8.7 Solve Two-Step Equations with Fraction Coefficients

Common Core Standards
8. EE.7. Solve linear equations in one variable.
   a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where $a$ and $b$ are different numbers).
   b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
WARM-UP

Solve the two-step equations.

1) \[ 3x + 7 = 25 \]
2) \[ 1 = \frac{x}{6} - 10 \]

Find the reciprocal.

3) \[ \frac{5}{3} \]
4) \[ \frac{1}{6} \]
Solve Two-Step Equations with Fraction Coefficients

Can we use the Inverse Property of Multiplication to help us solve equations?

\[ \frac{1}{7} \times \frac{7}{1} = 1 \]
Notes

To remove a fraction coefficient multiply both sides by the reciprocal during step 2. Step 1 remains the same.

Examples

Solve the equations.

\[
\frac{1}{2}x + 6 = 16 \\
\frac{1}{5}x - 3 = 4
\]
Solve the equations.

| \( \frac{2}{5}x - 8 = 2 \) | \( \frac{9}{2}x + 12 = 21 \) |
The formula to convert Fahrenheit temperatures into Celsius is...

$$\frac{9}{5}C + 32 = F$$

Example

The temperature is $50^\circ$ Fahrenheit. What is the temperature in Celsius?
EXAMPLES

Use the formula to convert $68^\circ$ Fahrenheit into Celsius.

$$\frac{9}{5}C + 32 = F$$
NOTES

It doesn’t matter where the negative sign is in the fraction.

Examples
Solve the equations.

\[-\frac{1}{4}x + 5 = 7\]

\[2 = \frac{-2}{7}x - 6\]
PRACTICE

Solve the equations.

\[
\begin{align*}
\frac{1}{3}x - 6 &= 5 \\
3 &= \frac{1}{2}x - 7 \\
\frac{2}{5}x + 2 &= 8 \\
17 &= 5 + \frac{2}{3}x
\end{align*}
\]
PRACTICE

Solve the equation.

\(- \frac{1}{4} x + 7 = 2\)

\(24 = 4 - \frac{1}{2} x\)
Use the formula to convert $104^\circ$ Fahrenheit into Celsius.

\[
\frac{9}{5}C + 32 = F
\]