

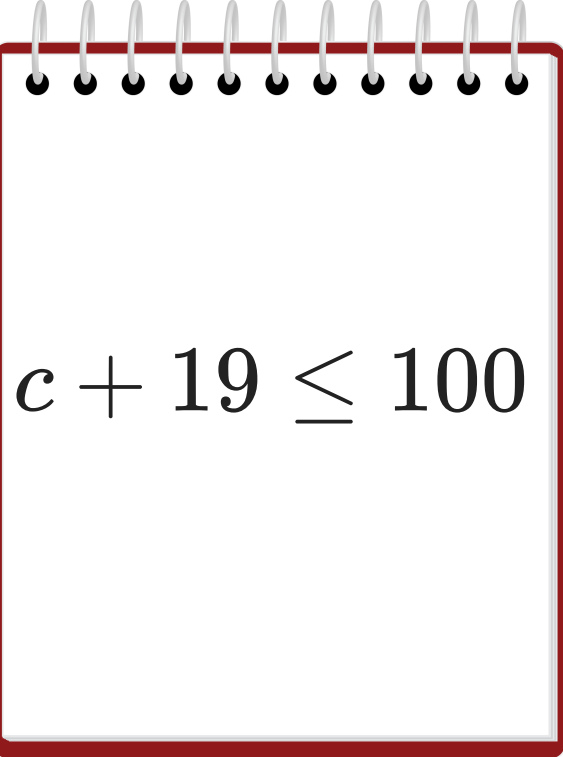
LEARNING GOAL

1. I can solve inequalities by solving a related equation and then checking which values are solutions to the original inequality.

KEY VOCABULARY

1. solution set
2. ray
3. end point

Learning goal: I can describe the set of numbers that make an inequality true.


$$c + 19 \leq 100$$

A **solution** is a number that makes an inequality true.

**NOT A
SOLUTION**

$$c = 89$$



SOLUTION

$$c = ?$$

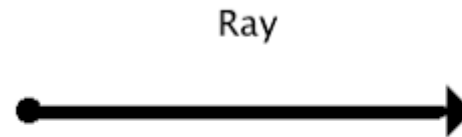
Learning goal: I can graph the solution to an inequality in one variable.

$$c + 19 \leq 100$$

c = cost of Thomas' cleats



In mathematics, a **ray** is a connected part of a line that has only one end point.



SOLUTIONS TO THOMAS' INEQUALITY

$$c + 19 \leq 100$$

c = cost of Thomas' cleats

Directions: Fill in the table to find which values are solutions to Thomas' inequality. Then graph the inequality on the number line, and write a simpler inequality describing the solutions.

c	40	60	71	76	86	90
$c + 19$	59	79	90	95	105	109
Solution or not a solution?	S	S	S	S	NS	NS

Answer blocks:

Solution

Not a solution

Find the endpoint: For which value of c is $c + 19 = 100$?:

$$\begin{array}{r} c + 19 = 100 \\ -19 \quad -19 \\ \hline c = 81 \end{array}$$

Graph of the solution set:

Simple inequality describing the solution set:

$$c \leq 81$$



SOLUTIONS TO JOE'S INEQUALITY

$$21 + 3g \leq 30$$

g = how many GB of data Joe uses

Directions: Fill in the table to find which values are solutions to Joe's inequality. Then graph the inequality on the number line, and write a simpler inequality describing the solutions.

g	-1	0	1	2	3	4	10
$21 + 3g$	18	21	24	27	30	33	51
Solution or not a solution?	S	S	S	S	S	NS	NS

Answer blocks:

Solution

Not a solution

Find the endpoint: For which value of g is $21 + 3g = 30$?:

