

MINN. UNIV. DULUTH

THESIS. PLAN B . . . ; MATH PROBLEM SOLVING IN THE ELEMENTARY SCHOOL

WITH A HANDBOOK FOR GRADES THREE, FOUR, FIVE, AND SIX

A PLAN B PAPER

SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL

OF THE UNIVERSITY OF MINNESOTA

---

Problems in  
Curriculum Construction  
Education - 8950  
Under the Direction of  
Dr. William Gemeinhardt

---

A Requirement for the Degree  
Master of Arts (Plan B)

---

By  
Sister Barbara Ann Vierzba, O.S.B.  
University of Minnesota  
Duluth, Minnesota  
August 1976

## TABLE OF CONTENTS

CHAPTER	PAGE
I. THE PROBLEM AND DEFINITIONS OF TERMS USED .....	1
The Problem .....	1
Purpose of the study .....	1
Importance of the study .....	2
Limitations of the study .....	2
Definitions of Terms Used .....	3
Intrinsic meaning .....	3
Functional meaning .....	3
Problem solving .....	3
Organization of the study .....	3
II. REVIEW OF THE LITERATURE .....	4
The Need for Problem Solving .....	4
The Constituents of a Good Problem .....	6
Procedures for Solving Problems .....	6
Alleviating Difficulties in Solving Problems ..	11
Reading Ability in Solving Problems .....	14
III. PROBLEMS TO SOLVE FOR GRADE THREE .....	18
Pre-test for Grade Three .....	19
Addition Problems .....	20
Subtraction Problems .....	22
Multiplication Problems .....	24

CHAPTER	PAGE
Division Problems .....	26
Post-test for Grade Three .....	28
Answers for Grade Three Problems .....	29
IV. PROBLEMS TO SOLVE FOR GRADE FOUR .....	30
Pre-test for Grade Four .....	31
Addition Problems .....	32
Subtraction Problems .....	34
Multiplication Problems .....	36
Division Problems .....	38
Fraction Problems .....	40
Post-test for Grade Four .....	42
Answers to Problems for Grade Four .....	43
V. PROBLEMS TO SOLVE FOR GRADE FIVE .....	45
Pre-test for Grade Five .....	46
Addition Problems .....	48
Subtraction Problems .....	50
Multiplication Problems .....	52
Division Problems .....	54
Addition of Fractions .....	56
Subtraction of Fractions .....	58
Multiplication of Fractions .....	60
Decimals .....	62
Metric Measures .....	64
Post-test for Grade Five .....	66

CHAPTER	PAGE
Answers to Problems for Grade Five .....	68
VI. PROBLEMS TO SOLVE FOR GRADE SIX .....	70
Pre-test for Grade Six .....	71
Addition Problems .....	73
Subtraction Problems .....	75
Multiplication Problems .....	77
Division Problems .....	79
Addition of Fractions .....	81
Subtraction of Fractions .....	83
Multiplication of Fractions .....	85
Division of Fractions .....	87
Decimals .....	89
Percents .....	91
Metric Measures .....	93
Post-test for Grade Six .....	95
Answers to Problems for Grade Six .....	96
VII. SUMMARY .....	99
BIBLIOGRAPHY .....	101

## CHAPTER I

### THE PROBLEM AND DEFINITIONS OF TERMS USED

Since mathematics first began to be taught, one of the major objectives has been problem-solving. Standardized tests have consistently shown that pupils are weaker in this than in the fundamental processes. For this reason, teaching problem-solving constitutes a real challenge to elementary teachers.

The problem, as the writer of this paper saw it, was that there are not a sufficient number of verbal problems in the mathematics texts that are used in the elementary school to give children the practice they need to think through words and numbers and come up with a mathematical answer.

#### I. THE PROBLEM

Purpose of the study. It was the purpose of this study to provide teachers of grades three, four, five, and six with verbal problems in the major areas of content. Having a number of problems to solve at his fingertips, the teacher should be able to provide children with the types of problems they need to increase their strength and ability in solving mathematical problems. To help the teacher determine in which areas a child is weak, a pre-test and post-test have been provided. Each of these tests contain the basic skills taught at each grade level.

Importance of the study. Providing teachers with a handbook of verbal problems in the major skill areas: addition, subtraction, multiplication, and division, should enable the teacher to help each student strengthen his ability to solve verbal problems in whatever area he is lacking. The use of a pre-test and post-test at each level will help the teacher diagnose the weak spots of the students. Although it is good to "make up" problems as one goes along, there is a tendency to use problems more difficult than the present skill being taught. Having several problems in each skill area to work with, the teacher may select the ones most appropriate to the skill that is currently being covered.

Limitations of the study. There is an unlimited number of problems that may have appeared under each skill area at each level. The writer of this paper set the cut-off number at twenty. Also, one type of problem may have appeared in more than one section, but was only put in one. For example, a problem dealing with subtraction, decimals, and the metric system may only have appeared in the problems dealing with decimals. Only the major areas of concepts and skills were dealt with for each grade level. On the whole, the easier problems were stated first and gradually increased in difficulty as one moved on.

## II. DEFINITIONS OF TERMS USED

Teachers know that children learn best when they understand the meaning of what they are learning, in terms of their own experiences and interests. There are two kinds of meaning of the quantitative relationships which underlie mathematical thinking.

Intrinsic meaning. The intrinsic meaning involves the abstract meaning of elementary mathematics.

Functional meaning. The functional meaning applies mathematics to practical, concrete situations. This meaning is connected with children's experiences.

Problem solving. Its consideration here is restricted to those situations commonly referred to as "word problems" or "story problems".

## III. ORGANIZATION OF THE STUDY

This study will contain the following:

CHAPTER I  
THE PROBLEM AND DEFINITIONS OF TERMS USED

CHAPTER II  
REVIEW OF THE LITERATURE

CHAPTER III  
PROBLEM SOLVING FOR GRADE THREE

CHAPTER IV  
PROBLEM SOLVING FOR GRADE FOUR

CHAPTER V  
PROBLEM SOLVING FOR GRADE FIVE

CHAPTER VI  
PROBLEM SOLVING FOR GRADE SIX

CHAPTER VII  
SUMMARY

## CHAPTER II

### REVIEW OF THE LITERATURE

Various experimental programs have been developed in efforts to make the study of mathematics more enjoyable and more meaningful for pupils in the elementary grades. Yet, with all of the progress which has been made in the areas of methodology and materials used in the classroom, it would appear that the desired end result of elementary mathematics programs, the ability to apply knowledge to unique problems, has not been reached.

The literature related to elementary school mathematics abounds with evidence that pupils in the elementary grades still experience considerable difficulty in the solution of verbal problems, even though they may give evidence of an understanding of the particular fundamental operation or operations required to perform the necessary computations.

#### I. THE NEED FOR PROBLEM SOLVING

Considerable investigation and experimentation have been carried on in an effort to determine the causes of the difficulty children experience in solving problems and devise more effective procedures. For example, there have been studies of the relationship between reading skills and problem-solving ability, the value of formal

analysis of a problem-solving procedure, the use of "cue words", the ability of the elementary child to reason, the relationship between experience and problem-solving, the grade in which problem-solving should be introduced, and the relationship between intelligence and problem-solving.

One of the major objectives of mathematics instruction is to teach children to solve written verbal problems. The purposes of this work are:

- 1) to test the pupil's readiness for new work to be done,
- 2) to determine how efficiently he uses number facts and computational skills,
- 3) to check and refine his concepts of mathematical relationships,
- 4) to challenge his ability to apply number processes and quantitative procedures,
- 5) to develop his ability to make estimations and approximations, and
- 6) to extend his arithmetical background and sensitivity to the role of number in daily life. <sup>1</sup>

The performance in mathematics can be very mechanical. How many children do mathematical computations by looking at pictures and numbers and guessing the outcome? The number would be amazingly staggering. Or easier, yet, how many ask the teacher what procedure should be used? There is a definite need to help children think through a problem and see these relationships in everyday experience.

---

<sup>1</sup> Foster E. Grossnickle, and Leo J. Brueckner, Discovering Meanings in Arithmetic (Philadelphia: John C. Winston Company, 1959), p. 315.

## II. THE CONSTITUENTS OF A GOOD PROBLEM

If the purpose of problem solving is to help the child learn to see a relationship between an event and its mathematical model, what then are the characteristics of a good problem?

1. The problem should be of significance mathematically. The potential of a situation as a vehicle for the development of mathematical ideas determine whether we choose one particular problem situation over another.
2. The situation in which the problem occurs should involve real objects or obvious simulations of real objects. The problem must be comprehensible to the child and easily related to his world of reality.
3. The problem situation should have many physical embodiments. Whatever situation is chosen as the particular vehicle for the problem, it should be possible to create other situations for the same mathematical structure.
4. The problem situation should capture the interest of the child.
5. The child should be convinced that he can solve the problem, and he should know when he has a solution for it.<sup>2</sup>

## III. PROCEDURES FOR SOLVING PROBLEMS

A major objective of mathematics teaching is to foster the skill of problem solving. It is this skill, the ability to solve problems, that is the real application of mathematics in daily life situations.

---

<sup>2</sup>James D. Gates, Mathematics Learning in Early Childhood (Virginia: The National Council of Teachers of Mathematics, 1975), p. 71,

Most teachers rely heavily on word problems found in their text-books to increase their students' skills in problem solving. Problem solving techniques are rarely discussed in class and discussion is usually limited to the solution. The real problem solving strategies take place during the solving of the problem. Once a problem has been solved, it is no longer a problem for the learner.

Many authors offer methods for solving problems. Krulik and Wilderman believe this is the best method:

1. Analyze and understand what it is that the problem requires. This usually involves organizing the data within the conditions stated in the problem.
2. Select alternative approaches to the problem, using the one you feel to be most appropriate. This will involve previous experience with similar kinds of problems.
3. Test the hypothesis. Does your method of solving the problem yield a reasonable solution?
4. Check the results to see if you have, in fact, solved the problem.
5. Make an attempt to generalize the solution for future use in a similar situation.<sup>3</sup>

According to Riedesel, there are five procedures in solving problems:

---

<sup>3</sup> Stephen Krulik and Ann M. Wilderman, "Mathematics Class and Strategy Games in Problem Solving," School Science and Mathematics, LXXVI (March, 1976), p. 221.

- 1) writing the number question or mathematical sentence,
- 2) using diagrams and drawings,
- 3) having pupils formulate problems
- 4) presenting problems orally, and
- 5) using problems that do not contain numerals.<sup>4</sup>

Henny feels that in order to solve a problem, the child must be able to read (recognize, comprehend) the words of the problem, visualize the question asked, note the important facts given in the problem, infer the relation among these facts which will imply the correct operation to be used in the solution, and interpret the solution obtained in terms of the question asked.<sup>5</sup>

Wilson says you should train a child to:

- a) "See" or recognize the real or imagined action in sequence structure of a problem.
- b) Express the action sequence in an equation.
- c) Compute, using the operation indicated.
- d) Check by rewriting the equation with the answer in the proper position.<sup>6</sup>

There are some verbal problem-solving techniques for which there is little explicit research evidence. Common sense, however, says that these techniques may be applicable at many points in the problem-solving program. Among the techniques that researchers suggest are the following,

---

<sup>4</sup> C. Alan Riedesel, "Verbal Problem Solving: Suggestions for Improving Instruction," The Arithmetic Teacher, XI (May, 1964), p. 312.

<sup>5</sup> Maribeth Henney, "Improving Mathematics Verbal Problem-Solving Ability Through Reading Instruction," The Arithmetic Teacher, XVIII (April, 1971) p. 224.

<sup>6</sup> John W. Wilson, "The Role of Structure in Verbal Problem Solving," The Arithmetic Teacher, XIV (October, 1967), p. 487.

whereby the teacher might -

1. provide a differentiated program, with problems at appropriate levels of difficulty;
2. have pupils write the number question or mathematical sentence for a problem;
3. have pupils dramatize problem situations and their solutions;
4. have pupils make drawings and diagrams and use them to solve problems or to verify solutions to problems;
5. have pupils formulate problems for given conditions;
6. use problems without numbers;
7. have pupils designate the process to be used;
8. have pupils test the reasonableness of their answers;
9. have pupils work together to solve problems;
10. encourage pupils to find alternate ways in which to solve problems.<sup>7</sup>

The procedure of following a well-defined series of steps such as what is given, what is needed, what is to be done, etc., is a good analytical process. However, this process basically makes the child aware of the need for a strategy; it does not do much to help him develop one.<sup>8</sup>

The common element embedded in any given verbal problem, regardless of the great variations in action, events, or objects involved, is the meaning of one of the four

---

<sup>7</sup> Gates, op. cit., p. 63.

<sup>8</sup> N. Wesley Earp, "Problem Solving - Arithmetic's Persistent Dilemma," The Education Digest, XXXII (April, 1967), p. 47.

fundamental operation of mathematics. Hence, the child must know the basic meanings of each operation, must be able to discriminate one meaning from another, and must be able to recognize each meaning when it is embedded in a variety of problem settings.<sup>9</sup>

Studies have shown that where teachers were cognizant of problem-solving difficulties and placed special emphasis on this area, improved achievement by children has resulted. Some of these same studies have indicated that through the simple expedient of giving children a good many well-chosen problems to solve, their abilities in this area have been improved. It is safe, then, to predict an acceptable level of problem-solving skill if the teacher will place emphasis on developing these skills.<sup>10</sup>

Earp feels that many problems would be solved if special attention to the following suggestions is warranted:

1. Frequently the problems children are asked to work should come from their classroom or life situation. The teacher should often introduce new processes with such problems which she has devised.
2. Children should be required in many instances to estimate what they believe to be a sensible answer to a problem.

---

<sup>9</sup> John W. Wilson, "What Skills Build Problem-Solving Power?," Instructor, LXXVI (February, 1967), p. 79.

