Name _____ Date _____

WORKSHEET 3.4: SOLVING TWO-STEP EQUATIONS WITH THE VARIABLE ON ONE SIDE

To solve a two-step equation, you must first add the same number to or subtract the same number from both sides of an equation, then multiply or divide both sides by the same nonzero number. Follow the steps below:

1. Decide what number you can add to or subtract from both sides of the equation so that the variable and its coefficient are isolated on one side of the equation.
2. Divide both sides of the equation by the coefficient or multiply both sides by the reciprocal of the coefficient.
3. Check the work by substituting the value of the variable into the original equation.

EXAMPLE

Solve for x : $-\frac{3}{4}x - 1 = 14$

Step 1: Add 1 to each side.

$$-\frac{3}{4}x - 1 = 14$$
$$+1 \quad +1$$
$$-\frac{3}{4}x = 15$$

Step 2: Multiply both sides by $-\frac{4}{3}$.

$$-\frac{4}{3}\left(-\frac{3}{4}x\right) = -\frac{4}{3}\left(\frac{15}{1}\right)$$
$$x = -20$$

DIRECTIONS: Solve for the variable.

1. $4x - 8 = 24$
2. $-8y + 12 = 28$
3. $2y + 12 = -10$
4. $-7 + 4x = 5$
5. $24 + 12x = -12$
6. $-7y - 5 = 30$
7. $\frac{y}{3} - 5 = 1$
8. $20 = 16 - \frac{y}{5}$

CHALLENGE: Explain why $1x - 13 = 15$ is a one-step equation. Then solve for x.

Name Answer Key Date

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EXAMPLE

Solve for x: $-\frac{3}{4}x - 1 = 14$

Step 1: Add 1 to each side.

$$-\frac{3}{4}x - 1 = 14$$
$$+1 \quad +1$$
$$-\frac{3}{4}x = 15$$

Step 2: Multiply both sides by $-\frac{4}{3}$.

$$-\frac{4}{3}\left(-\frac{3}{4}x\right) = -\frac{4}{3}\left(\frac{15}{1}\right)$$
$$x = -20$$

DIRECTIONS: Solve for the variable.

1. $4x - 8 = 24$
   $x = 8$
2. $-8y + 12 = 28$
   $y = -2$
3. $2y + 12 = -10$
   $y = -11$
4. $-7 + 4x = 5$
   $x = 3$
5. $24 + 12x = -12$
   $x = -3$
6. $-7y - 5 = 30$
   $y = -5$
7. $\frac{y}{3} - 5 = 1$
   $y = 18$
8. $20 = 16 - \frac{y}{5}$
   $y = -20$

CHALLENGE: Explain why $1x - 13 = 15$ is a one-step equation. Then solve for x.

Add 13 to both sides to get $1x = 28$. This is the same as $x = 28$.