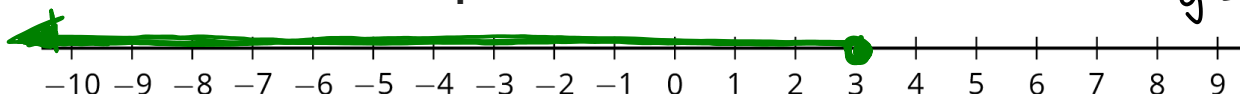
$$-21$$

$$-21$$

$$3g = 9$$

$$g = 3$$

Graph of the solution set:



Simple inequality describing the solution set:

$$g \leq 3$$

EXERCISE 1

$$x + 5 > 10$$

Directions: Fill in the table to find which values are solutions to the inequality. Then graph the inequality on the number line, and write a simpler inequality describing the solutions.

x	2	3	4	5	6	7	8
$x + 5$	7	8	9	10	11	12	13
Solution or not a solution?	NS	NS	NS	NS	S	S	S

Answer blocks:

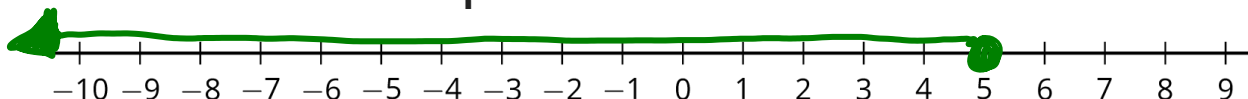
Solution

Not a solution

Find the endpoint: For which value of x is $x + 5 = 10$ true?:

$$\begin{array}{r} -5 \quad -5 \\ x + 5 = 10 \\ x = 5 \end{array}$$

Graph of the solution set:



Simple inequality describing the solution set:

$$x \geq 5$$

EXERCISE 2

$$3 - x \geq 5$$

Directions: Fill in the table to find which values are solutions to the inequality. Then graph the inequality on the number line, and write a simpler inequality describing the solutions.

x	-4	-3	-2	-1	0	1	2
$3 - x$	7	6	5	4	3	2	1
Solution or not a solution?	S	S	S	NS	NS	NS	NS

Answer blocks:

Solution

Not a solution

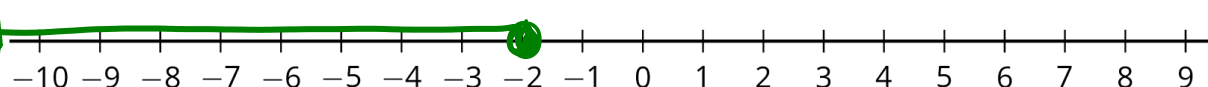
Find the endpoint: For which value of x is $-x + 3 = 5$ true?: $x = -2$

$$\begin{array}{r} -3 \quad -3 \\ -x + 3 = 5 \\ -x = 2 \end{array}$$

Graph of the solution set:

Simple inequality describing the solution set:

$$x \leq -2$$



EXERCISE 3

$$50 - 2x < 10$$

Directions: Fill in the table to find which values are solutions to the inequality. Then graph the inequality on the number line, and write a simpler inequality describing the solutions.

x	-30	-20	-10	0	10	20	30
$50 - 2x$	110	90	70	50	30	10	-10
Solution or not a solution?	NS	NS	NS	NS	NS	NS	S

Answer blocks:

<u>Solution</u>
<u>Not a solution</u>

Find the endpoint: For which value of x is $50 - 2x = 10$ true?:

$$-50$$

$$-50$$

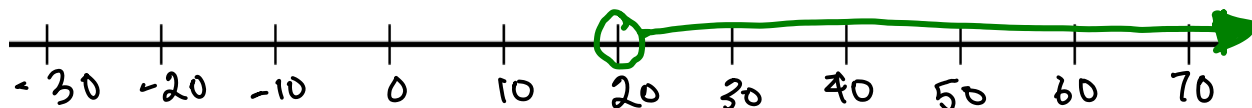
$$x = 20$$

$$\frac{-2x}{-2} = \frac{-40}{-2}$$

Graph of the solution set:

