

3.1 Solving Two-Step Equations

Objective: Solve two-step equations.

Example 1: Using Subtraction and Division to Solve

Solve the equations. Check your solution.

1. $4x + 9 = -7$

2. $3x + 8 = 26$

3. $-21 = 4x + 7$

4. $5 + 2x = 25$

Example 2: Using Addition and Multiplication to Solve

Solve the equations. Check your solution.

1. $\frac{x}{3} - 4 = -1$

2. $\frac{x}{4} - 7 = 2$

3. $8 = \frac{x}{3} - 3$

4. $\frac{x}{2} - 1 = -5$

Example 3: Solving an Equation with Negative Coefficients

Solve the equations. Check your solution.

1. $2 - 3x = 17$

2. $3 - 2y = 19$

3. $-5 = 4 - m$

4. $7 = -3a - 2$

Check It Out!

Solve the equations. Check your solution.

1. $9b + 8 = 80$

2. $\frac{z}{7} - 5 = -3$

3. $-10 = 20 - 6c$

4. $11 - \frac{b}{6} = 23$

3.2 Solving Equations Having Like Terms & Parentheses

Objective: Solve equations using the distributive property.

Example 1: Solving Equations Using the Distributive Property

Solve the equations. Check your solution.

1. $-24 = 6(2 - x)$

2. $-2(7 - 4x) = 10$

3. $-20 = 5(3 - x)$

4. $-3(6 - 2x) = 12$

Example 2: Combining Like Terms After Distributing

Solve the equations. Check your solution.

1. $6x - 4(x - 1) = 14$

2. $4y - 14 + 3y = 28$

3. $5x - 2(x - 3) = 30$

4. $3 + 4(x + 1) = 35$

Check It Out!

Solve the equations. Check your solution.

1. $-8(5 - 7c) = 184$

2. $-2(7 - 11v) = 96$

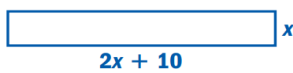
3. $10a + 5(2a + 1) = 65$

4. $11z - 3(z - 9) = 123$

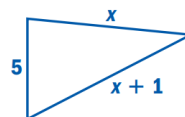
Example 3: Solving Equations with Geometry

Find the value of x for the given geometric shape.

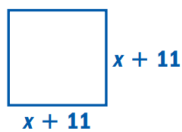
1. Perimeter = 32 units



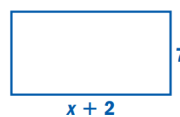
2. Perimeter = 22 units



3. Perimeter = 104 units



4. Perimeter = 40 units



3.3 Solving Equations with Variables on Both Sides

Objective: Solve equations with variables on both sides.

Example 1: Solving an Equation with the Variable on Both Sides

Solve the equations. Check your solution.

1. $5n - 7 = 9n + 21$

2. $3n - 6 = 5n + 20$

3. $24z - 35 = 55 - 21z$

4. $5x - 19 = 20 - 8x$

Example 2: An Equation with No Solution

Solve the equations. Check your solution.

1. $3(2x + 1) = 6x$

2. $12x = 4(3x - 1)$

3. $3(2 - x) = 5 - 3x$

4. $3(14x + 3) = 6(7x + 1)$

Example 3: Solving an Equation with All Numbers as Solutions

Solve the equations. Check your solution.

1. $4(x + 2) = 4x + 8$

2. $3(2n + 4) = 2(3n + 6)$

3. $4 - 3(2t + 12) = -2 - 2(15 + 3t)$

4. $3(14x + 3) = 6(7x + 1) + 3$

Check It Out!

Solve the equations. Check your solution.

1. $13x + 9 = 11x + 13$

2. $-3k - 25 = 5k - 1$

Example 4: Writing a Verbal Sentence as an Equation

Write the verbal sentence as an equation. Then solve the equation.

1. Nine plus 2 times a number is equal to 2 less than 3 times the number.

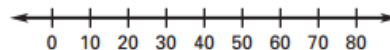
2. Twelve less than -9 times a number is equal to 8 minus 4 times the number.

3.4 Solving Inequalities Using Addition or Subtraction

Objective: Solve inequalities using addition or subtraction.

Example 1: Writing and Graphing Inequalities

1. An airline allows passengers to carry on-board one piece of luggage. Luggage that exceeds 40 pounds cannot be carried on-board. Write and graph an inequality that gives the weight of the luggage that cannot be carried on-board.



2. You need at least 85 points on the final exam to get an A in your math class.



Addition and Subtraction Properties of Inequality

Words Adding or subtracting the same number on each side of an inequality produces an equivalent inequality.

Algebra If $a < b$, then $a + c < b + c$ and $a - c < b - c$.

