

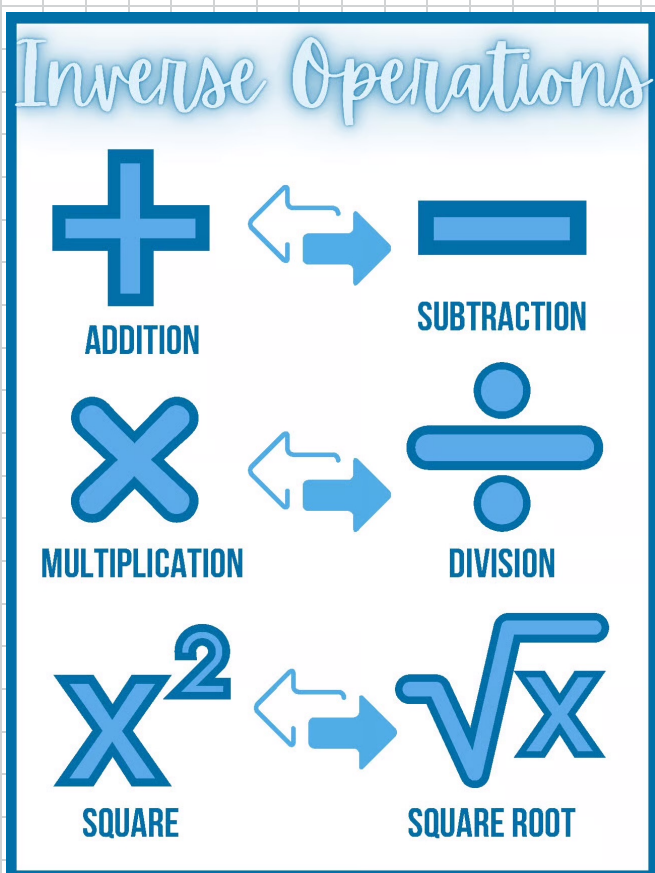
Solving Linear Equations

Objective:

- Students will be able to:

- Explain each step in solving a linear equation.
- Create and solve linear equations with one variable using the properties of equality.

New Vocabulary	Definition	Example
1. Equivalent equations	Use internet to get def &	to get examples!
2. Inverse operations		
3. Isolate		
4. Property of Equality - Addition, Subtraction, Multiplication, Division		



Properties of equality

Adding, subtracting, multiplying or dividing **the same number** to **each side** of an equation produces an EQUIVALENT EQUATION.

- For any real numbers a , b , and c

Addition	If $a = b$, then $a + c = b + c$
Subtraction	If $a = b$, then $a - c = b - c$
Multiplication	If $a = b$, then $a \cdot c = b \cdot c$
Division	If $a = b$, then $\frac{a}{c} = \frac{b}{c}$

Use inverse operations to solve equations.
Solve for x.

Ex. 1 Addition

$$\begin{array}{r} x + 15 = 20 \\ -15 \quad -15 \\ \hline \end{array}$$
$$\boxed{x = 5}$$

$$\begin{array}{r} 30 = 15 + x \\ -15 \quad -15 \\ \hline \end{array}$$
$$\boxed{15 = x}$$

$$\begin{array}{r} 12 + x = 28 \\ -12 \quad -12 \\ \hline \end{array}$$
$$\boxed{x = 16}$$

always solve for a positive x

$$\begin{array}{r} 5 = x + 10 \\ -10 \quad -10 \\ \hline \end{array}$$
$$\boxed{-5 = x}$$

Ex. 2 Subtraction

$$\begin{array}{r} x - 8 = 10 \\ +8 \quad +8 \\ \hline \end{array}$$
$$\boxed{x = 18}$$

$$\begin{array}{r} 14 = x - 10 \\ +10 \quad +10 \\ \hline \end{array}$$
$$\boxed{24 = x}$$

$$\begin{array}{r} 12 - x = 20 \\ -12 \quad -12 \\ \hline \end{array}$$
$$(-1) - x = 8(-1)$$
$$x = -8$$

Multiply both sides by -1 to change $-x \rightarrow +x$

$$\begin{array}{r} 18 = 11 - x \\ -11 \quad -11 \\ \hline \end{array}$$
$$0$$
$$(-1) 7 = -x(-1)$$
$$\boxed{-7 = x}$$

Ex. 3 Multiplication

$$\begin{array}{r} 8x = 16 \\ \div 8 \quad \div 8 \\ \hline \end{array}$$
$$\boxed{x = 2}$$

$$\begin{array}{r} -3x = -12 \\ \div -3 \quad \div -3 \\ \hline \end{array}$$
$$\boxed{x = 4}$$

$$\begin{array}{r} -4b = 24 \\ \div -4 \quad \div -4 \\ \hline \end{array}$$
$$\boxed{b = -6}$$

$$\begin{array}{r} 5a = -25 \\ \div 5 \quad \div 5 \\ \hline \end{array}$$
$$\boxed{a = -5}$$

Ex. 4 Division

Inverse operation: multiplication.

$$1. \left(\frac{7}{1}\right) \frac{a}{7} = 10(7)$$

$$\frac{7a}{7} = 70$$

$$\boxed{a = 70}$$

$$3. \left(\frac{4}{1}\right) \frac{m}{4} = 7(4)$$

$$1 \frac{4m}{4} = 28$$

$$\boxed{m = 28}$$

$$2. \left(\frac{x}{1}\right) \frac{21}{x} = 3(x)$$

$$\frac{21}{3} = \frac{3x}{3}$$

$$\boxed{7 = x}$$

$$4. \left(\frac{1}{n}\right) \frac{63}{n} = 9(n)$$

$$\frac{63}{9} = \frac{9n}{9}$$

$$\boxed{7 = n}$$