

Solving and Graphing Compound Inequalities

1 Solve the inequality.

$$-1 < \frac{2 - 2x}{2} < 2$$
$$\underline{\hspace{1cm}} < x < \underline{\hspace{1cm}}$$

2 Solve the inequality.

$$-2 < \frac{3 - 2x}{3} < 2$$
$$\underline{\hspace{1cm}} < x < \underline{\hspace{1cm}}$$

3 Solve the compound inequality $-8 < \frac{3x-1}{5} \leq 4$.

A. $-11 < x \leq 4$

B. $-8 < x \leq 9$

C. $-13 < x \leq 7$

D. $-20 < x \leq 13$

4 The solution of the system of linear inequalities $\begin{cases} 3x+1 \geq 7 \\ 4x-3 < 9 \end{cases}$ is _____.

A. $x \geq 2$

B. $x < 3$

C. $x < \frac{3}{2}$

D. $2 \leq x < 3$

5 How many integral solution(s) is/ are there for x if $-24 \leq 7x + 4 \leq 18$?

A. 4

B. 6

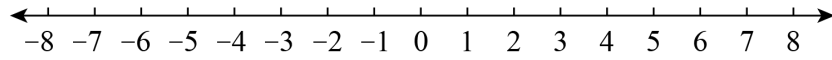
C. 7

D. 8

6 Solve the compound inequality $-1 < \frac{1 - 2x}{4} \leq 2$.

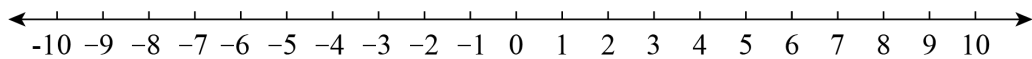
- 7 Solve the inequalities and graph the solution.

$$7x < -42 \text{ or } x + 5 \geq 3$$



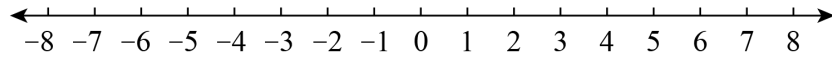
- 8 Solve the inequalities and graph the solution.

$$2x + 7 < -11 \text{ or } -3x - 2 < 13$$



- 9 Solve the inequality and graph the solution.

$$x + 3 < 2 \text{ or } -\frac{x}{4} \leq -1$$



- 10 Which integer n satisfies $\frac{3}{10} < \frac{n}{20} < \frac{2}{5}$?

A. 3 B. 4 C. 5 D. 6 E. 7

Solving and Graphing Compound Inequalities

1 Solve the inequality.

$$-1 < \frac{2-2x}{2} < 2$$

$$\underline{\hspace{1cm}} < x < \underline{\hspace{1cm}}$$

Answer 1: -1

2: 2

Solution $-2 < 2 - 2x < 4$

$$-4 < -2x < 2$$

$$-1 < x < 2$$

2 Solve the inequality.

$$-2 < \frac{3-2x}{3} < 2$$

$$\underline{\hspace{1cm}} < x < \underline{\hspace{1cm}}$$

Answer 1: $-\frac{3}{2}$

2: $\frac{9}{2}$

Solution $-6 < 3 - 2x < 6$

$$-9 < -2x < 3$$

$$-\frac{3}{2} < x < \frac{9}{2}$$

3 Solve the compound inequality $-8 < \frac{3x-1}{5} \leq 4$.

A. $-11 < x \leq 4$

B. $-8 < x \leq 9$

C. $-13 < x \leq 7$

D. $-20 < x \leq 13$

Answer C

Solution $-40 < 3x - 1 \leq 20$, $-39 < 3x \leq 21$, $-13 < x \leq 7$.

