

WORKSHEET 3.2: SOLVING EQUATIONS BY ADDING OR SUBTRACTING

Follow the steps below to solve an equation by adding or subtracting:

1. Isolate the variable on one side of the equation by adding the same number to both sides or subtracting the same number from both sides.
2. Find the value of the variable.

EXAMPLES

Solve each equation.

$$\begin{array}{r} x - 9 = -15 \quad \text{To isolate } x, \text{ add } 9 \text{ to each side.} \\ +9 \quad +9 \\ \hline x = -6 \end{array}$$

$$\begin{array}{r} x - (-3) = 14 \quad \text{To isolate } x, \text{ rewrite the problem as } x + 3 = 14, \text{ then subtract } 3 \text{ from} \\ x + 3 = 14 \quad \text{each side.} \\ -3 \quad -3 \\ \hline x = 11 \end{array}$$

DIRECTIONS: Write the number you would add to or subtract from both sides of the equation. Then solve the equation.

1. $x - (-6) = 15$

2. $x + (-7) = 20$

3. $4 - (-y) = 13$

4. $-4 = z + (-32)$

5. $-3 + x = -8$

6. $n - 6 = -9$

7. $-4 = s + (-4)$

8. $\frac{2}{5} = n - \frac{3}{5}$



CHALLENGE: Sal solved the equation $x - 3 + 2 = -10$ by adding 3 to both sides, then subtracting 2 from both sides. He got the correct answer, $x = -9$. Mike solved the same equation by adding 1 to both sides. He got the same answer as Sal. What did he do? And was his method correct?

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Follow the steps below to solve an equation by adding or subtracting:

1. Isolate the variable on one side of the equation by adding the same number to both sides or subtracting the same number from both sides.
2. Find the value of the variable.

EXAMPLES

Solve each equation.

$x - 9 = -15$ To isolate x , add 9 to each side.

$$\begin{array}{r} x - 9 = -15 \\ +9 \quad +9 \\ \hline x = -6 \end{array}$$

$x - (-3) = 14$ To isolate x , rewrite the problem as $x + 3 = 14$, then subtract 3 from each side.

$$\begin{array}{r} x + 3 = 14 \\ -3 \quad -3 \\ \hline x = 11 \end{array}$$

DIRECTIONS: Write the number you would add to or subtract from both sides of the equation. Then solve the equation.

1. $x - (-6) = 15$
 $x + 6 = 15$; subtract 6
 $x = 9$

2. $x + (-7) = 20$
 $x - 7 = 20$; add 7
 $x = 27$

3. $4 - (-y) = 13$
 $4 + y = 13$; subtract 4
 $y = 9$

4. $-4 = z + (-32)$
 $-4 = z - 32$; add 32
 $z = 28$

5. $-3 + x = -8$
 add 3
 $x = -5$

6. $n - 6 = -9$
 add 6
 $x = -3$

7. $-4 = s + (-4)$
 $-4 = s - 4$; add 4
 $s = 0$

8. $\frac{2}{5} = n - \frac{3}{5}$
 add $\frac{3}{5}$
 $n = 1$



CHALLENGE: Sal solved the equation $x - 3 + 2 = -10$ by adding 3 to both sides, then subtracting 2 from both sides. He got the correct answer, $x = -9$. Mike solved the same equation by adding 1 to both sides. He got the same answer as Sal. What did he do? And was his method correct?

Mike combined like terms first $(-3+2)$;
 $x - 1 = -10$ then add 1 to both sides