

Solving Simple Equations

(One and Two step problems)

Learning Goal:

By the end of today, I will be able to solve simple (one step and two step) equations using the opposite operations of adding/subtracting/multiplying and dividing.

$$10 = 10$$

Is this a TRUE statement?

We can imagine an equal sign as acting like a scale balance or teeter totter. When each side has the same value, regardless of appearance, it is considered EQUAL or balanced. *

$$\begin{array}{c} 10 = 10 \\ \hline \triangle \end{array}$$

Are the following True or False?

(a) $20 = 18 + 2$

(b) $4 - 19 = -15$

(c) $45 \div 15 = 12 - 9$

(d) $(9)(8) = 36 \times 2$

Therefore, it is possible for left and right side to be equal in magnitude, but appear differently.

This is a very important concept to understand before solving equations.

What is the missing value to make the following statements true?

(a) $24 = 12 \times \underline{\hspace{1cm}}$

(b) $34 - \underline{\hspace{1cm}} = 11$

(c) $\underline{\hspace{1cm}} \div 12 = 5$

(d) $(\underline{\hspace{1cm}})(-6) = 42$

What is the missing value to make the following statements true?

(a) $2(\underline{\quad}) + 9 = 31$

(b) $5(\underline{\quad}) + 6 = -14$

Instead of blank spaces we can use "variables" or "unknowns" that are represented with letters. Those variables act like containers for numbers that we don't yet know.

ie.

$$\underline{\quad} + 12 = 22 \qquad a + 12 = 22$$



If I perform the SAME mathematical operation to BOTH sides of the equal sign, does the statement remain true?

$$10 = 10$$

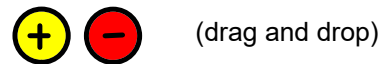
Solving an Equation

To determine the value of the variable, we can use our four main mathematics operations, adding, subtracting, multiplying, and division.

The goal is to **isolate the variable** by itself. The coefficient (the number in front of the variable) should be "1".



Solve for the unknown quantity, by moving the counters around or by using the Zero Principle to cancel out counters.

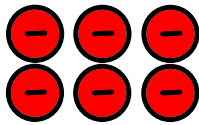
$$n + 3 = 7$$



Solve for the unknown quantity, by moving the counters around or by using the Zero Principle to cancel out counters.

$$n - 6 = 3$$



  (drag and drop)

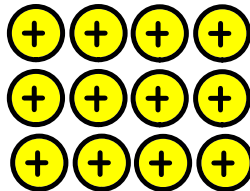


Solve for the unknown quantity, by moving the counters around or by using the Zero Principle to cancel out counters.

$$2n = 12$$

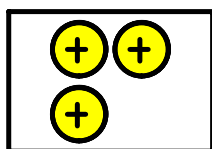


  (drag and drop)



Solve for the unknown quantity, by moving the counters around or by using the Zero Principle to cancel out counters.

$$\frac{n}{3} = 4$$



(drag and drop)

(How many groups of three fit into the unknown number?
Four.)

To "undo" an adding operation, we would need to use a subtracting operation, and vice versa.

To "undo" a multiplication operation, we would need to use a division operation, and vice versa.

Inverse Operations or Opposite Operations

Solve the following for the given unknown, be sure to show the opposite operation being used.

(a) $n - 15 = 32$

(b) $6n = 18$

(c) $x + 33 = -4$

(d) $m \div 14 = 5$

In two step equations it can be difficult to know where to begin, we will use the acronym SAMDEB to help guide us.

You should see that this is the familiar BEDMAS acronym in reverse.

We will start by looking for adding or subtracting operations to undo first, and then move on to multiplication and division, and lastly brackets and exponents.

We use opposite operations to ISOLATE the variable we are trying to determine.

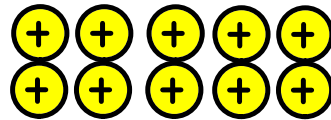
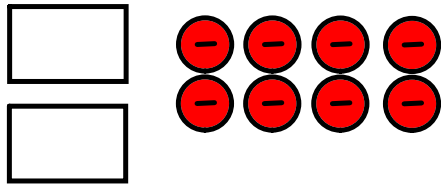
Isolate means get the variable in the top position, by itself, with no other numbers around it.

Solve for the unknown quantity, by moving the counters around or by using the Zero Principle to cancel out counters.

SAMDEB - guide



$$2n - 8 = 10$$



Solve the following for the given unknown, be sure to show the opposite operation being used.

SAMDEB - guide

$$2a + 16 = 38$$

Solve the following for the given unknown, be sure to show the opposite operation being used.

SAMDEB - guide

$$-4a + 22 = 10$$

Solve the following for the given unknown, be sure to show the opposite operation being used.

SAMDEB - guide

$$\frac{a}{2} - 12 = 30$$

Solve the following for the given unknown, be sure to show the opposite operation being used.

SAMDEB - guide

$$\frac{a}{6} = \frac{16}{24}$$

Task - Solving Equations

Attachments

Math - task - simple equations.doc