4 The solution of the system of linear inequalities $\begin{cases} 3x + 1 \geq 7 \\ 4x - 3 < 9 \end{cases}$ is _____.

- A. $x \geq 2$ B. $x < 3$ C. $x < \frac{3}{2}$ D. $2 \leq x < 3$

Answer D

Solution Solve $\begin{cases} 3x + 1 \geq 7 \text{ ①} \\ 4x - 3 < 9 \text{ ②} \end{cases}$,

①: $x \geq 2$,

②: $x < 3$.

The solution is $2 \leq x < 3$.

5 How many integral solution(s) is/ are there for x if $-24 \leq 7x + 4 \leq 18$?

- A. 4 B. 6 C. 7 D. 8

Answer C

Solution $-24 \leq 7x + 4 \leq 18$

$$-28 \leq 7x \leq 14$$

$$-4 \leq x \leq 2$$

$$x = -4, -3, -2, -1, 0, 1, 2.$$

There are seven.

The answer is C.

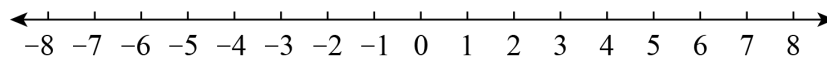
6 Solve the compound inequality $-1 < \frac{1 - 2x}{4} \leq 2$.

Answer $-\frac{7}{2} \leq x < \frac{5}{2}$

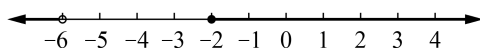
Solution $-4 < 1 - 2x \leq 8$, $-5 < -2x \leq 7$, $-\frac{7}{2} \leq x < \frac{5}{2}$.

7 Solve the inequalities and graph the solution.

$$7x < -42 \text{ or } x + 5 \geq 3$$



Answer $x < -6 \text{ or } x \geq -2$



Solution $7x < -42$

$$x < -6$$

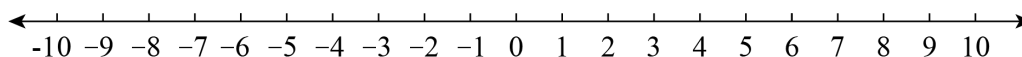
$$x + 5 \geq 3$$

$$x \geq -2$$

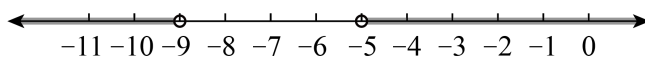
$$\therefore x < -6 \text{ or } x \geq -2$$

8 Solve the inequalities and graph the solution.

$$2x + 7 < -11 \text{ or } -3x - 2 < 13$$



Answer $x < -9 \text{ or } x > -5$

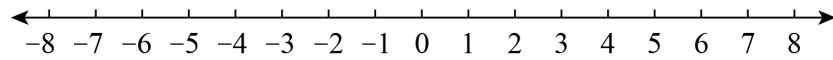


Solution

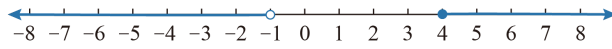
$2x + 7 < -11$	or	$-3x - 2 < 13$
$2x < -18$		$-3x < 15$
$x < -9.$		$x > -5.$

9 Solve the inequality and graph the solution.

$$x + 3 < 2 \text{ or } -\frac{x}{4} \leq -1$$



Answer $x < -1$ or $x \geq 4$



Solution $x + 3 < 2$

$$x < -1$$

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

$$\left(-\frac{x}{4}\right) \div \left(-\frac{1}{4}\right) \geq (-1) \div \left(-\frac{1}{4}\right)$$

$$x \geq 4$$

$$\therefore x < -1 \text{ or } x \geq 4$$

10 Which integer n satisfies $\frac{3}{10} < \frac{n}{20} < \frac{2}{5}$?

A. 3

B. 4

C. 5

D. 6

E. 7

Answer E

Solution (2018 Intermediate Mathematical Challenge Question #9)

If we multiply both sides of an inequality by a positive number, we obtain an equivalent inequality.

Therefore, by multiplying by the positive number **20**, we see that the given inequalities are equivalent to

$$6 < n < 8.$$

The only integer that satisfies these inequalities is **7**.