

**Title:** Translating Word Phrases Into Expressions

**Class:** Math 4 or Math 100

**Author:** Pam Guenther

**Instructions to tutor:** Read instructions and follow all steps for each problem exactly as given.

**Keywords/Tags:** translating, word problems, word phrases, expressions, unknown

### **Translating Word Phrases Into Expressions**

#### **Purpose:**

In real life we often have to translate a problem which is phrased in English into a mathematical phrase using symbols. The problems we encounter will contain one or more unknown or variable quantities. This activity will help you practice translating English phrases into algebraic expressions.

**Activity:** Work through the following activity/problems. You may use your book to help you, but do not consult a tutor until you have completed through problem #6 on this activity.

#### • **Steps for translating English phrases into math**

**The key to translating English phrases is to choose a letter to represent the unknown.**

We'll use the following steps:

- Step 1: What is the unknown quantity or quantities?
- Step 2: Give this quantity a letter name. It is good to use a letter that matches the unknown quantity, but not necessary.
- Step 3: Translate the phrase into symbols, analyzing the phrase to determine what operation(s) is/are necessary.

**REMARK:** Translating words into mathematical phrases takes some practice. There are many ways to say the same thing in English, and it takes time to learn how all the different words translate. Learning math is like learning a foreign language. Do not be discouraged if you cannot get every translation immediately! Practice is the key. One way to help you read carefully is to underline as you read. Try it!

#### • **Phrases that involve addition and subtraction**

**Example:** Translate: "3 inches more than Colin's height."

Step 1: The unknown is \_\_\_\_\_.

Step 2: Let's call this \_\_\_\_\_.

Step 3: "more than" in this problem means \_\_\_\_\_, so the phrase translates:  
\_\_\_\_\_

1. Translate: "the length of the rectangle, increased by 10."

**In your textbook, there are examples of many phrases that can be translated into addition. Please review these. You may want to write some of them here:**

**WATCH OUT!** Different phrases can indicate a different order of subtraction. Remember, addition is commutative, so the order you add does not matter. However, subtraction is NOT commutative, so the order you subtract does matter.

**Example:** “the difference between the revenue and the cost”

Steps 1 and 2: The unknowns are \_\_\_\_\_ and \_\_\_\_\_. Let’s call them \_\_\_\_\_ and \_\_\_\_\_.

Step 3: “The difference” means \_\_\_\_\_. Notice the order is the same as the order in the original phrase: \_\_\_\_\_

2. Translate: “5 dollars less than the regular price.”

**Note:** When the phrase “less than” is used it generally means that you subtract the number preceding it. So, “3 less than her age” would be represented by  $a - 3$ . The same is true for the expression “more than”—“4 more than his age” would be  $a + 4$ . However, when we add the order does not matter, so it does not affect the problem if we write  $4 + a$  instead. In our first example,  $3-a$  is NOT the same as  $a-3$ .

**Again, your textbook has examples of many phrases that can be translated into subtraction. Please review these. You may want to write some of them here:**

- **Phrases that involve multiplication and division**

**Example:** “the product of 20 and  $w$ ”

Steps 1 and 2: The unknown is already named: \_\_\_\_\_

Step 3: “Product” means \_\_\_\_\_, so the phrase translates: \_\_\_\_\_

One of the less common known verbal expressions of multiplication is fractional part of a quantity. If I say “ $\frac{1}{2}$  of the previous price” that becomes  $\frac{1}{2} \cdot p$ .

3. Translate “ $\frac{3}{5}$  of the number of math students”

Your textbook has other examples of phrases that can be translated into multiplication. Please review these. You may want to write some of them here:

**WATCH OUT!** Just as with subtraction, watch the order when you use division.

**Example:** "The ratio of your test score to 100"

Steps 1 and 2: Let \_\_\_\_\_ be your \_\_\_\_\_.

Step 3: "Ratio" means \_\_\_\_\_, and we \_\_\_\_\_ in the order the quantities appear in

the phrase: \_\_\_\_\_

4. Translate: "7 divided into the total number of oatbran muffins"

Your textbook has examples of many phrases that can be translated into division. Please review these. You may want to write some of them here:

- **Phrases that involve powers or roots**

**Example:** "the square of the distance"

Steps 1 and 2: Let \_\_\_\_\_ be \_\_\_\_\_.

Step 3: "the square of" means to raise to \_\_\_\_\_. So, we have \_\_\_\_\_.

5. Translate: "the cube of the time"

Your textbook has examples of many phrases that can be translated into powers or roots. Please review these. You may want to write some of them here:

- **Phrases that involve more than one operation**

When translating phrases indicating more than one operation, we must be careful to translate the order of operations indicated.

**Example:** “6 times the sum of  $x$  and 2”

Steps 1 and 2: The unknown is already labeled \_\_\_\_\_.

Step 3: “Times” means \_\_\_\_\_. “Sum” means to \_\_\_\_\_. We are to multiply 6 by the **entire** sum of  $x$  and 2, so we’ll need parentheses.

\_\_\_\_\_

6. Translate: “5 more than twice  $y$ ”

**After you go over the previous problems with a tutor, try the following on your own, then check with a tutor to make sure you did them correctly.**

7. Practice translating each phrase:

a) “the life of the satellite increased by 15 years”	b) “2 inches subtracted from the width of the picture frame”
c) “7 minus $x$ ”	d) “7 less than $x$ ”
e) “12 times the number of cartons of eggs”	f) “the quotient of $t$ and 25”
g) “ $x$ divided by 4”	h) “ $x$ divided into 4”

i) "10 more than $\frac{1}{3}$ of the number of centimeters"	j) "4 times the difference of $w$ and 9"
k) "the square of $x$ plus the square root of $y$ "	

8. Give a number or an expression for each question:

Jamie is 5 less than twice as old as Teresa. Find out how old Jamie is if Teresa is

a) 13 years of age

b)  $n$  years of age

Find the total value of a book of stamps worth 50¢ each if the book contains

a) 40 stamps

b)  $n$  stamps

**Review:** Meet with a tutor to verify your work on this worksheet and discuss some of the areas that were more challenging for you. If necessary, choose more problems from the homework to practice and discuss with the tutor.

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 For tutor use: Please check the appropriate box.

- Student has completed worksheet but may need further assistance. Recommend a follow-up with instructor.
- Student has mastered topic.