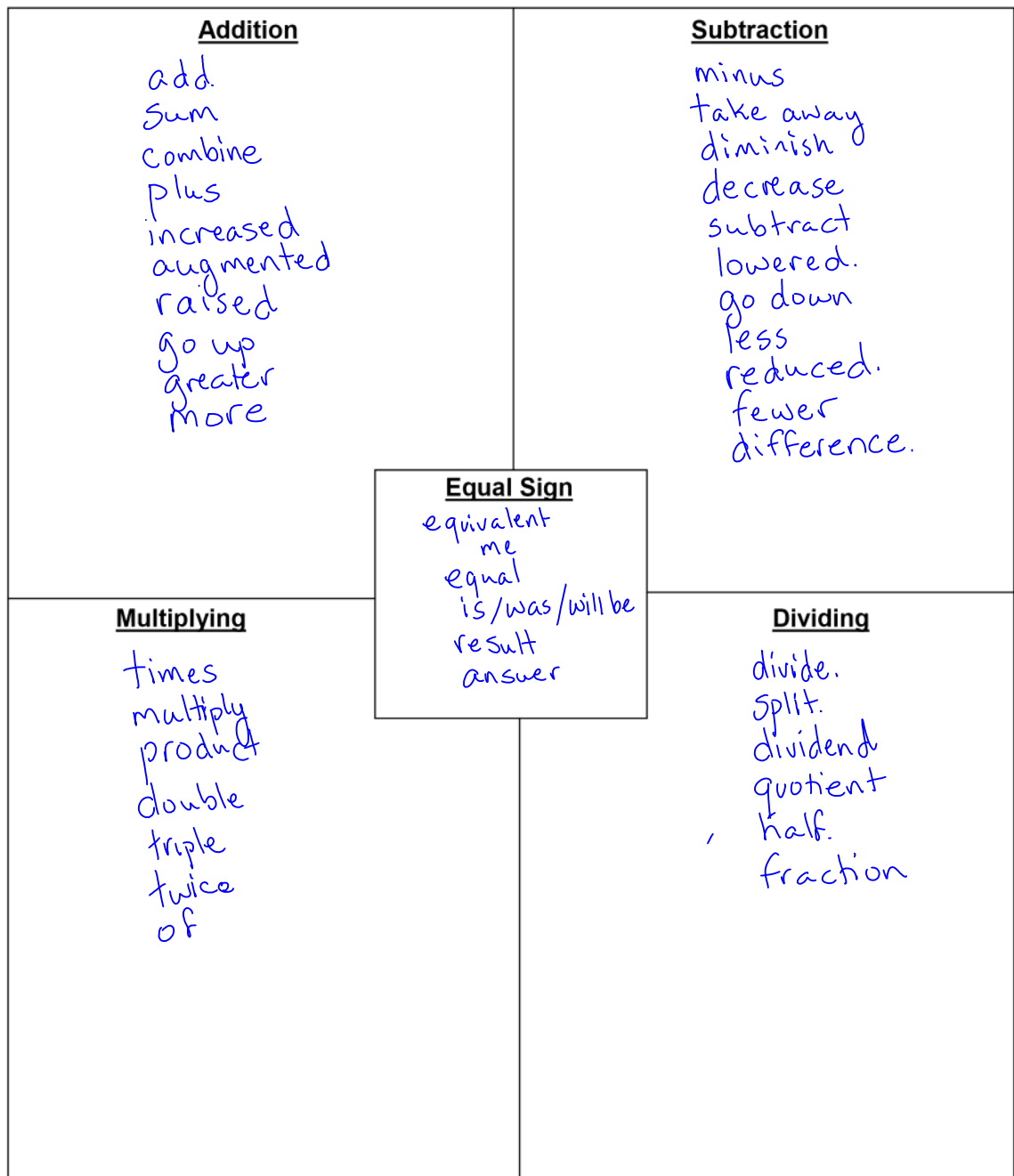# Solving Word Problems

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Mathematics 9
Equation Solving
Solving Word Problems

One of the most important things in mathematics is to be able to translate English in to math. Vocabulary is critical in understanding and communicating in mathematics. Let's take a look at words and how they can be translated into mathematical operations.

Addition

add.
sum
combine
plus
increased
augmented
raised
go up
greater
more

Subtraction

minus
take away
diminish
decrease
subtract
lowered.
go down
less
reduced.
fewer
difference.