Simple inequality describing the solution set:

$$x > 20$$



EXERCISE 4

$$2x + 4 < 8$$

Directions: Fill in the table to find which values are solutions to the inequality. Then graph the inequality on the number line, and write a simpler inequality describing the solutions.

x	-2	-1	0	1	2	3	4
$2x + 4$	0	2	4	6	8	10	12
Solution or not a solution?	S	S	S	S	N-S	N-S	N-S

Answer blocks:

Solution

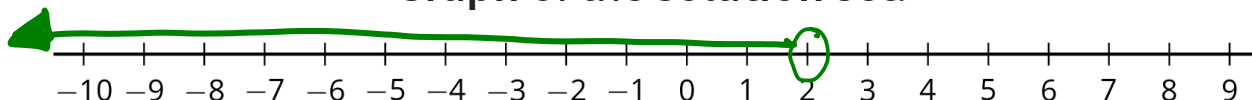
Not a solution

Find the endpoint: For which value of x is $2x + 4 = 8$ true?:

$$x = 2$$

$$\begin{aligned} & -4 \quad -4 \\ & 2x = 4 \end{aligned}$$

Graph of the solution set:



Simple inequality describing the solution set:

$$x < 2$$

EXERCISE 5

$$5 - 2x \leq 1$$

Directions: Fill in the table to find which values are solutions to the inequality. Then graph the inequality on the number line, and write a simpler inequality describing the solutions.

x	-2	-1	0	1	2	3	4
$5 - 2x$	9	7	5	3	1	-1	-3
Solution or not a solution?	N.S.	N.S.	N.S.	N.S.	S	S	S

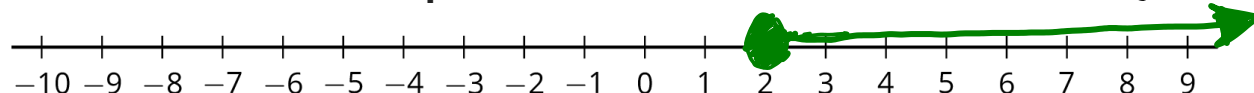
Answer blocks:

Solution

Not a solution

Find the endpoint: For which value of x is $5 - 2x = 1$ true?: $x = 2$

Graph of the solution set:



$$\begin{aligned} -5 & \\ -5 & \\ \frac{-2x}{-2} &= \frac{-4}{-2} \\ &= 2 \end{aligned}$$

Simple inequality describing the solution set:

$$x \geq 2$$

EXERCISE 6

$$4 - 2x < 0$$

Directions: Fill in the table to find which values are solutions to the inequality. Then graph the inequality on the number line, and write a simpler inequality describing the solutions.

x	-2	-1	0	1	2	3	4
$4 - 2x$	8	6	4	2	0	-2	-4
Solution or not a solution?	N.S.	N.S.	N.S.	N.S.	N.S.	S	S

Answer blocks:

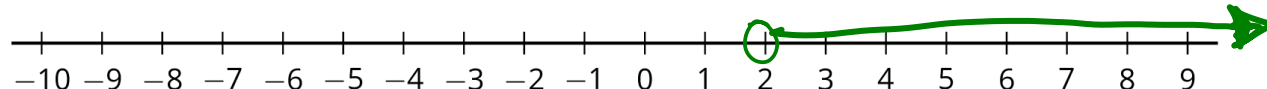
Solution

Not a solution

Find the endpoint: For which value of x is $4 - 2x = 0$ true?:

$$x = 2$$

Graph of the solution set:



$$\begin{aligned} -4 & \\ -4 & \\ -2x &= -4 \\ \frac{-2x}{-2} &= \frac{-4}{-2} \end{aligned}$$

Simple inequality describing the solution set:

$$x > 2$$

EXERCISE 7

$$2x - 8 > 4$$

Directions: Fill in the table to find which values are solutions to the inequality. Then graph the inequality on the number line, and write a simpler inequality describing the solutions.

x	-2	-1	0	1	2	3	4
$2x - 8$	-12	-10	-8	-6	-4	-2	0
Solution or not a solution?	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.

