

ANSWER KEY

Solving Linear Equations: Variables on Both Sides

Solve each equation.

1.
$$\frac{6r + 7}{-7r} = \frac{13 + 7r}{-7r}$$

check:

$$\begin{aligned} 6(-6) + 7 &= 13 + 7(-6) \\ -36 + 7 &= 13 + -42 \\ -29 &= -29 \end{aligned}$$

$$\begin{array}{r|l} -1r + 7 & = 13 \\ \hline -7 & -7 \\ \hline 1r & = 6 \\ \hline 1 & -1 \\ \hline r & = -6 \end{array}$$

2.
$$\frac{13 - 4x}{+x} = \frac{1 - x}{+x}$$

check:

$$\begin{aligned} 13 - 4(4) &= 1 - 4 \\ 13 - 16 &= -3 \\ -3 &= -3 \end{aligned}$$

$$\begin{array}{r|l} 13 - 3x & = 1 \\ \hline -13 & -13 \\ \hline -3x & = -12 \\ \hline -3 & -3 \\ \hline x & = 4 \end{array}$$

3.
$$\frac{-7x - 3x + 2}{+8x} = \frac{-8x - 8}{+8x}$$

check:

$$\begin{aligned} -7(5) - 3(5) + 2 &= -8(5) - 8 \\ -35 - 15 + 2 &= -40 - 8 \\ -50 + 2 &= -48 \\ -48 &= -48 \end{aligned}$$

$$\begin{array}{r|l} -10x + 2 & = -8x - 8 \\ \hline +8x & +8x \\ \hline -2x + 2 & = -8 \\ \hline -2 & -2 \\ \hline -2x & = -10 \\ \hline -2 & -2 \\ \hline x & = 5 \end{array}$$

4.
$$\frac{-8 - x}{+x} = \frac{x - 4x}{+x}$$

check:

$$\begin{aligned} -8 - 4 &= 4 - 4(4) \\ -12 &= 4 - 16 \\ -12 &= -12 \end{aligned}$$

$$\begin{array}{r|l} -8 - x & = -3x \\ \hline +x & +x \\ \hline -8 & = -2x \\ \hline -2 & -2 \\ \hline 4 & = x \end{array}$$

5.
$$\frac{n + 2}{+n} = \frac{-14 - n}{+n}$$

check:

$$\begin{aligned} -8 + 2 &= -14 - (-8) \\ -6 &= -14 + 8 \\ -6 &= -6 \end{aligned}$$

$$\begin{array}{r|l} 2n + 2 & = -14 \\ \hline -2 & -2 \\ \hline 2n & = -16 \\ \hline 2 & 2 \\ \hline n & = -8 \end{array}$$

6.
$$4(1 + 5n) = 2n - 14$$

check:

$$\begin{aligned} 4(1 + 5(-1)) &= 2(-1) - 14 \\ 4(1 - 5) &= -2 - 14 \\ 4(-4) &= -16 \\ -16 &= -16 \end{aligned}$$

$$\begin{array}{r|l} 4 + 20n & = 2n - 14 \\ \hline -2n & -2n \\ \hline 4 + 18n & = -14 \\ \hline -4 & -4 \\ \hline 18n & = -18 \\ \hline 18 & 18 \\ \hline n & = -1 \end{array}$$