Equal Sign

equivalent
me
equal
is/was/will be
result
answer

Multiplying

times
multiply
product
double
triple
twice
of

Dividing

divide.
split.
dividend
quotient
half.
fraction

A. Translating English Into Math

When we translate language into mathematics we look for the "key words" that represent the different mathematical operations.

Use the variable "n" to represent the number.

1) The **sum** of the number and two. $\underline{n + 2}$

2) The **product** of the number and nine. $\underline{9n}$

3) One-quarter **added** to number. $\underline{n + \frac{1}{4}}$

4) One-third **of** the number. $\underline{\frac{1}{3}n \quad \text{or} \quad \frac{n}{3}}$

5) Ten **decreased** by the number. $\underline{10 - n}$

6) Three **less** than **twice** the number. $\underline{2n - 3}$

7) Two **times** the **sum** of a number and five. $\underline{2(n+5)}$

8) The **sum** of the number and one **divided** by six. $\underline{\frac{n+1}{6}}$

9) The number **diminished** by four **is** nine. $\quad n - 4 = 9 \quad$ $\underline{n - 4 = 9}$

10) **Twice** a number **increased** by one **is** eleven. $\quad 2n + 1 = 11 \quad$ $\underline{2n + 1 = 11}$

11) Seven **less** than **one-half the number** **equals** five. $\quad \frac{1}{2}n - 7 = 5 \quad$ $\underline{\frac{1}{2}n - 7 = 5}$

12) **Half of** a number **is equal** to the same number **plus** four. $\quad \frac{1}{2}n = n + 4 \quad$ $\underline{\frac{1}{2}n = n + 4}$

B. Writing and Solving Word Problems

There are four important items that you must have when solving any word problem.

1) Let statements
   - for each item that you are looking for you must establish what variable and expression you are going to use.
2) Equation
   - using the key words in the problem to create a correct algebra equation.
3) Solving the Equation
   - using correct algebra to solve the equation that was created.
4) Answer the question using a sentence.
   - correctly answer the question asked in the word problem using the correct units where necessary.

** You do **not** need to provide a check for your word problems.

1) (One-third of a number) is equalled to (-18). What is the number?

let statement n = the number

$$\begin{array}{r} 2 \\ -18 \\ \times 3 \\ \hline -54 \end{array}$$

equation $3\left[\dfrac{1}{3}n = -18\right]$

The number is -54
answer in a sentence

Solution $n = -54$

2) (Two more than three times a number) is (17) What is the number?

$3n + 2 = 17$

let statement n = the number

equation $3n + \cancel{2} = 17$
            $-2 -2$

$\dfrac{\cancel{3}n}{\cancel{3}} = \dfrac{15}{3}$

Solution $n = 5$

The number is 5.
answer in a sentence.

3) (Twice a number increased by 5) is equalled to (three times the same number decreased by 9.) What is the number?

let statement m = the number

equation $2m + 5 = 3m - 9$
           $-3m -3m$
           $-m + 5 = -9$
           $-5 -5$
           $\dfrac{\cancel{+}m}{-1} = \dfrac{-14}{-1}$

The number is 14
answer In a sentence

Solution $m = 14$

Assignment: Solving Word Problems Assignment

Name:_____

Solving Word Problems Assignment

Solve the following. Make sure to include let statements, equation, solution and answer in sentence.

1. A number diminished by 11 is 14. What is the number?

2. Five times a number is equalled to (-35). What is the number?

3. Four more than twice a number is eighteen. What is the number?

4. When you subtract half of a number from seven the result is five. Find the number.

5. Three times a number plus 8 is equalled to the same number plus twelve. Find the number.

6. One-half of a number increased by $\dfrac{5}{6}$ is one. What is the number?

7. When eight is subtracted from half of a number the result is one. Find the number.

8. When you double a number increase it by six the result is four. What is the number?

9. Six times a number diminished by 2 is equal to twice the same number increased by 14. What is the number?

10. Six times the sum of a number and eight is equaled to sixty. What is the number?

11. Four more than twice a number is equaled to five times the same number decreased by twenty. What is the number?

12. Two less than one-half of a number is equaled to one-quarter of the same number increased by seven. Find the number.

1) Number is 25

2) Number is -7

3) Number is 7

4) Number is 4

5) Number is 2

6) Number is $\dfrac{1}{3}$

7) Number is 18

8) Number is -1

9) Number is 4

10) Number is 2

11) Number is 8

12) Number is 36