Transform the equation if necessary, and then solve to find the value of x that makes the equation true.

1. $5x-(x+3)=\frac{1}{3}(9x+18)-5$

$$5x-(x+3)=\frac{1}{3}(9x+18)-5$$
$$5x-x-3=3x+6-5$$
$$4x-3=3x+1$$
$$4x-3x-3=3x-3x+1$$
$$x-3=1$$
$$x-3+3=1+3$$
$$x=4$$

2. $5(3x+9)-2x=15x-2(x-5)$

$$5(3x+9)-2x=15x-2(x-5)$$
$$15x+45-2x=15x-2x+10$$
$$13x+45=13x+10$$
$$45\neq 10$$

Since $45 \neq 10$, the equation has no solution.

Students practice using the distributive property to transform equations and solve.

Transform the equation if necessary, and then solve it to find the value of x that makes the equation true.

1. $x-(9x-10)+11=12x+3\left(-2x+\frac{1}{3}\right)$

$$x-(9x-10)+11=12x+3\left(-2x+\frac{1}{3}\right)$$
$$x-9x+10+11=12x-6x+1$$
$$-8x+21=6x+1$$
$$-8x+8x+21=6x+8x+1$$
$$21=14x+1$$
$$21-1=14x+1-1$$
$$20=14x$$
$$\frac{20}{14}=\frac{14}{14}x$$
$$\frac{10}{7}=x$$

Transform the equation if necessary, and then solve it to find the value of x that makes the equation true.

1. $x-(9x-10)+11=12x+3\left(-2x+\frac{1}{3}\right)$

2. $7x+8\left(x+\frac{1}{4}\right)=3(6x-9)-8$

3. $-4x-2(8x+1)=-(-2x-10)$

4. $11(x+10)=132$

5. $37x+\frac{1}{2}-\left(x+\frac{1}{4}\right)=9(4x-7)+5$

6. $3(2x-14)+x=15-(-9x-5)$

7. $8(2x+9)=56$

2. $7x + 8\left(x + \frac{1}{4}\right) = 3(6x - 9) - 8$

$$\begin{aligned}
7x + 8\left(x + \frac{1}{4}\right) &= 3(6x - 9) - 8 \\
7x + 8x + 2 &= 18x - 27 - 8 \\
15x + 2 &= 18x - 35 \\
15x - 15x + 2 &= 18x - 15x - 35 \\
2 &= 3x - 35 \\
2 + 35 &= 3x - 35 + 35 \\
37 &= 3x \\
\frac{37}{3} &= \frac{3}{3}x \\
\frac{37}{3} &= x
\end{aligned}$$

3. $-4x - 2(8x + 1) = -(-2x - 10)$

$$\begin{aligned}
-4x - 2(8x + 1) &= -(-2x - 10) \\
-4x - 16x - 2 &= 2x + 10 \\
-20x - 2 &= 2x + 10 \\
-20x + 20x - 2 &= 2x + 20x + 10 \\
-2 &= 22x + 10 \\
-2 - 10 &= 22x + 10 - 10 \\
-12 &= 22x \\
-\frac{12}{22} &= \frac{22}{22}x \\
-\frac{6}{11} &= x
\end{aligned}$$

4. $11(x + 10) = 132$

$$\begin{aligned}
11(x + 10) &= 132 \\
\left(\frac{1}{11}\right)11(x + 10) &= \left(\frac{1}{11}\right)132 \\
x + 10 &= 12 \\
x + 10 - 10 &= 12 - 10 \\
x &= 2
\end{aligned}$$

5. $37x + \frac{1}{2} - \left(x + \frac{1}{4}\right) = 9(4x - 7) + 5$

$$\begin{aligned}
37x + \frac{1}{2} - \left(x + \frac{1}{4}\right) &= 9(4x - 7) + 5 \\
37x + \frac{1}{2} - x - \frac{1}{4} &= 36x - 63 + 5 \\
36x + \frac{1}{4} &= 36x - 58 \\
36x - 36x + \frac{1}{4} &= 36x - 36x - 58 \\
\frac{1}{4} &\neq -58
\end{aligned}$$

This equation has no solution.

6. $3(2x-14)+x=15-(-9x-5)$

$$
\begin{aligned}
3(2x-14)+x &= 15-(-9x-5)\\
6x-42+x &= 15+9x+5\\
7x-42 &= 20+9x\\
7x-7x-42 &= 20+9x-7x\\
-42 &= 20+2x\\
-42-20 &= 20-20+2x\\
-62 &= 2x\\
-31 &= x
\end{aligned}
$$

7. $8(2x+9)=56$

$$
\begin{aligned}
8(2x+9) &= 56\\
\left(\frac{1}{8}\right)8(2x+9) &= \left(\frac{1}{8}\right)56\\
2x+9 &= 7\\
2x+9-9 &= 7-9\\
2x &= -2\\
\left(\frac{1}{2}\right)2x &= \left(\frac{1}{2}\right)-2\\
x &= -1
\end{aligned}
$$