<sup>10</sup> Earp, op. cit., p. 49.

3. Children should occasionally be asked to compose verbal problems of the type under study. Some children will not include enough information; others may be encouraged to put in more information than is needed.
4. Flexibility in seeking the solution of problems is mandatory. Teachers sometimes tend to hinder the problem-solving process by insisting on the use of one correct procedure. The child who is allowed to think out his own strategy and who then is gradually led to more efficient procedures has an advantage.
5. Related to flexibility in the solving of problems is the recommendation that the student receive instruction in drawing, diagramming, and/or using manipulative objects to represent a problem.
6. The process in solving a problem has sometimes been referred to as programming and processing. The programming of the problem is a matter of arriving at a mathematical plan or statement for solving it.<sup>11</sup>

Studies have indicated improved problem solving by children who were given instruction in developing such programming techniques. Children who are better students seem to benefit particularly from such teaching.

#### IV. ALLEVIATING DIFFICULTIES IN SOLVING PROBLEMS

Problem solving is a typical form of thinking in life situations. The approaches to problem solving are very similar, regardless of what the area of experience happens to be.

---

<sup>11</sup> Ibid., pp. 47-48.

Factors which have been studied in attempts to analyze difficulties in problem solving include: size of numbers; physical defects; terms used, especially those involving quantitative relations; sex of pupils; methods used; systematic arrangement of work; nature of supervision; general vocabulary; grasp of essential facts, i.e., tables of weights and measures; the habit of checking results; presence of non-essential elements; background of experience; reading level; individual preferences, energy, effort; command of fundamentals; general intelligence; and ability to do reflective thinking.

Many factors besides intelligence play an important role in determining the rate of learning. For example, the widely differing levels of anxiety with which children enter learning situations have been found to be significantly related to their rate of learning. The style with which they approach problems also differs - some respond rapidly and impulsively - and some learning situations require one or another style of approach more or less exclusively. Furthermore, the nature of children's motivation to achieve and their level of aspiration have been found to play an important role in determining how well they will perform in learning tasks.

Children are easily distracted by the presence of irrelevant information. The ability to observe selectively - to categorize the environment into what is critical and what is not - develops rather late; evidence

indicates that not until the child is ten or twelve years old is he able to do this spontaneously.<sup>12</sup>

Obviously, success in solving arithmetic problems is more likely to occur when teaching methods designed to contribute to success are undertaken as part of the instructional program. An instructional program intended to develop, through concrete experiences and well-directed practice, an understanding of arithmetical processes, clear number concepts, skill in mathematical computation and reasoning, and basic skills involving the use of arithmetical materials, may materially reduce the number of poor achievers in problem solving.<sup>13</sup>

Herlihy believes, "When the pupil understands the concepts and principles involved, the teacher can promote problem-solving ability by guiding him to determine what is given, devise a plan, execute it and check the solution."<sup>14</sup> She feels these four aspects are essential to successful problem-solving.

---

<sup>12</sup> Gates, op. cit., p. 5.

<sup>13</sup> Carl W. Hansen, "Factors Associated with Successful Achievement in Problem Solving in Sixth Grade Arithmetic," Journal of Educational Research, XXXVIII (October, 1944), p. 118.

<sup>14</sup> Kathryn V. Herlihy, "A Look at Problem Solving in Elementary School Math," The Arithmetic Teacher, XI (May, 1964), p. 309.

"Talking through a problem," says Shipp, "is the best procedure."<sup>15</sup> The class may discuss a problem to see what is given and what is to be found. Such a group discussion can help students to understand the kind of thinking used in problem solving. The teacher may also ask a sequence of questions to help the students break down the larger concepts into small steps. Shipp also feels that diagrams, when applicable, should be used. The use of problems without numbers, in which the student decides what should be done without getting into computations, is another aid in problem solving. One can also use problems with inadequate data or problems with superfluous data. Estimating answers before solving problems is also a good practice.<sup>16</sup>

#### V. READING ABILITY IN SOLVING PROBLEMS

One of the most obvious obstacles children face in work with verbal problems is that of reading; the teacher is encouraged to provide needed instruction in both mathematics reading vocabulary and comprehension. Many children also have difficulty planning or arriving at a strategy for solving a problem. There is no attempt to discern the action or direction of the problem. Consequently,

---

<sup>15</sup> Donald E. Shipp and Sam Adams, Developing Arithmetic Concepts and Skills (New Jersey: Prentice-Hall, Inc., 1964), p. 215.

<sup>16</sup> Ibid.

the child searches rather randomly for an operation that "fits" - for a way of handling the numerals so that they work out evenly. Teaching the child to look for cue words and phrases will work in carefully selected problems but is of doubtful value in more life-related problems.

There is much disagreement on which factors have the greatest influence on the ability to solve verbal problems. Henney feels:

There is consensus that children must be able to recognize words and comprehend thought units in the problem, logically interpret the problem situation, and organize the information in such a way as to lead to an answer to the stated question. Computational skill is necessary, but it is useless without the ability to read the problem accurately.<sup>17</sup>

Verbal problems become more complicated at the fourth-grade level. The vocabulary used may have more than one meaning, requiring the child to choose an appropriate meaning according to the context. Sentences involve more difficult grammatical structure. Material that has no bearing on the solution is sometimes included in the problem.

In problem solving, the student must determine the question being asked, the information given, the mathematical operations required, and must find this information through reading. Obviously, reading ability is

---

<sup>17</sup> Henney, op. cit., p. 223

involved. However, general reading ability has not been found to correlate highly with problem solving ability as measured by standardized tests. Balow says:

Problem solving requires computation skill - the child who is unable to compute is unable to solve problems requiring computation. Computation is a much more important factor in problem solving than is reading ability.<sup>18</sup>

Numerous research findings serve to illustrate the importance of reading skills as they are related to facility in solving verbal problems. There is a vital role of reading competence in the ability of elementary students to solve verbal problems.

Linville conducted a study to determine whether or not the degree of syntax used in the sentences which state verbal mathematics problems and/or the level of vocabulary used in the statement of the problems are factors which contribute significantly to the degree of difficulty of the problems when the computational operations are held constant.

An analysis of the data for this study suggests the following conclusions:

1. Syntax and vocabulary level can both be determiners of difficulty in verbal arithmetic problems. Vocabulary level could be more crucial in determining success than syntax.

---

<sup>18</sup> Irving H. Balow, "Reading and Computation Ability as Determinants of Problem Solving," The Arithmetic Teacher, XI (January, 1964), p. 18.

2. Boys and girls appear to do equally well in solving verbal arithmetic problems.
3. Pupils of higher ability can be expected to meet with considerably greater success in solving verbal arithmetic problems than pupils having less ability.
4. Pupils who have scored high in reading achievement can be expected to experience greater success in solving verbal arithmetic problems than pupils who scored low in reading achievement.<sup>19</sup>

After much reading on the reading-ability factor, this writer feels that it is highly debatable which offers the greatest difficulty in solving problems for children - computational skill or reading ability.

---

<sup>19</sup> William J. Linville, "Syntax, Vocabulary, and the Verbal Arithmetic Problems," School Science and Math, LXXVI (February, 1976), p. 157.

## CHAPTER III

### PROBLEMS TO SOLVE FOR GRADE THREE

In the third grade, students are introduced to solving verbal problems on their own. The major areas covered are addition, subtraction, multiplication and division. Sentence structure and computations are kept at a level at which the student may perform.

This section will include a pre-test which may be given to students to point out areas in which a student may need some additional practice. There will also be a section of twenty problems each for the four main areas covered: addition, subtraction, multiplication and division. The teacher must realize that many more problems could have been added to each section, and he or she is free to do so. These problems may be used in any way the teacher wishes to strengthen the student's ability to solve verbal problems. At the end, there is a post-test covering the four basic areas of mathematics.

## I. PRE-TEST FOR GRADE THREE

Solve the following problems:

1. Katie lost 4 pounds during June, 3 pounds during July, and 1 pound in August. How many pounds did she lose in the three months?
2. There were 33 children in Grade 3. If 14 of them were sent to the cafeteria, how many are left?
3. Bobby sold 6 books of tickets for the school carnival. There were 15 tickets in each book. How many tickets did he sell?
4. Kelly saves 8¢ each day. How many days will it take her to save 56¢?
5. Mr. Marten sold 1752 tons of hay this year. Last year he sold 982 tons. How many more tons did he sell this year?
6. Joey helped his dad at the grocery store. He put 274 carrots into bunches. Each bunch had 6 carrots. How many bunches of carrots did he have? How many carrots were left?
7. The first stage of a rocket ship drove it 51 miles. The second stage drove the ship 789 miles. The third stage drove the ship 599 miles. How many miles in all did the three stages drive the ship?
8. There are 26 floors in an apartment building. There are 8 apartments on each floor. How many apartments are there in all?

## II. ADDITION PROBLEMS

1. Bill had 2 hamsters and Robert had 3 hamsters. How many hamsters did both boys have?
2. Carol had 3 cookies, Kathy had 2 cookies, and Joyce had 4 cookies. How many cookies did the girls have altogether?
3. Bob ate 3 apples and 5 apricots. How many pieces of fruit did he eat?
4. Joy collected 14 pop bottles, Debbie collected 25 bottles, and Janet collected 23 bottles. How many bottles did the three girls collect?
5. 18 girls and 27 boys went to the picnic. How many children went to the picnic?
6. Janice has 11 dimes, 14 nickels, and 27 pennies. How many coins does she have?
7. Bill found 16 arrowheads and Jim found 19 arrowheads. How many arrowheads did the two boys find?
8. 14 first-graders, 21 second-graders, and 29 third-graders took a chartered bus to the zoo. How many children were on the bus?
9. On Thursday, 472 cars crossed Lincoln Bridge. On Friday, 434 cars crossed. How many cars crossed the bridge in the two days?
10. There were 264 containers of white milk and 185 containers of chocolate milk in the school cafeteria. How many containers of milk were there altogether?
11. There are 242 girls and 273 boys in Washington School. How many students are in the school?
12. Jane collected 193 plastic buttons and 45 wooden buttons. How many buttons were in her collection?
13. Sam wants a bicycle that costs \$39.95. He also wants a headlight that costs \$2.98. How much will he need to buy both things?
14. At a sale, Jill's mother bought Jill a coat for \$14.98 and her brother a suit for \$16.79. How much did she pay in all for both things?

(Addition problems - continued)

15. Jack watched TV for 160 minutes one day. The next day he watched TV for 135 minutes. In all, how many minutes did Jack watch TV?
16. Theresa had 76 straws for her art project. A friend gave her 18 more. How many straws did Theresa have then?
17. Ricky weighs 96 pounds. His pony weighs 693 pounds. How much do Ricky and his pony weigh together?
18. Mike bought a game for \$3.49 and a model car for \$1.29. How much did Mike spend in all?
19. Billy and Sissy went to buy a pumpkin for Halloween. Billy counted 38 at the stand. Then Sissy saw 17 more. How many were there in all?
20. In a game at a party, Becky got 17 points, 19 points, and 16 points. How many points did she get in all?

## III. SUBTRACTION PROBLEMS

1. 54 horses were in the pasture. If 13 jumped the fence, how many were left in the field?
2. Stan raised 38 turkeys. He sold 21 of them. How many does he have left?
3. Lilly had 23 paper dolls. Carol had a collection of 18 paper dolls. How many more paper dolls did Lilly have than Carol?
4. 11 children were at the park. 4 went home. How many stayed at the park?
5. Bob had 17 white mice. He had to get rid of 14. How many did he have left?
6. There were 26 children on the bus. 9 got off at Northern Ave. How many were still on the bus?
7. 129 tickets were sold on Monday and 96 were sold on Tuesday. How many more tickets were sold on Monday than on Tuesday?
8. 143 cakes were in the bakery when it opened. By 2:00 p.m., 84 had been sold. How many cakes were still to be sold?
9. Janet had 56 coins in her collection. She sold 19 of them. How many did she have left?
10. John weighs 97 pounds and Bob weighs 84 pounds. How many more pounds does John weigh than Bob?
11. An office building is 272 feet tall. A flagpole is 67 feet tall. How many feet taller is the office building?
12. The Washington Monument is 555 feet tall. The Statue of Liberty is 151 feet tall. Which is taller and how many feet taller?
13. There are about 365 days in a year on Earth. There are about 687 days in a year on Mars. How many more days are there in a year on Mars?
14. Sarah saved \$4.29. She spent \$1.96 for a fish. How much money did she have left?

(Subtraction problems - continued)

15. Eric had 25 marbles. He gave 9 to David. How many marbles did Eric then have?
16. Kathy is going to read 49 pages today. She has already read 27 pages. How many more pages does Kathy have to read today?
17. Jerry's father is 28 years old. Jerry is 9 years old. How much older than Jerry is Jerry's father?
18. During the two days of Open House, 578 people visited our school. On one day, 349 people visited. How many visited the school on the other day?
19. In the pet show, there were 17 dogs and 8 cats. How many fewer cats than dogs were there in the show?
20. Jeffrey wants a radio for \$6.98. He has saved \$5.35. How much more does he need?

## IV. MULTIPLICATION PROBLEMS

1. Mrs. Klein bought 5 sacks of oranges. There were 24 oranges in each sack. How many oranges did she buy?
2. If there are 144 eggs in each crate, how many eggs are there in 9 crates?
3. If each row has 32 plants, how many plants are there in 3 rows?
4. Darlene picked 6 boxes of strawberries. If each box contains 22 strawberries, how many strawberries did she pick?
5. Sam gave each of his 4 friends 8 baseball cards. How many baseball cards did he give away?
6. Willie put 7 candies in each of the 6 paper sacks given to him. How many pieces of candy did he put in the sacks?
7. Each of the 9 members of a scout troop was allowed to bring 3 pounds of food on a hike. If each member brought his limit, how many pounds of food were carried on the hike?
8. Sue baked 8 pans of cupcakes. If there were 12 cupcakes in each pan, how many cupcakes did she bake?
9. If there are 11 boys on each team, how many boys are on 6 teams?
10. Joan started a garden. She made 7 rows and planted 6 plants in each row. How many flower plants did she have?
11. Mr. Smith installed 4 new tires on each of 3 cars brought into his service station. How many new tires did he install?
12. Joyce paid 6¢ each for 3 balloons. How much did she spend for the balloons?
13. Shelly bought 7 packs of gum. There are 8 sticks in each pack. How many sticks are there in all?
14. Each student needs 9 sheets of paper. How many sheets are needed for 8 students?