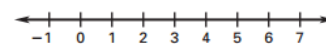
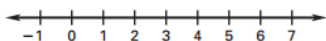
If $a > b$, then $a + c > b + c$ and $a - c > b - c$.

Example 2: Solving Inequalities using Subtraction

Solve the inequalities. Graph and check your solution.

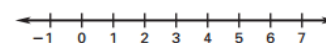
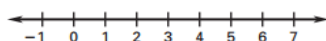
1. $m + 9 \leq 12$

2. $x - 11 > -7$



3. $m + 7 < 13$

4. $a + 4 \geq 5$

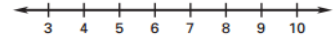
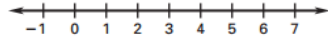


Example 3: Solving Inequalities using Addition

Solve the inequalities. Graph and check your solution.

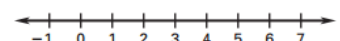
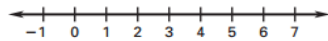
1. $3 \geq x - 2$

2. $4 \leq a - 5$



3. $-6 < z - 7$

4. $-7 > c - 9$



Check It Out!

Solve the inequalities. Graph and check your solution.

1. $y + 11 > 7$

2. $u - 31 < -22$



3. $-9 \geq m + 7$

4. $-3 \leq x - 6$



3.5 Solving Inequalities Using Multiplication or Division

Objective: Solve inequalities using multiplication or division.

Multiplication Property of Inequality

Words Multiplying each side of an inequality by a *positive* number produces an equivalent inequality.

Multiplying each side of an inequality by a *negative* number and *reversing the direction of the inequality symbol* produces an equivalent inequality.

Algebra If $a < b$ and $c > 0$, then ac bc .

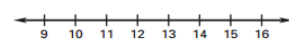
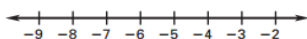
If $a < b$ and $c < 0$, then ac bc .

Example 1: Solving an Inequality Using Multiplication

Solve the inequities. Graph and check your solution.

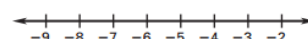
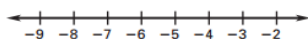
1. $\frac{m}{-4} > 2$

2. $\frac{t}{5} < 3$



3. $\frac{b}{-8} \leq 1$

4. $\frac{x}{3} \geq -2$



Division Property of Inequality

Words Dividing each side of an inequality by a *positive* number produces an equivalent inequality.

Dividing each side of an inequality by a *negative* number and *reversing the direction of the inequality symbol* produces an equivalent inequality.

Algebra If $a < b$ and $c > 0$, then $\frac{a}{c}$ $\frac{b}{c}$.

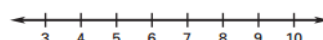
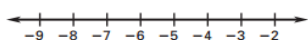
If $a < b$ and $c < 0$, then $\frac{a}{c}$ $\frac{b}{c}$.

Example 2: Solving an Inequality Using Division

Solve the inequities. Graph and check your solution.

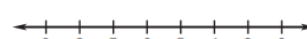
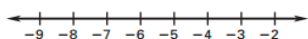
1. $-11t \geq 33$

2. $4y \leq 36$



3. $-3x > 12$

4. $12a > -48$



Check It Out!

Solve the inequities. Graph and check your solution.

1. $-8x < -104$

2. $\frac{y}{17} \leq -2$



3. $5u > -35$

4. $\frac{h}{6} < -4$



5. $-7y \geq -63$

6. $18 \geq \frac{x}{-3}$



7. $-30 > -6x$

8. $\frac{n}{2} < -4$



3.6 Solving Multi-Step Inequalities

Objective: Solve multi-step inequalities.

Example 1: Writing and Solving a Multi-Step Inequality

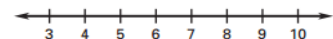
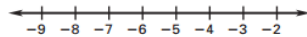
1. You are participating in a charity walk. You want to raise at least \$500 for the charity. you already have \$175 by asking people to pledge \$25 each. How many more \$25 pledges do you need?

Example 2: Solving a Multi-Step Inequality

Solve the inequalities. Graph and check your solution.

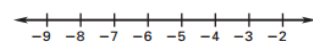
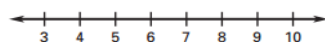
1. $\frac{x}{-3} - 9 < -7$

2. $2x + 9 < 25$



3. $-3 \geq \frac{x}{-4} - 2$

4. $2 > -4 - x$

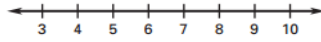


Check It Out!

Solve the inequities. Graph and check your solution.

1. $\frac{x}{2} + 4 \leq 9$

2. $2 + 3k > 35$



3. $12 \leq 9 - \frac{m}{3}$

4. $2 > 5 - 3x$

