

Basic Math Skills

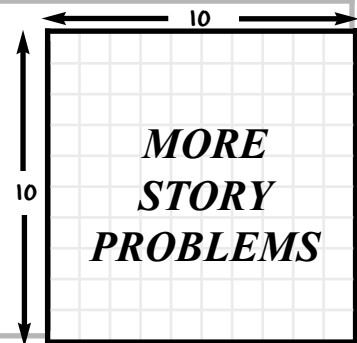


Lesson 12

Chapter 1

Word Problems

Section 3
Lessons 11-15



Professor K and his family vacationed a few years ago in Europe. While there, Professor K's children noticed that not only did the people in many parts of Europe speak different languages, but they **Professor K** also measured things differently than in the United States. This gave Professor K the opportunity to explain to his children that until the Twentieth Century, the peoples and nations of the world lived somewhat *isolated* from each other. Several centuries opened and closed before Europeans learned of the continents now called North and South America. Time *elapsed*, but travel among various areas of the world was still difficult. Therefore, what happened in one region of the world had little effect on



VOCABULARY

Isolated: separated

Elapsed: passed, went by, expired

Economic depressions: long periods of inactivity in business and trade with widespread unemployment.

Vice-versa: switched about, change of order

Contemporary: modern, current, present time

other parts of the world.

In the 1900s, however, life changed around the globe. Wars in the past had been confined to certain areas or regions, as had *economic depressions*. In the 1900s, depressions and wars became worldwide problems. The world was affected dramatically by World War I (WWI), World War II (WWII), and the terrorists' attacks on the United States in 2001. The invention of computers and faster, easier, cheaper means of transportation in a sense made the world "smaller." What happens in Japan's stock market immediately affects other markets around the world and *vice-versa*. Nations depend on trade with other nations of the world in order to balance their budgets.

Contemporary people in international business know and understand various methods used by the countries of the world to measure things, communicate and respond to emergencies.

In Section 3, Professor K will show you how to solve multiplication and division word problems. Also, you will learn the basics of the two major systems used in the world for measurement: the English System (sometimes referred to as the U. S. System) and the Metric System.

MULTIPLICATION AND DIVISION WORD PROBLEMS

You will need to recall or refer to the **Steps to solving a word problem** from Lesson 7. These steps should be followed to solve any word problem. In this lesson the story problems will involve ideas which will require multiplication to solve each problem.



DEFINITION: AVERAGE

average = total divided by how many [quantity]



Calculating an average is a two-step process:

1. Add all the numbers to get a total;
2. Divide the total by the quantity of numbers added together.

Example Set 1

Calculate the average of the following numbers:

- a) 50, 30, 10. Add: $50 + 30 + 10 = 90$. How many numbers?: 3 Divide: $90 \div 3 = 30$
b) 32, 64. Add: $32 + 64 = 96$. How many numbers?: 2 Divide: $96 \div 2 = 48$

“Key” words used and what they mean in word problems

product	multiplication problem
multiple, or multiplied by	multiplication problem
times	multiplication problem
quotient	division problem
divided by	division problem
average	addition and division problem

Example Set 2

Mary worked for a hospital for 4 weeks (5 days per week) and received \$60 per day. How much money did Mary earn at the end of the job?

Following the steps in **Steps to solving a word problem** (Chapter 1, Lesson 12), the problem is worked by the following procedure:

- a) Read the problem to see that Mary had a job and worked a certain period of time for a certain amount of money. The problem is to calculate the amount of money Mary earned.
- b) Rereading the problem, you see that Mary worked 4 weeks (5 days per week) and was paid \$60 per day.

- c) The wording of the problem shows that the operation needed to solve the problem is multiplication (see **words used** section on previous page) because of multiple days of work for which Mary was paid multiples of dollars.
- d) Multiply:
$$\begin{array}{r} 4 \text{ weeks} \\ \times 5 \text{ days/week} \\ \hline 20 \text{ total days worked} \end{array}$$

$$\begin{array}{r} 60 \text{ dollars per day} \\ \times 20 \text{ total days Mary worked} \\ \hline \$1,200 \text{ total amount of money Mary earned} \end{array}$$
- e) Check to see if the answer looks reasonable.

Example Set 3

Four times eleven less six is what number?

Following the steps in **Steps to solving a word problem**, you work the problem by the following procedure:

- a) Read the problem to see that two numbers are multiplied together ("times"), and another number is subtracted ("less") from the product in order to answer the question.
- b) Rereading the problem, you can see that the two numbers multiplied together are 4 and 11; 6 is subtracted from their product.
- c) The wording of the problem tells you that the operations needed to solve the problem are multiplication and subtraction, since the words "times" and "less" appear in the wording.
- d) Multiply:
$$\begin{array}{r} 4 \\ \times 11 \\ \hline 44 \end{array}$$
 Subtract:
$$\begin{array}{r} 44 \\ - 6 \\ \hline 38 \end{array}$$
- e) Check to see if the answer looks reasonable.

Example Set 4

Twenty-four divided by eight less one produces what number?

Following the steps in **Steps to solving a word problem**, the problem is worked by the following procedure:

- a) Read the problem to see that one number is "divided by" another number (a division problem), and another number is subtracted ("less") from the quotient in order to answer the question.
- b) Rereading the problem, you can see that the two numbers involved in the division are 24 and 8, and you will need to subtract 1 from the quotient.
- c) Wording of the problem informs you that the operations needed to solve the problem are division and subtraction since the words "divided by" and "less" appear in the wording.
- d) Divide: $24 \div 8 = 3$ Subtract: $3 - 1$ to get 2 as the final answer to the problem
- e) Check to see if the answer looks reasonable.

Example Set 5

Sixty times three increased by four is what number?

Following the steps in **Steps to solving a word problem**, the problem is worked by the following procedure:

- Read the problem to see that one number is "times" another number (a multiplication problem), and is "increased by" (added to) other numbers.
 - Reread to see that the two numbers involved in the multiplication process are 60 and 3, and that 4 more are added.
 - The wording of the problem informs you that the operations needed to solve the problem are multiplication ("times") and addition ("increased by").
 - Multiply: $60 \times 3 = 180$ Add: $180 + 4 = 184$
 - Check to see if the answer looks reasonable
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Example Set 6

Robert attended firefighter's school where he took four math tests. His scores were 80%, 94%, 72% and 62%. What was Robert's average for the class?

Following the steps in **Steps to solving a word problem**, the problem is worked by the following procedure:

- Read the problem to see that Robert has taken 4 tests (scores given), and you are to find the average. This means you will have to add the 4 test scores and then divide by 4 (the number of tests).
- Rereading the problem, you can see that the tests scores are 80, 94, 72 and 64. The total number of tests is 4.
- The wording of the problem tells you that the operations needed to solve the problem are addition and division because of the word, "average".

d) Add

$$\begin{array}{r} 80 \\ 94 \\ 72 \\ + 62 \\ \hline 308 \end{array}$$

Now divide 308 by 4 (the number of tests). Notice the equation, $308 \div 4 = 77$. So Robert's test average is 77%.

- Check to see if the answer looks reasonable.
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LIFE PRINCIPLE



"Glass and reputation are easily cracked, and never well mended."

—Benjamin Franklin