## (Multiplication problems - continued)

15. What is the cost of 5 cans of soup at 26¢ each?
16. A race car went 176 miles an hour for 3 hours. How many miles did it go?
17. Jamie delivers papers 6 days a week. He delivers 147 papers each day. How many papers does he deliver in the 6 days?
18. Beth baked 7 pans of cookies. Each pan had 18 cookies. How many cookies did she bake?
19. Leroy bought 21 balloons for his party. Each balloon cost 4¢. How much did he spend on balloons?
20. A truck was carrying 162 bricks. Each brick weighs 3 pounds. How much do the bricks weigh in all?

## V. DIVISION PROBLEMS

1. John put 8 crayons in each box. He had 56 crayons. How many boxes did he fill?
2. Ellen picked 36 roses. She put 4 roses in each vase. How many vases did she need?
3. 488 children attended the school picnic. 8 children ate at each table. How many tables were used?
4. Lori has 84 pine cones. She uses 6 cones to make a doll. How many dolls can Lori make?
5. There are 7 days in a week. There are 34 days before Stephanie's birthday. How many weeks is this? How many extra days are there?
6. Jack's dad has 144 apples. He packs 12 apples in a box. How many boxes can he fill?
7. There are 67 students in the third grade. How many teams with 9 students can be formed? How many students left over?
8. How many 7¢ cookies can I buy with 85¢? How much do I have left?
9. Seven children have \$14 in all to spend. How much does each have if each has the same amount of money?
10. Mrs. Jones baked 92 cookies. She has 5 children. She gave the same number of cookies to each child. How many cookies did each child get? How many cookies were left?
11. A store has 104 quarts of milk. There are 8 quarts in each carton. How many cartons are there?
12. Angie has 51 beads in all. She put them on 3 strings. Each string has the same number of beads. How many beads are on each string?
13. There were 86 children on 2 buses. Each bus had the same number of children. How many children were on each bus?
14. Mr. Jake sold 92 apples to 4 people. Each bought the same number of apples. How many apples did each one buy?

(Division problems - continued)

15. Mrs. Watson has a pet shop. She has 68 goldfish. She wants to put 4 in each bowl. How many bowls does she need?
16. Steve sold 315 newspapers in 5 days. He sold the same number each day. How many newspapers did he sell each day?
17. Mr. Thomas sold 294 loaves of bread in 6 days. He sold the same number each day. How many loaves of bread did he sell each day?
18. Lynn put 372 stamps in 7 rows. The same number of stamps were in each row. How many stamps were in each row? How many left?
19. Mr. Roy packed 864 eggs into 4 boxes. How many eggs were in each box if each box had the same number of eggs?
20. Adela's older sister works 6 hours each Saturday at a fruit stand. She worked 126 hours. How many Saturdays had she worked?

## VI. POST-TEST FOR GRADE THREE

Solve the following problems:

1. Wally had 44 guppies. He gave 19 of them to his cousin. How many did he have left?
2. Jeff has 8 puzzle boxes with 79 pieces in each box. How many pieces are there in all?
3. Phil has 66 stones. He uses 3 stones to make a ring. How many rings can he make?
4. Janet helped clean up the playground. She picked up 15 candy wrappers, 19 sheets of paper, and 24 popsicle sticks. How many objects did she pick up altogether?
5. Tom had 221 stamps in his collection. He was given 147 more from a friend. How many stamps did Tom have then?
6. David is making bean bags. It takes 4 pounds of beans for each bag. He has 147 pounds of beans. How many bean bags can he make? How many pounds of beans are left?
7. Candy costs 89¢ a pound. How much do 9 pounds cost?
8. There are 278 adults at the baseball game and 167 children. How many more adults than children?

## VII. ANSWERS FOR GRADE THREE PROBLEMS

Pre-test

1. Addition - 8 pounds
2. Subtraction - 19 children
3. Multiplication - 90 tickets
4. Division - 7 days
5. Subtraction - 770 tons
6. Division - 45 bunches  
4 carrots left
7. Addition - 1439 miles
8. Multiplication - 208 apts.

Post-test

1. Subtraction - 25 guppies
2. Multiplication - 632 pieces
3. Division - 22 rings
4. Addition - 58 objects
5. Addition - 368 stamps
6. Division - 36 bags,  
3 pounds left
7. Multiplication - \$8.01
8. Subtraction - 111 more adults

Addition Problems

1. 5 hamsters
2. 9 cookies
3. 8 pieces
4. 62 bottles
5. 45 children
6. 52 coins
7. 35 arrowheads
8. 64 children
9. 906 cars
10. 449 containers
11. 515 students
12. 238 buttons
13. \$42.93
14. \$31.77
15. 295 minutes
16. 94 straws
17. 789 pounds
18. \$4.78
19. 55 pumpkins
20. 52 points

Subtraction Problems

1. 41 horses
2. 17 turkeys
3. 5 paper dolls
4. 7 children
5. 3 mice
6. 17 children
7. 33 tickets
8. 59 cakes
9. 37 coins
10. 13 pounds
11. 205 feet
12. WM, 404 feet
13. 322 days
14. \$2.33
15. 16 marbles
16. 22 pages
17. 19 years
18. 229 people
19. 9 cats
20. \$1.63

Multiplication Problems

1. 120 oranges
2. 1296 eggs
3. 96 plants
4. 132 strawberries
5. 32 cards
6. 42 pieces
7. 27 pounds
8. 96 cupcakes
9. 66 boys
10. 42 plants
11. 12 tires
12. 18¢
13. 56 sticks
14. 72 sheets
15. \$1.30
16. 528 miles
17. 882 papers
18. 126 cookies
19. 84¢
20. 486 pounds

Division Problems

1. 7 boxes
2. 9 vases
3. 61 tables
4. 14 dolls
5. 4 weeks, 6 days
6. 12 boxes
7. 7 teams, 4 left
8. 12 cookies, 1¢
9. \$2.00
10. 18 cookies, 2
11. 13 cartons
12. 17 beads
13. 43 children
14. 23 apples
15. 17 bowls
16. 63 papers
17. 49 loaves
18. 53 stamps, 1
19. 216 eggs
20. 21 Saturdays

## CHAPTER IV

### PROBLEMS TO SOLVE FOR GRADE FOUR

In the fourth grade, students are more familiar with working with verbal problems. The major areas covered are addition, subtraction, multiplication and division. Fractions and decimals are introduced at this particular grade level. Both sentence structure and computations are kept at a level at which the student may perform.

This section will include a pre-test which may be given to students to point out areas in which a student may need additional practice. There will also be a section of twenty problems each for the four main areas covered: addition, subtraction, multiplication and division. Also included will be a section of problems dealing with fractions. Addition and subtraction of fractions has been dealt with.

The teacher must realize that many more problems could have been added to each section and he or she is certainly free to do so. These problems may be used in any way the teacher wishes to strengthen the student's ability to solve verbal problems. At the end, there is a post-test covering the four basic areas of mathematics.

## I. PRE-TEST FOR GRADE FOUR

Solve the following problems:

1. The storekeeper had 213 baseball mitts. He sold 168 of them. How many baseball mitts were left?
2. Mr. Nichols had 428 passes to the basketball game. He divided the passes equally among 4 leagues. How many passes did each league receive?
3. On Monday morning, 306 students visited the Hyde Museum. That afternoon, 167 students visited the museum. How many students visited the museum?
4. Liz put 7 suitcases in the car. Each suitcase weighed 26 pounds. How much did all 7 suitcases weigh?
5. A rope is marked into 8 equal parts. What fraction tells about 3 parts? 5 parts? 7 parts?
6. On Thursday, 362 people went to the symphony. On Friday, 398 people went. How many people went to the symphony on these two days?
7. Mrs. Marks used 50 eggs for our classroom breakfast. How many cartons of 12 each were used? How many left over?
8. Paul's father weighs 224 pounds. He lost 36 pounds by jogging. How many pounds does he weigh now?
9. Gloria lives  $\frac{7}{8}$  of a mile from school. Terry lives  $\frac{1}{8}$  of a mile from school. How much closer to school does Terry live?
10. At one football game 47 cases of root beer were sold. Each case had 24 cans. How many cans were sold?

## II. ADDITION PROBLEMS

1. Last week, 478 students rode the bus to Paradise Valley. This week, 602 students rode the bus. How many students rode the bus in these two weeks?
2. There were 1764 girls and 1572 boys at the school dance. How many students were at the school dance?
3. The shortest man in the circus is 34 inches tall. The tallest man in the circus is 52 inches taller. How tall is the tallest man?
4. On Friday, 699 students took tests, and 348 took tests on Monday. How many students took tests in those two days?
5. There are 48 students in the cafeteria, 52 students in the library, and 39 students in the hall. How many students are in the three areas?
6. 4,115 people went to the concert Friday night; 3,109 went Saturday afternoon; and 3,842 went on Sunday. How many people went to the concert during the weekend?
7. Chad delivered 114 newspapers on Monday, 109 newspapers on Tuesday, and 142 newspapers on Wednesday. How many newspapers did he distribute in the three days?
8. 521 balloons were popped in Monday's contest, and 371 in Tuesday's. How many balloons were popped altogether?
9. One morning, the minstrels traveled 206 miles. The next day, they traveled 185 miles. How many miles did the minstrels travel in the two days?
10. The oldest man in the circus joined when he was 17. He has been with the circus for 64 years. How old is he now?
11. Rita bought a basket for her bike for \$2.49 and a horn for \$1.59. How much did she spend?

## (Addition problems - continued)

12. Laura weighs 87 pounds. Her mother weighs 128 pounds and her father weighs 208 pounds. How many pounds do they weigh altogether?
13. Charles bought a kite for \$.75. He bought a puzzle for \$.98. He bought bubble gum for \$.14. How much did he pay for the puzzle and the bubble gum?
14. Stan bowled 132, 84, and 143. What was his total score for the 3 games?
15. In a football game, the Tigers gained 249 yards passing and 158 yards rushing. How many yards did they gain in all?
16. One of the highest scores ever recorded for a basketball game was 169 to 147. What was the total amount of scoring?
17. The Central Hill Post Office has 2 mail trucks. One truck picked up 31,293 letters and the other picked up 65,479. How many letters were picked up in all?
18. Janice bought a sweater for \$4.98, gloves for \$1.79, and shoes for \$14.99. How much did she spend?
19. Elaine bought 2 hot dogs for \$.39 each, cake for \$.24, and juice for \$.29. How much did she spend?
20. Joyce paid \$24.98 for a camera and \$4.95 for a camera case. How much did she spend in all?

## III. SUBTRACTION PROBLEMS

1. One day, 417 people arrived at San Xavier Mission. 196 of them came by bus. The rest came by automobile. How many came by automobile?
2. On Friday, 851 people watched the boat races, and 1,194 watched on Saturday. How many more people watched the races on Saturday, than on Friday?
3. Ski Harbor had 764 pairs of skis for rent. On Monday, 267 pairs were rented. How many pairs of skis were not rented?
4. On Wednesday, 4563 license plates were sold, and 2876 plates were sold on Thursday. How many more license plates were sold on Wednesday than on Thursday?
5. Chris found 39 eggs in one hen house. He needs 90 eggs to sell to his customers. How many more eggs must he find?
6. Charlie has to read 137 pages of his geography book by Friday. If he reads 84 pages by Wednesday, how many more pages will he have to read before class on Friday?
7. Jimmy sold 347 tickets to the Little League game, and Ned sold 297. How many more tickets does Ned have to sell to catch up to Jimmy?
8. There were 367 kites in the store. In one week, 292 of them were sold. How many kites were left?
9. At Mt. Lemmon, 362 people rode the ski lift during the day. In the afternoon, 194 people rode the lift. How many people rode the lift in the morning?
10. The Big Bull ski run is 483 yards long. The Little Bull ski run is 266 yards long. How much longer is the Big Bull run?

(Subtraction problems - continued)

11. On Friday, 595 adults bought movie tickets, and 257 children bought movie tickets. How many more adults bought movie tickets?
12. One of the oldest giant tortoises lived to be 200 years old. One of the oldest men lived to be 113 years old. How much longer did the tortoise live?
13. The Milwaukee Zoo in Wisconsin has about 640 animals. The Memphis Zoo in Tennessee has about 3040 animals. About how many more animals are in the Memphis Zoo?
14. Jerry is saving to buy a new electric train. This week he saved \$1.46. In all, he has saved \$8.13. How much had he saved before this week?
15. An aquarium costs \$17.59. Jack has saved \$12.92. How much more money does he need?
16. Tracy had 224 baseball cards. He gave 117 of them away. How many cards were left?
17. Lunch at a motel cost \$2.84. How much change would be returned from a \$5 bill?
18. There were 40,809 people at a football game. 26,649 were adults. How many were children?
19. The Gazette News used to spend \$80.74 a day on paper. Now they use recycled paper which costs \$63.38 a day. How much do they save?
20. 12,989 children had tickets to the circus. There was a bus strike, and 2,487 children didn't go. How many children went to the circus?

