part I

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Contents

Solution of the System of Linear Inequalities

The system of iniqualities formed by more than one linear inequality is called a system of linear inequalities. The solution of a system of linear inequalities is the set of all points that satisfy all the inequalities in the system, and can be represented by a numberline.

14.0.1 Practice 4

Solve the following system of linear inequalities.

1.

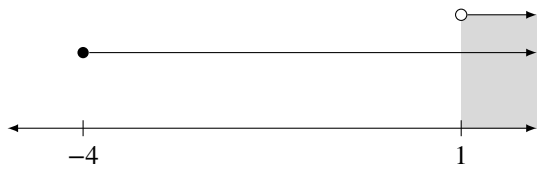
$$\begin{cases} 3x+2 \geq 2x-2 & (1) \\ 4x-3 > 3x-2 & (2) \end{cases}$$

Sol.

$(1): x \geq 4$

$(2): x > 1$

$\therefore x > 1$



2.

$$\begin{cases} 5x-4 \leq 2x+5 & (3) \\ 7-x < 3+x & (4) \end{cases}$$

Sol.

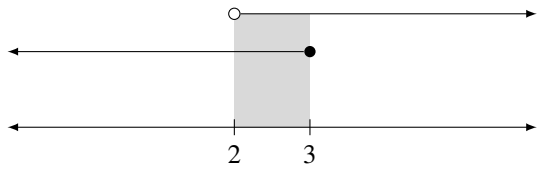
$(1): 3x \leq 9$

$x \leq 3$

$(2): -2x < -4$

$x > 2$

$\therefore 2 < x \leq 3$



3.

$$\begin{cases} 2-x < 4+x & (5) \\ 1-2x \geq 3x+11 & (6) \end{cases}$$

Sol.

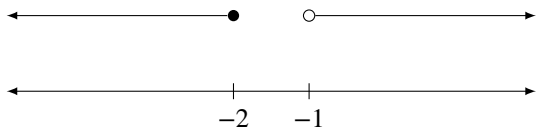
$(1): -2x < 2$

$x > -1$

$(2): -5x \geq 10$

$x \leq -2$

$\therefore$ No solution



4. $2-x < 2x-7 \leq x-9$

Sol.

$$\begin{cases} 2-x < 2x-7 & (7) \\ 2x-7 \leq x-9 & (8) \end{cases}$$

$(1): -3x < -9$

$x \geq 3$

$(2): x \leq -2$

$\therefore$ No solution

14.0.2 Exercise 15.2b

Solve the following system of linear inequalities.

1.

$$\begin{cases} 5-x < 6 & (9) \\ 7-3x \geq 4 & (10) \end{cases}$$

Sol.

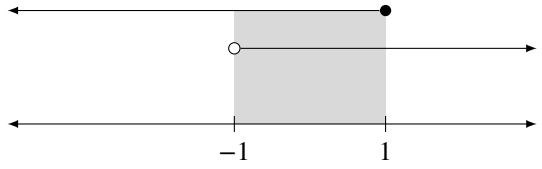
$(1): -x < 1$

$x > -1$

$(2): -3x \geq -3$

$x \leq 1$

$\therefore -1 < x \leq 1$



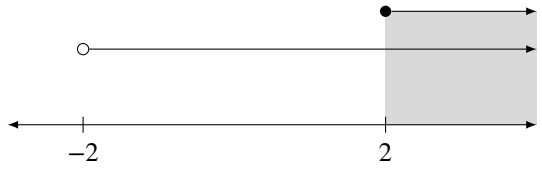
2.

$$\begin{cases} x+2>0 & (11) \\ 2x+1 \le 4x-3 & (12) \end{cases}$$

Sol.

$$\begin{aligned} (1):\ & x > -2 \\ (2):\ & -2x \le -4 \\ & x \ge 2 \end{aligned}$$

$$\therefore x \ge 2$$



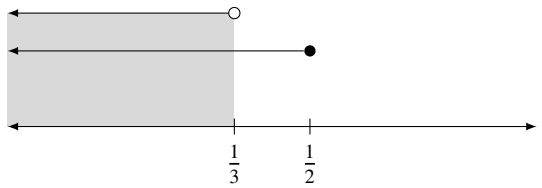
3.

$$\begin{cases} 3x-1<0 & (13) \\ 1-2x \ge 0 & (14) \end{cases}$$

Sol.

$$\begin{aligned} (1):\ & 3x < 1 \\ & x < \frac{1}{3} \\ (2):\ & -2x \ge -1 \\ & x \le \frac{1}{2} \end{aligned}$$

$$\therefore x < \frac{1}{3}$$



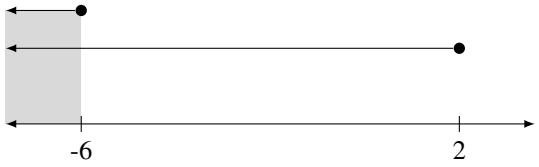
4.

$$\begin{cases} 4x-6 \ge 5x & (15) \\ 3x+5 \le x+9 & (16) \end{cases}$$

Sol.

$$\begin{aligned} (1):\ & -x \ge 6 \\ & x \le -6 \\ (2):\ & 2x \le 4 \\ & x \ge 2 \end{aligned}$$

$$\therefore x \le -6$$



5.

$$\begin{cases} 2(x+2)>3x & (17) \\ 6x-8>4(x+1) & (18) \end{cases}$$

Sol.

$$\begin{aligned} (1):\ & 2x+4 > 3x \\ & -x > -4 \\ & x < 4 \\ (2):\ & 6x-8 > 4x+4 \\ & 2x > 12 \\ & x > 6 \end{aligned}$$

$$\therefore \text{No solution}$$