

Important Terminology

Inequality	Properties of Inequality	Solution Set	Interval Notation
Compound Inequality	AND OR		

What should I be able to do?

1. Solve simple inequalities and represent their solution sets graphically and using interval notation
2. Solve compound inequalities and represent their solution sets graphically and using interval notation
3. Write inequality statements to represent situations
4. Solve problems by writing, solving and interpreting solution sets of inequalities
5. Identify the properties of inequalities used when solving an inequality

Practice Problem Set

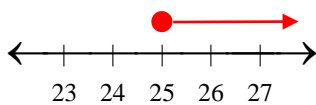
For each inequality below and represent the solution set **graphically** and using **interval notation**.

1. $10 - a \leq -15$

$$-a \leq -25$$

$$a \geq 25$$

$$[25, \infty)$$



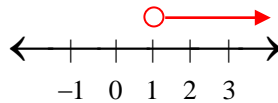
2. $2x + 5 > 11 - 4x$

$$6x + 5 > 11$$

$$6x > 6$$

$$x > 1$$

$$(1, \infty)$$



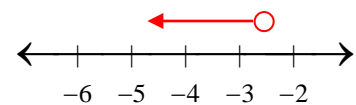
3. $1 > 2y + 6$

$$-5 > 2y$$

$$-2.5 > y$$

$$y < -2.5$$

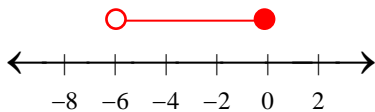
$$(-\infty, -2.5)$$



For each compound inequality below, represent the solution set **graphically** and using **interval notation**.

4. $x > -6$ and $x \leq 0$

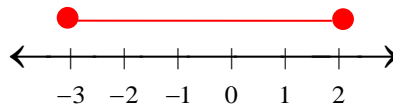
$$(-6, 0]$$



5. $-3 \leq x \leq 2$

$$x \geq -3$$
 and $x \leq 2$

$$[-3, 2]$$



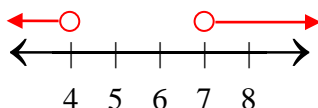
6. $x > 5$ and $x \leq -1$

No solution

$$\emptyset$$

7. $x < 4$ or $x > 7$

$$(-\infty, 4) \cup (7, \infty)$$



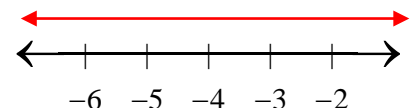
8. $x \leq -2$ or $x \geq 9$

$$(-\infty, -2] \cup [9, \infty)$$



9. $x > -6$ or $x \leq -3$

$$(-\infty, \infty)$$



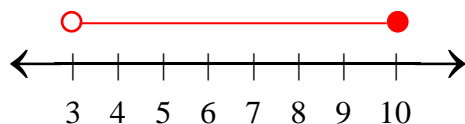
For each compound inequality below, **solve** the inequality and represent the solution set **graphically** and using **interval notation**.

10. $2x + 5 > 11$ and $-3x + 3 \geq -27$

$$\begin{array}{l} 2x > 6 \\ x > 3 \end{array} \quad \begin{array}{l} -3x \geq -30 \\ x \leq 10 \end{array}$$

$$x > 3 \text{ and } x \leq 10$$

$$(3, 10]$$

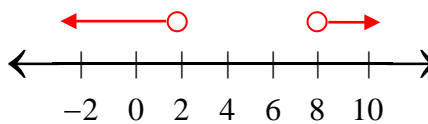


11. $4x - 1 < 7$ or $2x > 16$

$$\begin{array}{l} 4x < 8 \\ x < 2 \end{array} \quad \begin{array}{l} x > 8 \end{array}$$

$$x < 2 \text{ or } x > 8$$

$$(-\infty, 2) \cup (8, \infty)$$



12. Consider the compound inequality statements below.

a) $x > 2$ and $x \leq 5$

b) $x < 2$ or $x \geq 5$

Are the following values of x part of the solution set? Explain.

Compound Statement	Graphic Representation of Solution Set	$x = 4$	$x = 6$
a) $x > 2$ and $x \leq 5$		<p>Yes, 4 is part of the graph.</p> <p>$4 > 2$ True</p> <p>$4 \leq 5$ True</p> <p>The number 4 is a solution to the compound inequality because it makes both inequalities true.</p>	<p>No, 6 is not part of the graph.</p> <p>$6 > 2$ True</p> <p>$6 \leq 5$ False</p> <p>The number is 6 <u>not</u> a solution to the compound inequality because it only makes one of the inequalities true.</p>
b) $x < 2$ or $x \geq 5$		<p>No, 4 is not part of the graph.</p> <p>$4 < 2$ False</p> <p>$4 \geq 5$ False</p> <p>The number 4 is <u>not</u> part of the solution set because it doesn't make either inequality true.</p>	<p>Yes, 6 is part of the graph.</p> <p>$6 < 2$ False</p> <p>$6 \geq 5$ True</p> <p>The number 6 is a solution to the compound inequality because it makes at least one of the inequalities true.</p>

For each problem below, write an inequality statement to represent the situation. Solve the inequality and answer the question. Remember to define unknown(s) algebraically.

13. Jessica's family is on vacation at the Outer Banks. She is going to buy dinner at a local seafood distributor. She can buy shrimp at \$8.50 per pound and crab cakes for \$3 each. She has \$45 to spend and must buy 3 pounds of shrimp. What is the largest quantity of crab cakes that she can buy?

c = number of crab cakes

$$\begin{aligned}8.50(3) + 3c &\leq 45 \\25.50 + 3c &\leq 45 \\3c &\leq 19.50 \\c &\leq 6.5\end{aligned}$$

The largest number of crab cakes that Jessica can buy is 6.

Check #1

\$8.50(3 lbs) = \$25.50 for Shrimp
\$3(6 crab cakes) = \$18 for crab cakes

\$25.50 + \$18 = \$43.50 ← within budget

Check #2

\$8.50(3 lbs) = \$25.50 for Shrimp
\$3(7 crab cakes) = \$21 for crab cakes

\$25.50 + \$21 = \$46.50 ← too much money

14. Greg's summer savings account currently has a balance of \$675. Once a week during his summer vacation, he plans to withdraw \$50 for fun activities with friends. If no other transactions are performed on the account, how many weeks can he withdraw money if by the end of the summer he wants to have at least \$200 remaining in the account?

w = number of weeks

$$\begin{aligned}675 - 50w &\geq 200 \\- 50w &\geq -475 \\w &\leq 9.50\end{aligned}$$

Greg can withdraw money for at most 9 weeks.

Check #1

\$50(9 weeks) = \$450
\$675 - \$450 = \$225

\$225 ← reaches goal (account balance is > \$200)

Check #2

\$50(10 weeks) = \$500
\$675 - \$500 = \$175

\$175 ← doesn't reach goal (account balance is < \$200)