## IV. MULTIPLICATION PROBLEMS

1. Mr. Viere wanted to dig a well. If he dug 3 feet a day for 18 days, how deep was the well?
2. Sally saved 6 cents a day for 30 days. How much did she save altogether?
3. Gina earned \$1.25 each day for 7 days. How much did she earn altogether?
4. Tom's beagle eats 4 cans of dog food each week. How many cans of dog food does the dog eat during the 52 weeks of one year?
5. There are 37 boys taking swimming in each of 12 classes. How many boys altogether are taking the swimming class?
6. Peter has 38 rocks in his collection. Phillip has 4 times as many rocks as Peter. How many rocks does Phillip have?
7. Mr. Williams has 6 boxes of pencils in his desk. If there are 150 pencils in each box, how many pencils does he have?
8. Jane sold 32 packages of Girl Scout cookies. Each box contained 36 cookies. How many cookies did she sell?
9. Jerry packed 54 Christmas ornaments in each of 34 boxes. How many ornaments did he pack?
10. Charlie visited the tallest building in the city. The guide said that the building had 66 floors and that each floor had 204 windows. How many windows were there in the whole building?
11. An office building has 282 offices. Each office has 4 telephones. How many telephones in all?
12. A parking garage has 4 parking levels. Each level has 216 parking spaces. How many parking spaces are in the whole garage?

## Multiplication problems - continued)

13. Ken's older brother works at the bakery. Each day he makes 436 dinner rolls. How many does he make in 6 days?
14. At Sky Harbor Airport, people can take sightseeing rides. The plane holds 39 people and makes 5 trips a day. How many people can go on the trip each day?
15. It costs \$1.25 to have your picture taken beside a donkey at the Grand Canyon. How much would 6 pictures cost?
16. Sodas at Bridgeman's are \$.80. How much would 4 sodas cost?
17. Bill spends \$2.25 a week for school lunches. How much does he spend in 8 weeks?
18. There are 18 teams in the league. Each team has 26 players. How many players are there in all?
19. Baseball tickets cost \$1.75 each. How much do 12 tickets cost?
20. The stadium at Gerard High School has 36 rows of seats. There are 84 seats in a row. How many seats are there in all?

## V. DIVISION PROBLEMS

1. If Marilyn can skip rope 246 times in 6 minutes, how many times can she skip in 1 minute?
2. At summer camp, 6 scouts were assigned to each tent. How many tents were needed to shelter 222 scouts?
3. Stan counted 477 pennies into 9 equal stacks. How many pennies were in each stack?
4. Stephanie has 55 pictures. If she puts 5 pictures on each page of her photo album, how many pages will she use?
5. Jack bought 296 oranges for Christmas baskets. If he puts 8 oranges in each basket, how many baskets can he fill?
6. Pencils are 7¢ each. How many pencils can Brent buy with 38¢? How much change will he have left?
7. There were 56 empty bottles to put in cartons. The boys put 8 bottles in each carton. How many cartons did they use?
8. Four sea shells cost \$1.84. Each shell cost the same amount. How much did each cost?
9. Guppies cost \$.27 each. How many guppies could Joan buy with \$3.00? How much money did she have left?
10. The students in Grade Four need 68 paper cups for planting seeds. The cups are sold in packages of 34. How many packages should they buy?
11. When Mark cleaned the garage, he found 129 empty pop bottles. He put them in cases of 24 each. How many cases did he fill? How many bottles were left?
12. Susan has 80 bean seeds. She will plant 16 seeds in each tray. How many trays will she need for all the seeds?

(Division problems - continued)

13. Mary has 102 bird pictures to put in an album. Each page holds 32 pictures. How many pages will she need for all of the pictures?
14. Six hamburgers cost \$3.30. How much does one hamburger cost?
15. Mrs. Dagle drove 456 kilometers in 6 hours. This was an average of how many kilometers per hour?
16. In August, Jamie slept a total of 279 hours. August has 31 days. On an average, Jamie slept how many hours each day?
17. Sarah baby-sat a total of 208 hours in the last 52 weeks. She baby-sat an average of how many hours a week?
18. Harold read a 112-page book in 7 days. He read on the average of how many pages per day?
19. Jeff, Chuck, and Tom shared 198 marbles equally. How many did each boy have?
20. Susie, Molly, and Sandra share the cost of a set of dominoes for 87¢. How much does each one spend?

## VI. FRACTION PROBLEMS

1. Sally had 4 red crayons and 6 yellow crayons. What fraction of the 10 crayons are red? What fraction are yellow?
2. There were 26 boys and 19 girls in the fourth grade. What fraction of the 45 students are boys? What fraction are girls?
3. Sally put  $\frac{1}{3}$  cup of water with  $\frac{1}{3}$  cup of orange juice. What fraction of a cup of liquid does she have?
4. Peter had  $\frac{5}{8}$  of a pie. He took  $\frac{2}{8}$  of the pie to eat. What fraction of the pie was left?
5. Cory put  $\frac{1}{4}$  of a box of cheese and  $\frac{1}{6}$  of a box of cheese together. What fraction of a box did she have then?
6. Mary took  $\frac{1}{4}$  of a pound of butter from a whole pound. What fraction of a pound of butter was left?
7. Mrs. Strouss bought  $\frac{5}{8}$  pound of cashews and  $\frac{1}{8}$  pound of walnuts. How much did she buy in all?
8. James walked  $\frac{3}{10}$  of a mile, rode a bus  $\frac{9}{10}$  of a mile, and then walked another  $\frac{1}{10}$  of a mile. How many miles did he travel?
9. Pam had  $\frac{5}{8}$  yard of ribbon. She gave  $\frac{3}{8}$  yard to Debbie. What fraction of a yard was left?
10. The choir practiced  $\frac{3}{4}$  of an hour on Monday and  $\frac{1}{4}$  of an hour on Tuesday. How much longer did they practice on Monday?
11. The regular price of a toy is \$1.98. On sale, it was  $\frac{1}{2}$  price. How much does the toy cost now?

## (Fraction problems - continued)

12. Jim sleeps  $\frac{1}{3}$  of his day and plays  $\frac{1}{6}$  of his day. What part of a day does he sleep and play?
13. Cathy grew  $\frac{1}{8}$  inch in May and  $\frac{1}{4}$  inch in June. How much did she grow during these two months?
14. Mrs. Davis had  $\frac{2}{3}$  of a dozen eggs. She used  $\frac{1}{4}$  of a dozen for a cake. What part of a dozen does she have left?
15. Mom used  $\frac{1}{6}$  dozen eggs for a cake and  $\frac{1}{3}$  dozen for a pie. How many in all?
16. Bill's fish weighed  $\frac{1}{4}$  pound and John's weighed  $\frac{9}{16}$  pound. How much did both fish weigh?
17. Mrs. Brown had  $2\frac{1}{4}$  yards of red cloth and  $1\frac{1}{4}$  yards of white cloth. How many yards did she have?
18. It takes  $3\frac{3}{4}$  hours by bus to Flagstaff. Joe has been traveling on the bus  $1\frac{1}{4}$  hours. How many more hours by bus will it take Joe to get to Flagstaff?
19. David got  $\frac{2}{3}$  of his problems done in one minute. Kathy got  $\frac{3}{4}$  of hers done in one minute. Who got more done? How much more?
20. Mr. Hobson bought  $3\frac{7}{8}$  yards of rope and  $1\frac{1}{8}$  yards of wire. How much more rope did he buy?
21. A farm has  $\frac{7}{8}$  acre of corn and  $\frac{1}{2}$  acre of wheat. How much more corn does it have?
22. Liz bought  $3\frac{3}{8}$  yards of red ribbon and  $2\frac{1}{8}$  yards of blue ribbon. How much ribbon did she buy in all?

## VII. POST-TEST FOR GRADE FOUR

Solve the following problems:

1. Each day, 26 planes arrive from Chicago. How many planes arrive each week from Chicago?
2. Brenda's mother bought a dress for \$9.98. She gave the clerk \$20. How much change should she receive?
3. Ralph has had his bicycle for 28 days. The odometer shows that he has ridden 112 kilometers. This is an average of how many kilometers per day?
4. Mary put  $\frac{4}{6}$  of a box of cheese and  $\frac{1}{6}$  of a box of cheese together. What fraction of a box did she have then?
5. The Sunnyslope Post Office sold 8,146 stamps in June; 11,602 in July; and 7,241 in August. How many stamps did they sell in all three months?
6. The chorus practiced  $\frac{3}{4}$  of an hour on Monday and  $\frac{1}{4}$  of an hour on Tuesday. How much longer did they practice on Monday?
7. Madison School has 1164 students this year. Harrison School has 1152 students. How many students are there in the two schools?
8. Jeff read 348 pages of his book in 6 days. How many pages did he read each day?
9. An elephant weighed 3387 pounds. If it lost 949 pounds, how much does it weigh now?
10. Bob was able to save 40¢ each week from his allowance. After 14 weeks, he put one-half of the money he had saved in the bank. How much did he put in the bank?

## VIII. ANSWERS TO PROBLEMS FOR GRADE FOUR

Pre-test

1. Subtraction - 45 mitts
2. Division - 107 passes
3. Addition - 473 students
4. Multiplication - 182 pounds
5.  $\frac{3}{8}$ ,  $\frac{5}{8}$ ,  $\frac{7}{8}$
6. Addition 760 people
7. Division - 4 cartons, 2 left
8. Subtraction - 188 pounds
9. Subtraction -  $\frac{6}{8}$  mile
10. Multiplication - 1128 cans

Addition Problems

1. 1080 students
2. 3336 students
3. 86 inches
4. 1047 students
5. 139 students
6. 11066 people
7. 365 newspapers
8. 892 balloons
9. 391 miles
10. 81 years old
11. \$4.08
12. 423 pounds
13. \$1.12
14. 359 points
15. 407 yards
16. 316 points
17. 96772 letters
18. \$21.76
19. \$1.31
20. \$29.93

Subtraction Problems

1. 221 people
2. 343 people
3. 497 pairs
4. 1687 license plates
5. 51 eggs
6. 53 pages
7. 50 tickets
8. 75 kites
9. 168 people
10. 217 yards
11. 338 more adults
12. 87 years
13. 2400 animals
14. \$6.67
15. \$4.67
16. 107 cards
17. \$2.16
18. 14160 children
19. \$17.36
20. 10502 children

Multiplication Problems

1. 54 feet
2. \$1.80
3. \$8.75
4. 208 cans
5. 444 boys
6. 152 rocks
7. 900 pencils
8. 1152 cookies
9. 1836 ornaments
10. 13464 windows
11. 1128 telephones
12. 864 parking spaces
13. 2616 rolls
14. 195 people
15. \$7.50
16. \$3.20
17. \$18.00
18. 468 players
19. \$21.00
20. 3024 seats

(Answers to Grade Four Problems - continued )

Division Problems

1. 41 times
2. 37 tents
3. 53 pennies
4. 11 pages
5. 37 baskets
6. 5 pencils, 3¢
7. 7 cartons
8. \$.46
9. 11 guppies, 3¢
10. 2 packages
11. 5 cases, 9 bottles
12. 5 trays
13. 4 pages
14. \$.55
15. 76 kilometers
16. 9 hours
17. 4 hours
18. 16 pages
19. 66 marbles
20. \$.29

Fraction Problems

1.  $\frac{4}{10}$  red,  $\frac{6}{10}$  yellow
2.  $\frac{26}{45}$  boys,  $\frac{19}{45}$  girls
3.  $\frac{2}{3}$  cup liquid
4.  $\frac{3}{8}$  of a pie
5.  $\frac{5}{12}$  of a box
6.  $\frac{3}{4}$  pound
7.  $\frac{6}{8}$  pound
8.  $\frac{13}{10}$  mile
9.  $\frac{2}{8}$  yard
10.  $\frac{2}{4}$  hour
11. \$.99
12.  $\frac{3}{6}$  day
13.  $\frac{3}{8}$  inch
14.  $\frac{5}{12}$  dozen
15. 6 eggs
16.  $\frac{13}{16}$  pound
17.  $3\frac{1}{2}$  yards
18.  $2\frac{1}{2}$  hours
19. Kathy,  $\frac{1}{12}$
20.  $2\frac{6}{8}$  yards
21.  $\frac{3}{8}$  acre
22.  $5\frac{4}{8}$  yards

Post-test

1. Multiplication - 182 planes
2. Subtraction - \$10.02
3. Division - 4 kilometers
4. Addition -  $\frac{5}{6}$  box
5. Addition - 26989 stamps
6. Subtraction -  $\frac{2}{4}$  hour
7. Addition - 2316 students
8. Division - 58 pages
9. Subtraction - 2438 pounds
10. Multiplication & Division  
\$2.80

## CHAPTER V

### PROBLEMS TO SOLVE FOR GRADE FIVE

In the fifth grade, students become more adept at solving verbal problems. The major areas covered are addition, subtraction, multiplication and division. More emphasis is placed on fractions and decimals at this level. Both sentence structure and computations are kept at a level at which the student may perform.

This section will include a pre-test which may be given to students to point out areas in which a student may need additional practice. There will also be a section of twenty problems each for the four main areas: addition, subtraction, multiplication and division. Also, included will be a section of twenty problems on fractions (addition, subtraction, and multiplication), decimals and metric measurers.

The teacher must realize that many more problems could have been added to each section and he or she is certainly free to do so. These problems may be used in any way the teacher wishes to strengthen the student's ability to solve verbal problems. At the end, there is a post-test covering the four basic areas of mathematics.