Answer blocks:

Solution

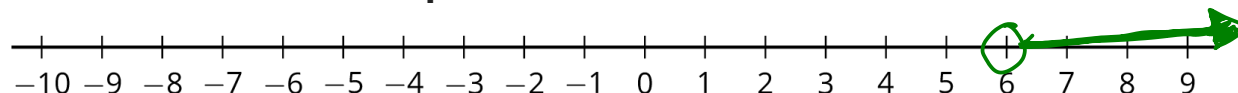
Not a solution

Find the endpoint: For which value of x is $2x - 8 = 4$ true?:

$$\begin{array}{r} +8 \\ +8 \end{array}$$

$$\begin{array}{l} 2x = 12 \\ x = 6 \end{array}$$

Graph of the solution set:



Simple inequality describing the solution set:

$$x > 6$$

EXERCISE 8

$$2x - 8 > 25$$

Directions: Fill in the table to find which values are solutions to the inequality. Then graph the inequality on the number line, and write a simpler inequality describing the solutions.

x	-30	-20	-10	0	10	20	30
$2x - 8$	-68	-48	-28	-8	12	32	52
Solution or not a solution?	N.S.	N.S.	N.S.	N.S.	N.S.	S	S

Answer blocks:

<u>Solution</u>
<u>Not a solution</u>

Find the endpoint: For which value of x is $2x - 8 = 25$ true?:

$$x = \frac{33}{2} = 16.5$$

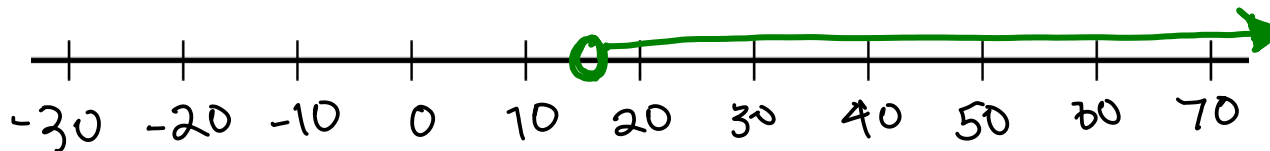
$$+8 \quad +8$$

$$\frac{2x}{2} = \frac{33}{2}$$

Graph of the solution set:

Simple inequality describing the solution set:

$$x > 16.5$$



EXERCISE 9

$$-3x - 10 > -40$$

Directions: Fill in the table to find which values are solutions to the inequality. Then graph the inequality on the number line, and write a simpler inequality describing the solutions.

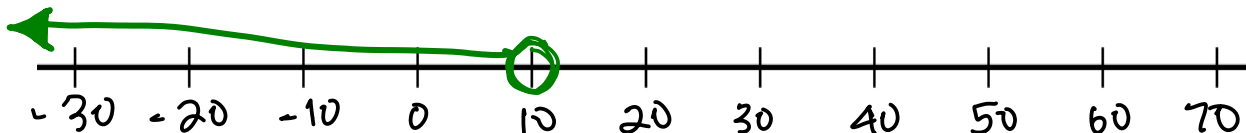
x	-30	-20	-10	0	10	20	30	Answer blocks:
$-3x - 10$	80	50	20	-10	-40	-70	-100	
Solution or not a solution?	S	S	S	S	N.S.	N.S.	N.S.	
								<u>Solution</u>
								<u>Not a solution</u>

Find the endpoint: For which value of x is $-3x - 10 = -40$ true?:

$$\begin{aligned} +10 & \quad +10 \\ -3x &= -30 \\ \underline{-3} & \quad \underline{-3} \end{aligned}$$

$$x = 10$$

Graph of the solution set:



Simple inequality describing the solution set:

$$x < 10$$