1.10

Equations and Their Solutions

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Oct 3-8:29 AM

Ella has 22 CDs. This is 9 more than her friend Kay has.

This situation can be written as an *equation*.
An **equation** is a mathematical statement that two expressions are equal in value.

An equation is like a balanced scale.

Number of CDs Ella has	is equal to	9 more than Kay has
22	**=**	***j* + 9**

Left expression **Right expressio**

Oct 3-9:06 AM

equation: $x + 9 = 22$

shows that two expressions are equal

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Just as the weights on both sides of a balanced scale are exactly the same, the expressions on both sides of an equation represent exactly the same value.

When an equation contains a variable, a value of the variable that makes the statement true is called a **solution** of the equation.

$22 = j + 9$ $j = 13$ is a solution because $22 = 13 + 9$.

$22 = j + 9$ $j = 15$ is not a solution because $22 \neq 15 + 9$

Reading Math

The symbol $\neq$ means "is not equal to."

$\neq$

Oct 3-9:07 AM

Determine whether the given value of the variable is a solution of $t + 9 = 17$.

26

$t + 9 = 17$

$26 + 9 \stackrel{?}{=} 17$ *Substitute 26 for t.*

$35 \stackrel{?}{=} 17$ ✗

26 **is not** a solution of $t + 9 = 17$.

$26 + 9 \neq 17$

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Additional Example 1B: Determining Whether a Number is a Solution of an Equation

Determine whether the given value of the variable is a solution of $t + 9 = 17$.

8

$8 + 9 = 17$

Yes

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Determine whether the given value of the variable is a solution of $t + 9 = 17$.

8

$t + 9 = 17$

$8 + 9 \stackrel{?}{=} 17$ *Substitute 8 for t.*

$17 \stackrel{?}{=} 17$ ✓

8 **is** a solution of $t + 9 = 17$.

Oct 3-9:08 AM

Check It Out: Example 1

Determine whether each number is a solution of $x - 5 = 12$.

A. 22

$22 - 5 \neq 12$

B. 8

$8 - 5 \neq 12$

Sep 29-1:57 PM

Mrs. Jenkins had $32 when she returned home from the supermarket. If she spent $17 at the supermarket, did she have $52 or $49 before she went shopping?

$m - 17 = 32$

$32 + 17 = 49$ $m = 49$

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Mrs. Jenkins had $32 when she returned home from the supermarket. If she spent $17 at the supermarket, did she have $52 or $49 before she went shopping?

You can write an equation to find the amount of money Mrs. Jenkins had before she went shopping. If m represents the amount of money she had before she went shopping, then $m - 17 = 32$.

$52

$m - 17 = 32$

$52 - 17 \stackrel{?}{=} 32$ *Substitute 52 for m.*

$35 \stackrel{?}{=} 32$ ✘

Oct 3-9:08 AM

Mr. Rorke had $12 when he returned home from buying a hat. If he spent $47 at the hat store, did he have $61 or $59 before he bought the hat?

$m - 47 = 12$

$m = 59$

$47 + 12 = 59$

Oct 3-8:56 AM

Which problem situation best matches the equation 5 + 2x = 13?

Situation A:

Admission to the county fair costs $5 and rides cost $2 each. Mike spent a total of $13. How many rides did he go on?

$5 for admission → 5 +

$2 per ride → $2x$

Mike spent $13 in all, so 5 + 2x = 13.
Situation A matches the equation.

Sep 29-2:01 PM

Which problem situation best matches the equation $5 + 2x = 13$?

Situation B:

Admission to the county fair costs $2 and rides cost $5 each. Mike spent a total of $13. How many rides did he go on?

The variable x represents the number of rides that Mike bought.

$5 per ride → $5x$

Since $5x$ is not a term in the given equation, Situation B does not match the equation.

Sep 29-1:49 PM

Which problem situation best matches the equation $13 + 4x = 25$?

Situation A:

Admission to the baseball game costs $4 and souvenir hats cost $13 each. Trina spent a total of $25. How many souvenir hats did she buy?

The variable x represents the number of souvenir hats Trina bought.

$13 per souvenir hat → $13x$

Since $13x$ is not a term in the given equation, Situation A does not match the equation.

Sep 29-2:02 PM

Which problem situation best matches the equation 13 + 4*x* = 25?

Situation B:

Admission to the baseball game costs $13 and souvenir hats cost $4 each. Trina spent a total of $25. How many souvenir hats did she buy?

$13 for admission → 13 +

$4 per souvenir hat → 4*x*

Trina spent $25 in all, so 13 + 4x = 25.
Situation B matches the equation.

Sep 29-2:03 PM

Determine whether the given value of the variable is a solution of 5 + *x* = 47.

1. *x* = 42 5+42=47

2. *x* = 52 5+52≠47

Determine whether the given value of the variable is a solution of 57 − *y* = 18.

3. *y* = 75 57-75≠18

4. *y* = 39 57-39=18

5. Kwan has 14 marbles. This is 7 more than Drue has. Does Drue have 21 or 7 marbles?

14-7=7

Oct 16-10:01 AM