## I. PRE-TEST FOR GRADE FIVE

Solve the following problems:

1. The school play was seen by 879 adults and 427 children. How many people saw the play?
2. Popsicles are 59¢ a dozen. How much will 9 dozen cost?
3. Jerry cut 12,366 Christmas trees. He sold them to stores in bundles of 9 each. How many bundles did he sell?
4. There were 27 guppies in Mark's fish tank. Some baby guppies were born. Then there were 52 guppies altogether. How many baby guppies were born?
5. It rained  $\frac{3}{10}$  inch on Monday. It rained  $\frac{6}{10}$  inch on Tuesday. How much rain fell on the two days?
6. About  $\frac{1}{4}$  of the people in the United States live in rural areas. What fraction do not live in rural areas?
7. One-half of the objects in a bag are buttons. Two-thirds of the buttons are white. What fraction of the objects are white buttons?
8. Wendy bought 4.5 pounds of chocolate and 2.9 pounds of mints. How many more pounds of chocolate did she buy?
9. The high jump record for a flea is 0.178 meter. Find the distance in centimeters.
10. There were 58,797 names in the telephone book in 1975, and 2,516 names were added in 1976. How many names were in the 1976 book?
11. There are 24 hours in a day. How many hours in 31 days?

(Pre-Test for Grade Five - continued)

12. If it takes 90 pearls to make one necklace, how many necklaces can be made from 21,870 pearls?
13. 1,435 students attended St. Mary's College in 1907. Today 7,398 students attend. How many more students attend the college today than in 1907?
14. Pat spends  $\frac{3}{4}$  hour painting the fence in the morning and  $\frac{5}{8}$  hour in the afternoon. How long does she spend altogether?
15. Barb had  $\frac{3}{4}$  of a dozen eggs. She used  $\frac{1}{3}$  dozen for a cake. How much of a dozen does she have left?

## II. ADDITION PROBLEMS

1. If 879 people saw the school play the first night and 789 saw it the second night, how many people saw it on the two nights?
2. There are 219 cars in one part of the parking lot and 94 in another. How many are there altogether?
3. Mabel and Dorothy collect trading stamps. Mabel has 541 trading stamps and Dorothy has 619. How many stamps do both girls have?
4. Harriet's family drove 974 miles on their vacation last year and 789 miles this year. How many miles did they travel during these two vacations?
5. Mary's sister drove 142 miles in the morning and 257 miles in the afternoon. How far did she drive in all?
6. Eighty-nine books were checked out of the library on Monday, 105 on Tuesday, 139 on Wednesday, 117 on Thursday, and 41 on Friday. How many books were checked out on the five days?
7. Neil read 139 pages of a book. He must read 96 more pages to finish the book. How many pages in the book?
8. Nancy would like to buy a blouse for \$3.98; a coat for \$9.49; and a hat for \$1.79. How much money does she need?
9. Mary corrected 45 papers on Monday, 57 on Tuesday, and 31 on Wednesday. How many papers did she correct?
10. The Dum Dum Lollipop Company makes 19,721 lollipops one day and 17,294 the next day. How many lollipops does it make in the two days?

(Addition problems - continued)

11. 476 nickels, 366 dimes, 945 quarters, and 358 pennies were deposited in the theater's vending machines last week. What was the total number of coins deposited?
12. The cashier at Globe rang up the following amounts on the register: \$1.05, \$1.65, \$2.13, \$4.06, \$.52, and \$3.01. What was the total amount?
13. During May, George put in 14, 16, and 11 gallons of gasoline in his car's tank. What was the total number of gallons?
14. The Jones family spent the following amounts for food during each of four weeks: 1st week, \$56.48; 2nd week, \$61.23; 3rd week, \$47.89; 4th week, \$39.96. How much did they spend?
15. Mr. Adair traded his car after 76,198 miles. The car he bought had been driven 8,975 miles. How many miles had the two cars been driven?
16. During the summer reading program, Faye read 768 pages. David read 439 pages. George read 526 pages. How many pages did these students read altogether?
17. During September, Jack Brown traveled the following number of miles: 476; 309; 241; and 579. What was the total number of miles traveled?
18. The number of parts shipped to six cities was as follows: 319; 2418; 32409; 4061; 208; and 5216. How many parts were shipped in all?
19. There were 349 telephone repairs in May; 386 in June, and 244 in July. How many telephone repairs were made in the three months?
20. Sally's father worked 1864 hours one year and 2432 hours the year after. How many hours did he work in the two years?

## III. SUBTRACTION PROBLEMS

1. Jeff threw a basketball 87 times. He missed the basket 54 times. How many baskets did he make?
2. There were 106 children living in the apartment building. More children moved in. Then there were 122 children. How many children moved in?
3. Frank had 68 stamps in his collection. He got more stamps for his birthday. Then he had 127 stamps. How many stamps did Frank get for his birthday?
4. Martin had 61 old coins. He bought more coins and now has 89 in all. How many coins did he buy?
5. Mary had \$24.96 in the bank. After making a deposit, she had \$32.81. How much did she deposit?
6. If Mrs. Dugan, the librarian, set up 46 chairs for the children to see a film in the library, and 72 children came to see the film, how many more chairs are needed?
7. Rita spent \$24.81 on groceries and \$10.69 on hardware. How much more did she spend on groceries than on hardware?
8. There are 156 pages in Valerie's new book. She has read 47 pages. How many pages does she have left to read?
9. Paul lives 48 miles from Tucson. Anna lives 96 miles from Tucson. How many miles closer to Tucson does Paul live than Anna?
10. The mileage reading on Mr. Stone's car is 16,142. On Mr. Peterson's, it is 24,349. How many more miles does Mr. Peterson have on his car than Mr. Stone?

(Subtraction problems - continued)

11. Pat needs 294 more points to win a prize. It takes 1500 points to win a prize. How many points does Pat have now?
12. The space flight is expected to last 11,820 minutes. They are now 7,246 minutes into the flight. How many minutes remain?
13. There was a hot dog eating contest. 10,932 hot dogs were put out to eat. Only 7,854 were consumed. How many hot dogs were left?
14. An elephant weighs 4,289 pounds. A whale weighs 185,291 pounds. How much more does the whale weigh?
15. Bill bought a radio for \$9.98. He gave the clerk \$20. How much change will he get back?
16. There were 78 students in the fifth grade. Forty-one wear glasses. How many do not wear glasses?
17. Lincoln-head pennies were first minted in 1909. How long ago was that?
18. The arena can seat 22,000 people. On one night, 13,698 seats were taken. How many were empty?
19. The lioness at the circus weighs 433 pounds. Her cub weighs 64 pounds. How much more does the lioness weigh?
20. Forty thousand raffle tickets were printed, but only 31,736 were sold. How many tickets were not needed?

## IV. MULTIPLICATION PROBLEMS

1. Mary practices her guitar lessons 30 minutes each morning. How many minutes per week does she practice?
2. Radishes are 35¢ a dozen. How much will 3 dozen cost?
3. Sue bought 7 sea horses that cost 69¢ each. How much did she spend?
4. Peter delivers 43 papers a day. How many does he deliver in 6 days?
5. How many hours are there in a 30-day month?
6. Each American family empties and throws away about 600 aluminum cans per year. About how many cans are thrown away per year by 50 families? 700 families?
7. Joe bought 18 packages of baseball cards. There were 6 cards in each package. How many cards did he buy?
8. Steve has filled 42 pages of his stamp book. Each page has 32 stamps. How many stamps does he have?
9. One hot dog vendor sold 19 trays of hot dogs. There were 34 hot dogs on each tray. About how many hot dogs did he sell?
10. An usher at the arena passed out 9 packages of programs. Each package contained 25 programs. About how many programs did he pass out?
11. There are 40 nickels in one roll. How many nickels are in 250 rolls?
12. Twenty-one girls made candy for the bazaar. Each girl made 36 pieces. How many pieces did they make in all?

(Multiplication problems - continued)

13. There were 31 swimming classes at the Y, with 18 children in each class. How many children took swimming?
14. Paula practices the piano for 55 minutes each day. How many minutes does she practice in 6 days?
15. What is the cost of 17 FM radios at \$59 each?
16. Find the total cost of 24 portable stereos at \$74.99 each.
17. If 461 persons see a film each night during its 21-day showing, how many persons see the film in all?
18. Each day 224 airplanes depart from the city airport. How many planes depart in 63 days?
19. There are 14 girl scouts going on a trip. They must pay \$3.55 each for bus fare. How much do they pay in all?
20. If the grocery store buys each case of corn for \$10.79, how much must be paid for an order of 24 cases of corn?

## V. DIVISION PROBLEMS

1. A jet plane traveled 6300 miles in 9 hours. What was the average speed?
2. Mr. Nelson borrowed \$36,000 from his rich uncle. He plans to repay his loan in 5 years, sending his uncle the same amount each month. How much is one monthly payment?
3. Five boys weeded Mr. Camp's garden and together earned \$88.15. If they share the money equally, how much should each boy get?
4. One day 64 people went on a canoe trip. Four people were assigned to each canoe. How many canoes were needed?
5. The 126 band members march in 9 equal rows. How many band members are in each row?
6. Mr. Jones has 76 pairs of scissors to distribute equally among 3 classrooms. How many pairs can he give to each room? How many are left?
7. Mrs. Burnotte and her cafeteria staff have prepared 1824 meatballs for lunch. How many people can she serve if each person gets 3 meatballs?
8. Martha's record player can hold a stack of 6 records. If she has 57 records, how many full stacks can she make? How many records will be left over?
9. If a bag of grass seed costs \$8, how many bags can be purchased for \$128?
10. The Welsh family takes a vacation trip. The first day they travel 420 miles in 7 hours. What is their rate per hour?

(Division problems - continued)

11. A bakery sells sweet rolls 16 to a box. How many boxes are needed for 624 sweet rolls?
12. If 18 washers cost \$4482, what is the cost of one washer?
13. If there are 520 feet of yarn in a skein, how many 15-foot lengths of yarn can you get from one package?
14. The combined weight of a class of 30 fifth-graders was 2,760 pounds. What was the average weight of each child?
15. The Littlepage Stationery Supply Company packs 25 rubber bands in each box. How many boxes will be needed for 1,000 rubber bands?
16. Bobby bought 24 paperbacks for \$17.28. If each book cost the same amount, how much did it cost?
17. There are 21,190 telephone poles for the houses in Westminster. If there are 26 poles for every mile of wire, how many miles of telephone wire are needed for the Westminster system?
18. In five hours, 15,189 cans came off the assembly line. There are 84 cans packed in each carton. How many full cartons are there? How many cans left over?
19. Ninety-five containers of the same size were filled with a total of 80,750 pounds of iron. How many pounds of iron were in each container?
20. There were a total of 43,000 peanuts. Twenty-eight were put into each bag. How many bags of peanuts were there?

## VI. ADDITION OF FRACTIONS

1. Ruby walked  $\frac{1}{8}$  mile to Ned's house. Then she rode  $\frac{5}{8}$  mile to school. How far did she travel?
2. On Tuesday,  $\frac{3}{10}$  inch of rain fell. On Wednesday,  $\frac{4}{10}$  inch fell. How much rain fell in all on those two days?
3. Betty used  $\frac{1}{2}$  cup milk for a cake; then  $\frac{2}{3}$  cup for some cookies. How much milk did she use in all?
4. Liz's mom drove  $5\frac{4}{10}$  miles in the morning and  $3\frac{1}{5}$  miles in the afternoon. How far did she drive in all?
5. Mary Ann had a ribbon  $4\frac{2}{3}$  yards long and a ribbon  $3\frac{1}{2}$  yards long. How much ribbon did she have in all?
6. In a contest Maribeth earned  $2\frac{5}{9}$  points. Denise earned  $3\frac{2}{3}$  points. How many points did the girls win altogether?
7. There are two boards. One is  $8\frac{1}{12}$  feet. The other is  $9\frac{4}{12}$  feet. How long are they together?
8. Of all the cars, trucks and buses in the world, about  $\frac{5}{9}$  are in the United States. About  $\frac{1}{18}$  are in France. What fraction of the cars, trucks and buses are in France and the United States combined?
9. Dennis bought two packages of meat. One package weighed  $1\frac{3}{4}$  pounds. The other package weighed  $2\frac{5}{8}$  pounds. How many pounds of meat did he buy?
10. Bob spends  $\frac{3}{4}$  hour mowing the lawn. Joe spends another  $1\frac{1}{2}$  hour mowing. How long do they spend in all?

(Addition of fractions - continued)

11. It takes Randy  $\frac{3}{4}$  hour to saw a piece of wood,  $1\frac{1}{4}$  hours to nail it together, and  $\frac{1}{2}$  hour to paint it. How long does he spend altogether?
12. On Tuesday, Peter hiked  $\frac{1}{2}$  mile in the morning and  $\frac{1}{3}$  mile in the afternoon. How far did Peter hike altogether?
13. Before school, Lisa read  $\frac{3}{5}$  hour. After school, she read  $\frac{1}{4}$  hour. How long did she read altogether?
14. Elsa lives  $3\frac{1}{2}$  blocks from school and Betty lives  $2\frac{5}{6}$  blocks from school. How many blocks do both girls live from school?
15. This week Melanie practiced the piano  $4\frac{5}{6}$  hours and last week  $5\frac{1}{3}$  hours. How many hours did she practice during these two weeks?
16. Matt's brother worked  $3\frac{2}{3}$  hours in the morning and  $1\frac{4}{5}$  hours in the afternoon. How many hours did he work?
17. Andy rode the bus  $1\frac{1}{6}$  miles north and  $2\frac{3}{10}$  miles west. How many miles did he ride the bus?
18. Mary used  $2\frac{1}{2}$  cups of flour for one kind of cookies and  $3\frac{3}{4}$  cups for another kind. How many cups of flour did she use altogether?
19. Jeffrey rode his bicycle  $6\frac{1}{10}$  miles yesterday and  $8\frac{5}{10}$  miles today. How far did Jeffrey travel in the two days?
20. Greg used  $2\frac{1}{2}$  gallons of paint to paint the fence and  $\frac{1}{4}$  gallon to paint the gate. How much paint did he use in all?

