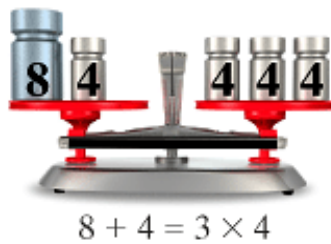


Objective: TSWBAT use mental math to find solutions to equations

Vocabulary

- ① equation - a mathematical sentence with an equal sign
- ② open sentence - an equation with one or more variables
- ③ solution - the value of the variable that makes an equation true

An **equation** is a mathematical sentence that has an equal sign, =. An equation is like a balanced scale. To be in balance, a scale must have weights with the same total on each side. A true equation has equal values on each side of the equal sign.



If each side of the equation does not have the same value, the equation is false. Use \neq to indicate that an equation is false.

An equation with one or more variables is an **open sentence**. A **solution** of an equation is the value of the variable that makes the equation true. For example, $x - 15 = 12$ is an open sentence. Since $27 - 15 = 12$, the value 27 is the solution of $x - 15 = 12$.

You can use mental math to find the solution of some equations.

EXAMPLE**Using Mental Math**

Baseball Cards How many baseball cards do you need to add to the 14 cards you already own to have a total of 25 cards? Solve the equation $n + 14 = 25$, which models this situation.

What you think

$11 + 14 = 25$, so the solution is 11.

You need 11 more cards.

Mental Math Use mental math to solve $4.7 + c = 5.9$.

Mental Math Use mental math to solve $w \div 4 = 20$.

Mental Math Use mental math to solve $17 - x = 8$.

EXAMPLE Estimating Solutions

Estimation Estimate the solution of each equation.

a. $n - 3.85 = 12.33$

Round 3.85 and 12.33 to the nearest whole number

$$3.85 \approx 4 \quad 12.33 \approx 12$$

Estimate the solution of $n - 3.85 = 12.33$ by solving $n - 4 = 12$.

Since $16 - 4 = 12$, the solution of $n - 3.85 = 12.33$ is about 16.

b. $12n = 105$

Use compatible numbers: 12 divides 108 without a remainder and 108 is close to 105. Solve $12n = 108$ to estimate the solution of $12n = 105$.

$$12n = 108$$

$$12 \cdot 9 = 108$$

The solution of $12n = 105$ is about 9.

Estimation Estimate the solution of $y - 6.14 = 23.08$.

$$y - 6 = 23$$

$$y = 29$$

Estimation Estimate the solution of $8.2x = 49.3$.

$$8x = 48$$

$$x = 6$$

Estimation Estimate the solution of $d - 3.8 = 14.1$.

$$d - 4 = 14$$

$$d = 18$$

Use mental math to solve each equation.

1. $4q = 12$

$q = 3$

2. $3w = 15$

$w = 5$

3. $h + 7 = 16$

$h = 9$

4. $h + 2 = 8$

$h = 6$

5. $h \div 3 = 12$

$h = 36$

6. $m \div 2 = 10$

$m = 20$

7. $y - 8 = 12$

$y = 20$

8. $w - 5 = 8$

$w = 13$

Tell whether each equation is true or false.

9. $100 \div 8 = 25$

 F

10. $18 + 25 = 43$

 T

11. $1,100 - 200 = 900$

 T

12. $16 \times 4 = 32$

 F

13. $18 = 9 \div 2$

 F

14. $32 = 16 + 16$

 T

15. $77 + 12 = 99$

 F

16. $2 \times 9 = 81$

 F

Homework: p. 86, 1-30