## VII. SUBTRACTION OF FRACTIONS

1. Jenny had  $\frac{3}{4}$  of a pie. She ate  $\frac{1}{4}$  of the whole pie for lunch. What fraction of the pie was left?
2. Maribeth had  $\frac{7}{8}$  yard of wool. She used  $\frac{5}{8}$  yard to make a vest. What fraction of a yard was left?
3. About  $\frac{1}{10}$  of the people in the United States live in California. What fraction live in the other 49 states?
4. About  $\frac{3}{50}$  of the land in the world is in the United States. What fraction of land is outside of the United States?
5. About  $\frac{5}{7}$  of the earth's surface is water. What fraction of the earth's surface is land?
6. Five-sixths of the students have pets. What fraction do not have pets?
7. Dick spends  $6\frac{3}{4}$  hours making a model plane. Bert spends  $4\frac{1}{4}$  hours on his plane. How much longer does Dick spend?
8. Aimee has  $2\frac{5}{8}$  yards of cloth. If she used  $1\frac{3}{8}$  yards to make a costume for a play, how many yards does she have left?
9. Sheila walked  $3\frac{4}{10}$  miles. Linda walked  $3\frac{1}{5}$  miles. Who walked the farthest and how much farther?
10. Phillip is building a birdhouse. From a piece of wood  $12\frac{1}{8}$  inches long, he cut a piece of wood for the roof  $8\frac{3}{4}$  inches long. How much scrap wood is left?
11. Mrs. Sacks painted some furniture. She had  $\frac{3}{4}$  gallon of red paint and used  $\frac{3}{8}$  gallon. How much is left?

(Subtraction of fractions - continued)

12. It took  $\frac{5}{6}$  hour to paint a table and  $\frac{1}{3}$  hour to paint a chair. How much longer did the table take?
13. Jim walked  $\frac{9}{10}$  mile. Sandy walked  $\frac{4}{10}$  mile. How much farther did Jim walk?
14. Mr. Nelson's oil tank holds 50 gallons of oil. He put in  $22\frac{4}{5}$  gallons. How much more is needed to fill the tank?
15. Lisa ate  $\frac{7}{8}$  of a pizza. David ate  $\frac{3}{4}$  of a pizza. Who ate more? How much?
16. Chris' frog took two jumps. One was  $7\frac{3}{8}$  inches long. The other was  $6\frac{1}{8}$  inches long. How much farther was the first jump?
17. Joanne cut  $3\frac{3}{4}$  yards of material from a  $10\frac{1}{2}$  yard long piece. How much was left?
18. Jim and Jack ran a 100-yard race. It took Jim  $11\frac{3}{5}$  seconds and Jack  $10\frac{3}{10}$  seconds. How much longer did it take Jim?
19. John's dad had 5 pounds of steak. He used  $3\frac{3}{4}$  pounds to make dinner. How much was left?
20. Mike used a  $3\frac{7}{12}$  foot piece from a board  $5\frac{11}{12}$  feet long. How long was the piece that was left?

## VIII. MULTIPLICATION OF FRACTIONS

1. An ant weighs  $\frac{1}{100}$  ounce. It can pull 5 times as much as the body weighs. How much weight can it pull?
2. A grizzly bear lives  $\frac{2}{7}$  as long as a human being. The average life span of a human being is 70 years. What is the life span of the grizzly bear?
3. 1 day = 24 hours. Bert sleeps  $\frac{1}{3}$  of the day. How many hours does Bert sleep?
4. The coffee pot holds 10 cups of coffee. How many cups can you pour if the pot is  $\frac{1}{5}$  full?  $\frac{1}{2}$  full?
5. If  $\frac{1}{7}$  of the \$350 the Carlson family spent on their trip was for gas, how much did they spend for gas?
6. The Nelsons spent  $\frac{4}{7}$  of their 21-day vacation camping. How many days did they camp?
7. Bob's father catches 15 fish. If  $\frac{3}{5}$  of them are bass, how many are bass?
8. Two-thirds of the flower bed is planted with roses. If  $\frac{1}{2}$  of the roses are red, what fractional part of the flower bed is planted with red roses?
9. Martha had 40 stamps. She put  $\frac{3}{5}$  of her stamps in her stampbook and gave  $\frac{2}{5}$  to her friend. How many stamps did Martha put in her book?
10. One-third of the library is for fiction. One-fifth of the fiction space is for mysteries. How much of the library is for mysteries?
11. It rained for 4 days. Each day  $\frac{3}{10}$  inch of rain fell. How much rain fell altogether?

(Multiplication of fractions - continued)

12. Jane must practice her trumpet  $\frac{3}{4}$  hour a day. How long does she practice in 7 days?
13. Joe had  $\frac{2}{3}$  pint of ice cream. He ate  $\frac{1}{2}$  of it. How much of a pint did he eat?
14. Seven-sixteenths of the jelly beans in the bag are green. The boys ate  $\frac{4}{7}$  of the green jelly beans. What fractional part of the jelly beans did they eat?
15. A carpentry job is  $\frac{9}{10}$  complete. Mr. Jones did  $\frac{5}{6}$  of the work. What fractional part of the entire job did he complete?
16. Twelve quarts of punch were made for the Christmas party. Four-ninths of it was used. How many quarts of punch were used?
17. Joyce had a 4-foot length of rope for her project. She used  $\frac{2}{3}$  of it. How many feet of rope did she use?
18. There are a dozen boxes of nails in each carton. Each box weighs  $2\frac{5}{9}$  pounds. How much would a carton of nails weigh?
19. A humming bird weighs  $\frac{1}{10}$  ounce. It eats  $6\frac{1}{2}$  times as much as its body weight daily. How much food does it eat daily?
20. Some square tiles measure  $3\frac{1}{2}$  inches on each side. Seven tiles are placed in a row. How long is the row of tiles?

## IX. DECIMALS

1. Karen bought 11.7 gallons of gasoline to fill her car's fuel tank. The tank holds 18.5 gallons. How much gasoline was already in the tank?
2. Sue went to the store to buy a pot roast. She bought two pieces. One weighed 2.8 pounds, and the other piece weighed 3.6 pounds. How many pounds of roast did she buy?
3. James bought two packages of fish. Together the packages weighed 4.6 pounds. One weighed 2.5 pounds. How much did the other package weigh?
4. The Murphys bought 5 chicken dinners for \$2.69 each. What was the total cost?
5. Gina earns \$4.50 a week babysitting. How much will she earn in 3 weeks?
6. Diane saves \$0.45 each week. How much will Diane save in 7 weeks?
7. The temperature rose one day until it was 3.4 degrees above the record. If the record had been 94.7 degrees, what is the new record?
8. There were 14.6 inches of snow in January, 11.7 inches in February, and 4.9 inches in March. How many inches of snow fell during the three months?
9. If 0.6 of a region is red and 0.8 of the red region is shaded, how much of the region is red and shaded?
10. If 0.898 inch of rain fell during 6 hours, what was the average amount of rain per hour?
11. If 8.348 inches of snow fell during 4 weeks, what was the average amount of snow per week?

(Decimals - continued)

12. The rainfall for 5 days in Arizona was: 0.7 inch, 0.2 inch, 0.8 inch, 0.3 inch, and 0.5 inch. What was the total rainfall for the 5 days?
13. Pam kept a record of the number of miles she traveled during her vacation. Her record shows 321.6, 129.4, 309.7, and 169.6 miles. How many miles did she travel in all?
14. Linda ran 200 yards in 28.3 seconds. She ran the first 100 yards in 13.8 seconds. How long did it take her to run the second 100 yards?
15. Mr. Carlson works in a machine shop. He cut a steel rod into 3 pieces. One piece was 16.04 inches, the second piece was 12.31 inches, and the third piece was 14.89 inches. How long was the original steel rod?
16. A United States gallon of water weighs 8.33 pounds. How many pounds were left after 3.11 pounds were used?
17. In the swimming meet, Phillip won the following points on 3 dives - 53.34, 62.39, and 49.51. What was his total score?
18. Janice swam a race in 5.28 minutes. Jill swam the same race in 3.96 minutes. How much faster did Jill swim?
19. Judy had \$2.54. Her mother gave her \$4.09. How much money does Judy have altogether?
20. Jerry lives 2.2 miles from school. Keith lives 1.9 miles from school. How much farther does Jerry live from school than Keith?

## X. METRIC MEASURES

- 1 kilometer (km) = 1000 meters (m)
- 1 meter = 100 centimeters (cm)
- 1 meter = 1000 millimeters (mm)
- 1 meter = about 39 inches
- 1 centimeter = 10 millimeters
- 1 kilogram (kg) = 1000 grams (g)
- 1 liter (l) = 1000 milliliters (ml)

1. Crunchy Chews contains 490 grams. Munchos contain 468 grams. How many more grams are in the Crunchy Chews?
2. There are 18 servings in Munchos (468 grams per box). How many grams of Munchos are in 1 serving?
3. Rachelle weighed 37.8 kilograms. She gained 1.7 kilograms. Then how much did she weigh?
4. Find the average height of the girls:  
     Sue: 148 cm    Linda: 161 cm    Mary Ella: 154 cm
5. A 32-meter piece of rope must be cut into 10 equal pieces. How long will each piece be?
6. The long-jump record for three frog-jumps in a row is 0.0087 kilometer. Find the distance in meters.
7. Longest steel-arch bridge: 0.503 km, or \_\_\_\_\_m.
8. Shortest frog: 0.0121 m or \_\_\_\_\_mm.
9. Thickness of paper: 0.0074 cm, or \_\_\_\_\_mm.
10. Baseball: 0.141 kg, or \_\_\_\_\_g.
11. Newborn kitten: 0.097 kg, or \_\_\_\_\_g.
12. Milk in baby's bottle: 0.23 l, or \_\_\_\_\_ml.
13. The longest vehicle in the world is a trailer 0.175 kilometers long. How many meters long is this trailer?
14. A badge is 0.03 meter wide. How long is a row of 1000 badges?

(Metric measures - continued)

15. A dictionary is 0.046 meter thick. How tall is a stack of 100 dictionaries?
16. Mrs. Smith drives 48 kilometers each day. How many kilometers does she drive in 125 days?
17. Mrs. Solom catches a Northern that weighs  $3\frac{1}{2}$  kilograms, and a Sunfish that weighs  $1\frac{1}{2}$  kilograms. What is the difference in their weights?
18. Bill jumped 2 meters. About how many inches did he jump?
19. On the way home, Jessie bought a 2000 gram package of candy. How many kilograms did she buy?
20. Mrs. Erickson bought 4 liters of milk on her way home from work. How many milliliters of milk was this?

## XI. POST-TEST FOR GRADE FIVE

Solve the following problems:

1. Seven-tenths of a person's body weight is water. Ann weighs 120 pounds. Water makes up how many pounds of Ann's weight?
2. In Avondale, the average rainfall during the wettest month is 7.9 inches. During the driest month the average rainfall is 0.3 inch. What is the difference in average rainfall for these months?
3. Michelle walks 1,400 m to school. How many kilometers is this?
4. Angie bowled 3 games last Saturday. Her scores were 139, 95, and 110. What was her total score for that day?
5. The 21 cabins at the camp have the same number of campers in each. There are 252 campers in all. How many campers are in each cabin?
6. What is the difference in cost between a tape recorder at \$19.98 and one at \$24.69?
7. In the United States, each person uses about 60 gallons of water per day in the home. About how many gallons does a person use in 7 days? In 30 days?
8. Joan planted  $\frac{3}{8}$  of the yard with corn and  $\frac{4}{8}$  of the yard in peas. What part of the yard did she use?
9. Bridget jumped  $3\frac{1}{3}$  feet and Carey jumped  $2\frac{5}{6}$  feet. How much longer was Bridget's jump?
10. There are 16 tablespoons in one cup. How many tablespoons in  $\frac{1}{4}$  cup?  $\frac{3}{4}$  cup?

(Post-Test for Grade Five - continued)

11. What is the total weight of 2 packages of cheese marked 0.67 pound and 0.31 pound?
12. Longest snail: 0.26 meter, or \_\_\_\_\_centimeters.
13. 3,123 spectators attended the ball game Friday, and 4,278 attended Saturday. How many attended during the two days?
14. In 5 days, Mr. Simms drives 375 miles on his regular bus route. How many miles does he drive each day?
15. Eighty boys were hired to pick watermelons. If each boy picked 75 watermelons, how many were picked by all 80 boys?

## XII. ANSWERS TO PROBLEMS FOR GRADE FIVE

Pre-Test

1. Addition - 1306 people
2. Multiplication - \$5.31
3. Division - 1374 bundles
4. Subtraction - 25 guppies
5.  $\div$  Fraction -  $\frac{9}{10}$  in.
6. - Fraction -  $\frac{3}{4}$  of the people
7.  $\times$  Fraction -  $\frac{1}{3}$  are white
8. - Decimal - 1.6 pounds
9. Metric - 17.8 cm.
10. Addition - 61313 names
11. Multiplication - 744 hours
12. Division - 243 pearls
13. Subtraction - 5963 students
14.  $\div$  Fraction -  $\frac{11}{8}$  hours
15. - Fraction -  $\frac{5}{12}$  dozen

Addition Problems

1. 1668 people
2. 313 cars
3. 1160 stamps
4. 1763 miles
5. 399 miles
6. 491 books
7. 235 pages
8. \$15.26
9. 133 papers
10. 37015 lollipops
11. 2145 coins
12. \$12.42
13. 41 gallons
14. \$205.56
15. 85173 miles
16. 1733 pages
17. 1605 miles
18. 44628 parts
19. 979 repairs
20. 4296 hours

Subtraction Problems

1. 33 baskets
2. 16 children
3. 59 stamps
4. 28 coins
5. \$7.85
6. 26 chairs
7. \$14.12
8. 109 pages
9. 48 miles
10. 8207 miles
11. 1206 points
12. 4574 minutes
13. 3078 hot dogs
14. 181002 pounds
15. \$10.02
16. 37 students
17. Answer varies
18. 8302 seats
19. 369 pounds
20. 8264 tickets

Multiplication Problems

1. 210 minutes
2. \$1.05
3. \$4.83
4. 258 papers
5. 720 hours
6. 30000 cans, 420000
7. 108 cards
8. 1344 stamps
9. 646 hot dogs
10. 225 programs
11. 10000 nickels
12. 756 pieces
13. 558 children
14. 330 minutes
15. \$1003
16. \$1799.76
17. 9681 persons
18. 14112 planes
19. \$49.70
20. \$258.96

Division Problems

1. 700 miles/hour
2. \$600
3. \$17.63
4. 16 canoes
5. 14 members
6. 25 scissors, 1
7. 608 people
8. 9 stacks, 3
9. 16 bags
10. 60 miles/hour
11. 39 boxes
12. \$249
13. 34 pieces
14. 92 pounds
15. 40 boxes
16. \$.72
17. 815 miles
18. 180 cartons, 69
19. 850 pounds
20. 1535 bags

(Answers to Grade Five Problems - continued)

<u>Addition Fractions</u>	<u>Subtraction Fractions</u>	<u>Multiplication Fractions</u>
1. $6/8$ mile	1. $1/2$ pie	1. $1/20$ ounce
2. $7/10$ inch	2. $2/8$ or $1/4$ yard	2. 20 years
3. $7/6$ cup	3. $9/10$ pop.	3. 8 hours
4. $8-6/10$ miles	4. $47/50$ land	4. 2 cups, 5
5. $8-1/6$ miles	5. $2/7$ is land	5. \$50
6. $6-2/9$ points	6. $1/6$ don't	6. 12 days
7. $17-5/12$ feet	7. $2-1/2$ hours	7. 9 bass
8. $11/18$ of all	8. $1-1/4$ yards	8. $1/3$ is red roses
9. $4-3/8$ pounds	9. Sheila, $1/5$ mi.	9. 24 stamps
10. $1-1/4$ hours	10. $3-3/8$ inches	10. $1/15$ for mysteries
11. $2-1/2$ hours	11. $3/8$ gallon	11. $1-1/5$ inches
12. $5/6$ mile	12. $1/2$ hour	12. $5-1/4$ hours
13. $17/20$ hour	13. $5/10$ mile	13. $1/3$ pint
14. $6-1/3$ blocks	14. $27-1/5$ gallons	14. $1/4$ of the j. beans
15. $10-1/6$ hours	15. Lisa, $1/8$ more	15. $3/4$ of the job
16. $5-7/15$ hours	16. $1-1/4$ inches	16. $5-1/3$ qts.
17. $3-14/30$ miles	17. $6-3/4$ yards	17. $2-2/3$ feet
18. $6-1/4$ cups	18. $1-3/10$ seconds	18. $30-2/3$ pounds
19. $14-6/10$ miles	19. $1-1/4$ pounds	19. $13/20$ ounce
20. $2-3/4$ gallons	20. $2-5/12$ feet	20. $24-1/2$ inches

DecimalsMetricPost-Test

1. 6.8 gallons	1. 22 grams	1. x Fraction - 84 pds.
2. 6.4 pounds	2. 26 grams	2. - Fraction - 7.6 inch
3. 2.1 pounds	3. 39.5 kg	3. Metric - $1/4$ km
4. \$13.45	4. 154.3 cm	4. Addition - 344 pts.
5. \$13.50	5. 3.2 m	5. Division - 12 campers
6. \$3.15	6. 8.7 m	6. Subtract - \$4.71
7. 98.1 degrees	7. 503 m	7. Mult. 420 gal., 1800
8. 31.2 inches	8. 12.1 mm	8. $\neq$ Fraction - $7/8$ yard
9. 0.48 region	9. 0.074 mm	9. - Fraction $1/2$ foot
10. 0.15 inch	10. 141 g	10. x Frac.-4T., 12 T.
11. 2.09 inches	11. 97 g	11. Decimals 9.8 pounds
12. 2.5 inches	12. 230 ml	12. Metric - 26 cm
13. 930.3 miles	13. 175 m	13. Addition - 7401 people
14. 14.5 seconds	14. 30 m	14. Division - 75 miles
15. 25.66 inches	15. 4.6 m	15. Mult. 6000 w.melons
16. 5.22 pounds	16. 6000 km	
17. 165.24 points	17. 2 kg	
18. 1.32 minutes	18. 78 inches	
19. \$6.63	19. 2 kg	
20. 0.3 miles	20. 4000 ml	

## CHAPTER VI

### PROBLEMS TO SOLVE FOR GRADE SIX

Sixth grade students have had quite a bit of experience by this time in solving verbal problems. The major areas covered are: addition, subtraction, multiplication and division. More emphasis is placed on multiplying and dividing fractions, as well as on problems dealing with percent. Both sentence structure and computations are kept at a level at which the student may perform.

This section will include a pre-test which may be given to students to point out areas in which a student may need additional practice. There will also be a section of twenty-problems each for the four main areas: addition, subtraction, multiplication, and division. Included, also, will be a section of twenty problems on fractions (addition, subtraction, multiplication, and division), decimals, percents and metric measures.

The teacher must realize that many more problems could have been added to each section and he or she is certainly free to do so. These problems may be used in any way the teacher wishes to strengthen the student's ability to solve verbal problems. At the end, there is a post-test covering the basic content areas of mathematics.

## I. PRE-TEST FOR GRADE SIX

Solve the following problems:

1. In December, three jets were flown the following number of miles: 53,187; 38,334; and 65,197. What was the total number of miles flown?
2. John earned 2,298 points and his sister earned twice as many points. How many points did his sister earn?
3. Susan practiced the guitar  $\frac{7}{10}$  hour in the morning and  $\frac{8}{10}$  hour in the afternoon. How long did Susan practice the guitar?
4. How many  $\frac{1}{2}$  inch slices can you get from a 16 inch loaf of bread?
5. There are 40 boys on the varsity team. 20% of all the boys in the school are on this team. How many boys are in the school?
6. Cocoa in thermos: 2.9 l., or \_\_\_\_\_ ml.
7. Lea had some comic books. Larry gave her 34 more comics. Then Lea had 91 comics. How many comics did Lea have to begin with?
8. There are 988 pupils enrolled in Kennedy School. If there are 26 pupils in each class, how many classes are in Kennedy School?
9. Trixie and Tricia have painted  $\frac{6}{7}$  of a room. Tricia painted  $\frac{3}{7}$  of the room. What part of the room did Trixie paint?
10. A can of cut beans weighs  $\frac{2}{3}$  pound. How many pounds would 3 cans of beans weigh?
11. Justin crossed the 412.5 foot bridge in 3 min. How many feet per minute did he cover?
12. The St. Thomas girls' basketball team won 40% of the games played. The team won 6 games. How many games were played?
13. A bus traveled 96.5 kilometers. How many meters is this?

(Pre-test for Grade Six - continued)

14. Twenty-four pupils are in Mr. Johnson's class. If  $\frac{2}{3}$  of his pupils are girls, how many of his pupils are girls? How many of Mr. Johnson's class are boys?
15. How many  $\frac{1}{8}$  yard pieces can Maribeth cut from a ribbon  $\frac{3}{4}$  yard long?

## II. ADDITION PROBLEMS

1. The price of Lucia's new bicycle was \$59.49. The sales tax was \$2.95. What was the total cost?
2. The Klein family traveled 425 miles on Monday, 379 miles on Tuesday, and 328 miles on Wednesday. How far did they travel altogether?
3. Janelle went shopping and bought the following items: puzzle, \$1.98; candy, \$.69; and a book, \$1.89. How much did she spend in all?
4. Susie's scores in bowling were: 64, 189, and 117. What was her three-game total?
5. The Ericksons spent \$63.71 for groceries, \$24.95 for clothing, and \$9.60 for gasoline in one week. How much did they spend in all?
6. What is the cost of mailing 3 packages; one at \$1.21, one at 84¢, and one at \$2.43?
7. Ricky went to the store and made the following purchases: 2 cans of peas, 29¢ each; 1 package of cereal, 79¢; 1 qt. of milk, 48¢. What was the total cost of his purchases?
8. Judy counted the money in her supermarket cash register. She had two \$100-bills; twenty-one \$10-bills; and forty-three \$1-bills. How much money did she have?
9. Last month 3 jets were flown the following number of miles: 43,714; 4,129; and 37,656. What was the total number of miles flown?
10. Last night, 28,135 people attended the concert. This afternoon 9,158 attended. How many came to the two performances?
11. The San Diego Zoo has 265 kinds of mammals, 1004 kinds of birds, and 292 kinds of reptiles. How many different kinds of animals does the zoo have?
12. Here are figures for the money taken in at the ticket office at the games last year: \$31,792; \$27,561; and \$29,016. What was the total intake for these games?
13. Stationer's Corporation filled 5,341 orders last week and 8,290 orders this week. How many orders were filled in these two weeks?

(Addition problems - continued)

14. Shelly bought a new outfit while in Africa; a blouse, 725 francs; cloth for a skirt, 1275 francs; cloth for a head-tie, 250 francs; and shoes 1750 francs. What was the total cost in francs? About 250 francs is \$1.00. How many dollars did she spend?
15. Chris took a plane to Seattle, an air distance of 984 miles. In Seattle, she boarded a new plane to Salt Lake City, a distance of 547 miles. What was the distance Chris covered in the planes?
16. A trucker drove 628 miles on one trip and 846 miles on another trip. What was the total number of miles he drove on these two trips?
17. In three weeks, Mr. Johnson carried the following number of passengers on his bus: 3,418; 2,196; and 6,296. What was the total number of passengers carried in the three weeks?
18. The odometer readings on the last three cars that Mr. Campo sold were 23,187; 48,756; and 18,145. How many miles were recorded on these three cars?
19. At the beginning of last year, the library had 36,258 books. During the first six months 1,899 books were obtained and during the last six months 2,655 books were obtained. How many books did the library have at the end of the year?
20. The space-ship Explorer X made one orbit of the Earth, a distance of 18,635 miles. Then it traveled 243,168 miles to the moon. How many miles did it travel in all?

## III. SUBTRACTION PROBLEMS

1. The school library has 4781 books in two rooms. There are 2116 in one room. How many books are in the other room?
2. Teri has received 19 issue of Highlights magazine. She has paid for 52 issues. How many more issues will she receive?
3. During the year, Charlie read 105 science fiction books and 18 biographies. How many more science fiction books did he read?
4. Robert has read 154 pages of a book. The book has 302 pages. How many more pages does Robert have to read?
5. Gerry had 114 coins in her collection. She was given more coins on her birthday. Then she had 131 coins. How many coins was Gerry given for her birthday?
6. Mrs. Johnson had \$33 in her wallet. She cashed a check and then she had \$193. What was the amount of the check?
7. For lunch, Barb bought a sandwich for \$.55 and also a dessert. She spent \$.89 in all. How much did she spend for dessert?
8. Patricia had \$5.26. She bought a record for \$4.89. How much money did she have left?
9. As a result of a safety campaign, the number of traffic accidents in Maricopa County dropped from 281 to 139 in one year. What was the decrease in the number of accidents?
10. The enrollment at Madison School is 716 students. There are 605 students at St. Thomas School. How many more students are at Madison?
11. Joanne saved \$19.48. Then she spent \$8.99 of it for a new pantsuit. How much does she have left?
12. The Boeing 727 jet mainliner is smaller and faster than the Boeing 720. The wingspan of the 720 is 1570 inches, where the 727 is only 1303 inches. Find the difference.

(Subtraction problems - continued)

13. Mrs. Murphy wanted to keep her daily calorie count down to 1500. Before the evening meal, she counted her intake to be 968 calories. How many calories could her dinner have?
14. Celia has \$1.37. She wants to buy a record for \$5.98. How much more must she save?
15. This month, 33,914 people visited the museum. Last month, 27,526 people visited the museum. How many more people visited the museum this month than last month?
16. After inventory, there were 141,619 books in the library. In September, 1,901 books were checked out. How many books were still in the library?
17. It takes 489 points to win a prize. If Eric now has 297 points, how many more points does he need in order to win a prize?
18. Factory A employs 6231 people and Factory B employs 4769 people. How many more people does Factory A employ than Factory B?
19. Mr. Ward had 56,125 miles on his car when he traded it for a newer car. If the newer car had 3,879 miles on it, how many fewer miles does it have than the older car?
20. Last year, 36,148 orders were shipped from a warehouse. So far this year, 6,145 orders have been shipped. How many more orders must be shipped this year in order to match the total for last year?

## IV. MULTIPLICATION PROBLEMS

1. If 66 passengers can be carried on each bus, how many passengers can be carried on 8 buses?
2. Five hundred forty-five meals were prepared each day for 6 days. How many meals were prepared in the 6 days?
3. A machine is designed to produce 1,874 parts each day. How many parts should the machine produce in 8 days?
4. Mr. Dewey set up 9 trays of rocks. Each tray had 41 rocks on it. How many rocks were there in all?
5. Lois had 124 pages in her scrapbook. Each page had 6 pictures on it. How many pictures were there in all?
6. Tim had 39 packages of baseball cards. There were 8 cards in each package. How many baseball cards did Tim have?
7. If each box weighs 24 pounds, what is the total weight of 36 boxes?
8. Each of the carpenters in a construction firm worked 46 hours last week. If there are 18 carpenters, what is the total number of hours worked?
9. The production schedule estimates that 436 machines can be produced each week. At that rate, how many machines can be produced in 52 weeks?
10. The rail distance between Los Angeles and New York is 3,257 miles. How many miles would a train travel if it made 32 one-way trips between the two cities?
11. There are 237 cases of soap in the warehouse. Each case contains 144 bars. How many bars are in the warehouse?
12. Mrs. Burnotte bought 37 packages of hamburgers for the school lunch. Each package had 48 hamburgers in it. How many hamburgers did she use for the school lunch?
13. She also purchased 17 boxes of catsup packs. There were 24 packs in each box. How many catsup packs were there in all?

## (Multiplication problems - continued)

14. The grapefruit orchard has 89 trees in each row. How many trees are there in 75 rows?
15. A manufacturing company has 12 departments with 985 workers in each department. How many workers does the company employ?
16. Jim packed 36 cans of fruit in each of 48 boxes. How many cans of fruit did he pack in all?
17. What is the cost of 54 color TV sets at \$298 each?
18. Mr. Tracy pays \$14.96 in interest on a loan each month. How much interest does he pay in a year?
19. Bill reads at the rate of 96 words per minute. How many words does he read in 45 minutes?
20. Mr. Duncan, the electrician, installed 748 light bulbs in a ballroom at a big hotel. Each bulb is 15-watts. How many watts of electricity will the room have if all these lights are on?

## V. DIVISION PROBLEMS

1. How many guides are needed to conduct tours for 152 students if each guide can take 8 people?
2. How many bags holding 5 pounds of pecans can be filled from a bin filled with 4825 pounds of pecans?
3. How many 12-foot strips of crepe paper can be cut from a 200-foot roll? How many feet are left?
4. Steve sold 96 hot dogs for a total of \$27.84. What had each hot dog cost?
5. A ship's crew drinks 14 gallons of water each day. They have 520 gallons of water on board. How many full days can they stay at sea?
6. A pair of boots costs 26 pesos. How many pairs of boots can be bought with 460 pesos?
7. There are 641,088 people in Boston. The area of Boston is 48 sq. miles. What is the population per square mile?
8. The population of Oklahoma City is 366,685. There are 649 sq. miles. How many persons live per sq. mile?
9. As each new car comes off an assembly line, it receives 8 gallons of gasoline. How many new cars receive gasoline from a tank containing 2,440 gallons?
10. Four pounds of candy are placed in each box. How many boxes are needed to package 273 pounds of candy? How many pounds of candy would be left over?
11. Each carton of pop holds 6 bottles. How many full cartons could be filled with 3,185 bottles of pop? How many bottles of pop would be left over?
12. A bank considers 30 days to be a month. How many months would there be in 9,245 days. How many days left over?

## (Division problems - continued)

13. During a two-week period, 75 employees worked a total of 5,625 hours. Each employee worked the same number of hours. How many hours did each employee work?
14. There are 76 sections with a total of 17,100 seats in the new stadium. Each section has the same number of seats. How many seats are in each section?
15. Three dozen grapefruit are packed in a case. How many cases would be needed to pack 27,100 grapefruit? How many grapefruit would be left over?
16. If it takes 28 minutes to make one toy, how many toys could be made in 196 minutes?
17. There were 5,790 tickets sold to the game. There are 75 tickets in a block of tickets. How many complete blocks of tickets were sold? How many tickets were left over?
18. A satellite orbits the moon every 53 minutes. How many complete orbits could it make in 6438 minutes? How many minutes would be left over?
19. Mountain Bell made desk phones in different colors. They made 250 phones in each color. If they made 2750 phones in all, how many colors were used?
20. A class of 78 students donated \$103.00 to the emergency flood fund. What was the average donation?

## VI. ADDITION OF FRACTIONS

1. Wally drank  $\frac{1}{4}$  gallon of milk yesterday and  $\frac{1}{4}$  gallon of milk today. What part of a gallon of milk did he drink during these two days?
2. Todd measured two boards and found that each one was  $\frac{5}{8}$  inch thick. What would the total thickness be in inches if he glues the boards together?
3. Jack spent  $\frac{10}{12}$  hour studying spelling and  $\frac{5}{12}$  hour studying history. How much time did he spend studying spelling and history?
4. A record has been playing for  $\frac{1}{3}$  hour. The record still has  $\frac{1}{12}$  hour to play. What is the total length of time the record can play?
5. Shirley read  $\frac{3}{5}$  hour in the morning and  $\frac{1}{2}$  hour in the afternoon. How many hours did she read in the morning and afternoon?
6. Sandra uses  $2\frac{3}{4}$  yard of ribbon to wrap one package and  $1\frac{1}{2}$  yards of ribbon to wrap another. How much ribbon does she use altogether?
7. If Billy joins a  $21\frac{1}{2}$  yard length of string and a  $17\frac{2}{3}$  yard length, what is the total length of string he uses?
8. Susie walked  $\frac{7}{10}$  mile home from the grocery store, then  $\frac{2}{10}$  mile to school. How far did she walk?
9. Sam ate  $\frac{1}{5}$  of the batch of cookies. Dick ate  $\frac{2}{5}$  of them. What part of the batch of cookies did they eat in all?
10. In a recipe, Ellen used  $\frac{3}{4}$  cup milk and  $\frac{1}{6}$  cup water. How much liquid did she use?
11. Jeff pushed two desks together. The width of one desk was  $3\frac{5}{6}$  feet. The width of the other desk was  $4\frac{1}{3}$  feet. What was the total width?
12. Jack made a cone with  $\frac{1}{3}$  pint of chocolate ice cream and  $\frac{2}{5}$  pint of mint ice cream. How much ice cream did he use in his cone?

(Addition of fractions - continued)

13. Ron gave  $\frac{1}{5}$  of a candy bar to his brother. He gave another  $\frac{1}{5}$  to a friend. Then he ate  $\frac{1}{2}$  of it himself. How much of the candy bar was gone?
14. On a trip to Niagara Falls, John used  $\frac{3}{4}$  of a roll of film on the way,  $2\frac{1}{8}$  rolls while he was there, and  $1\frac{1}{4}$  rolls on the way home. He had used how much film?
15. Sue had a bag of potting soil. After she had put  $5\frac{2}{3}$  cup of soil in a flower pot, she had  $2\frac{2}{3}$  cup left. How much soil did she begin with?
16. Jack has two boxes. One weighs  $3\frac{3}{10}$  pounds, and the other weighs  $1\frac{7}{8}$  pounds. What is the combined weight of both boxes?
17. Teri grew  $\frac{3}{4}$  of an inch in May and  $\frac{5}{8}$  of an inch in June. How much did she grow in the two months?
18. Judy studied  $1\frac{2}{3}$  hours on Monday and  $2\frac{1}{2}$  hours on Wednesday. How many hours did she study altogether?
19. Kurt worked  $2\frac{1}{4}$  hours on Friday and  $7\frac{2}{3}$  hours on Saturday. How many hours did he work in the two days?
20. It took John  $\frac{9}{10}$  hour to do his homework. It took Tom  $\frac{5}{6}$  hour to do his homework. What was the total amount of time both boys spent doing their homework?

## VII. SUBTRACTION OF FRACTIONS

1. An unopened box of cereal weighs  $15/16$  pound. If  $5/16$  pound of cereal is removed from the box, how much of a pound of cereal remains in the box?
2. A class period has just begun and will last  $5/6$  hour. After  $4/6$  hour, what fractional part of an hour remains in the period?
3. Bill has a board that is  $1/8$  inch too wide. If the board is  $3/4$  inch wide, what width of board does Bill need?
4. Together Beth and Dan paint  $5/6$  of the wall. If Beth paints  $1/2$  of the wall, how much of the wall does Dan paint?
5. Liz lives  $3/4$  mile from school; Jerry lives  $2/3$  mile from school. How much farther does Liz live from school?
6. Chuck had  $5/6$  of a pie. He ate  $1/5$  of the pie. How much pie was left?
7. Angie's earring is  $5/7$  inch long. Jane's earring is  $2/3$  inch long. How much longer is Angie's earring?
8. Bert walks  $3/5$  mile on his paper route each day except on Sunday. On Sunday, he walks  $5/7$  mile. How much farther does he walk on Sunday?
9. An average flea is  $1/32$  inch long. An average ant is  $3/4$  inch long. How much longer is the average ant?
10. Tim ran the race in  $4/5$  min. Jerry ran the race in  $9/12$  min. How much faster was Jerry?
11. Molly's mother used  $3/4$  cup of sugar to make lemon drop cookies and  $2/3$  cup to make spice bars. How much more sugar was used for the cookies?
12. Martha jumped  $4-1/2$  feet. Lucy jumped  $3-1/6$  feet. How much longer was Martha's jump?
13. Nancy and Jane went fishing. Nancy's fish is  $13-1/4$  inches long and Jane's is  $11-1/2$  inches long. How much longer is Nancy's?

(Subtraction of fractions - continued)

14. Jill bought  $2\frac{1}{2}$  yards of cloth. After she had made an apron, she had  $1\frac{1}{16}$  yards left. How much cloth was used for the apron?
15. Before her vacation, Ann weighed  $71\frac{3}{4}$  pounds. After the vacation, she weighed 74 pounds. How many pounds did she gain on her vacation?
16. Bill rides his bike  $2\frac{3}{5}$  miles to school each day. His dad drives  $4\frac{1}{10}$  miles to work each day. How much farther does his dad travel when going to work?
17. Kelly bought 8 pounds of nuts. She had  $5\frac{3}{4}$  pounds of peanuts and the rest were cashews. How many pounds of cashews were there?
18. Mrs. Barto bought  $5\frac{5}{8}$  yards of curtain material. She used  $2\frac{1}{3}$  yards. How much did she have left?
19. Trixie bought  $3\frac{3}{4}$  pounds of ground veal and  $2\frac{1}{3}$  pounds of ground beef. How many more pounds of veal did she buy?
20. Sarah bought 6 yards of fabric and used  $3\frac{2}{3}$  yards. How much does she have left?

## VIII. MULTIPLICATION OF FRACTIONS

1. Mrs. Smith had  $\frac{3}{4}$  gallon of milk. If  $\frac{1}{2}$  of this amount was used for dinner, what fractional part of a gallon was used for dinner?
2. Marsha read  $\frac{4}{5}$  of a book. Two-thirds of that reading was done at school. What fractional part of the book did she read at school?
3. Six-sevenths of the pupils are girls. If  $\frac{2}{3}$  of the girls are in class today, what fractional part of all the pupils are girls in class today?
4. Three-fourths of the room is now painted. If Joe did  $\frac{2}{9}$  of the painting, what fractional part of the room did Joe paint?
5. Two-thirds of the morning class session is completed. If  $\frac{1}{3}$  of that time was spent studying English, what fractional part of the morning session was spent studying English?
6. Three-fifths of an order is filled. If Miss Graham prepared  $\frac{5}{6}$  of this amount, what fractional part of the order did Miss Graham prepare?
7. Mother had  $\frac{5}{8}$  of a pie for dinner. If  $\frac{4}{5}$  of this amount was eaten at dinner, what fractional part of the whole pie was eaten at dinner?
8. The plumber expects the job to take him 10 hours to complete. If he has already worked  $\frac{5}{6}$  of this expected time, how many hours has he worked?
9. Each book is  $\frac{7}{8}$  inch thick. How many inches high would a stack of 12 such books be?
10. The carpenter stacked 15 sheets of wall board on top of each other. If each sheet is  $\frac{5}{8}$  inch thick, how high is the stack?
11. Millie, Eileen, Peter and John each practiced the piano for  $\frac{3}{4}$  hours. How many hours of practice was this?
12. Each class period lasts  $\frac{5}{6}$  hours. How many hours are there in 9 class periods?

## (Multiplication of fractions - continued)

13. If it takes  $1\frac{4}{5}$  hours to process 1 ton of ore, how many hours would it take to process  $3\frac{1}{3}$  tons of ore?
14. Each box of bolts weighs  $3\frac{3}{4}$  pounds. How many pounds would  $8\frac{1}{2}$  boxes weigh?
15. The boys can walk  $3\frac{1}{2}$  miles in 1 hour. At that rate, how many miles could the boys walk in  $1\frac{1}{6}$  hours?
16. There are 33 bones in the spine. Eight-elevenths of them are vertebrae joined by cartilage. There are how many vertebrae joined by cartilage?
17. David's body contains 90 pounds of water. About  $\frac{1}{15}$  of this water is in his bones. About how many pounds of water are in David's bones?
18. Brad's actual height is 28 times as great as his height in a photo. Brad's height in the photo is  $2\frac{5}{7}$  inches. What is Brad's actual height?
19. There are 72 students in Mrs. Webb's chorus class. If  $\frac{2}{3}$  of the students are girls, how many girls are there in Ellen's class?
20. The school let the boys play on  $\frac{3}{4}$  of the playground. They used  $\frac{4}{5}$  of their space for soccer. What part of the whole playground was used for the boys' soccer?

## IX. DIVISION OF FRACTIONS

1. How many  $\frac{5}{8}$  inch slices can you get from a 12-inch meat loaf?
2. How many  $\frac{1}{4}$  pound patties can you get from  $7\frac{1}{2}$  pounds of hamburger?
3. How many  $\frac{2}{3}$  cup servings can you get from 16 cups of cereal?
4. A shower uses  $4\frac{1}{2}$  gallons of water each minute. In how many minutes will 60 gallons of water be used?
5. A person needs  $2\frac{1}{2}$  quarts of water each day to survive. For how many days could a person survive on 80 quarts of water?
6. It takes 1350 pounds of water to produce a pound of aluminum. If one gallon of water weighs  $8\frac{1}{3}$  pounds, how many gallons of water are needed to produce a pound of aluminum?
7. A canteen holds  $1\frac{1}{2}$  pints of water. How many canteens can be filled with 18 pints of water?
8. How many  $\frac{1}{2}$  pint containers can be filled from a bottle holding 8 pints?
9. Grade 6 is making Pep Club ribbons for the football game. Each ribbon is to be  $\frac{3}{4}$  foot long. How many ribbons can they make from a ribbon 75 feet long?
10. Mary Ella has a piece of drapery material  $\frac{3}{4}$  yard long. How many pieces, each  $\frac{1}{8}$  yard long, can she cut from it?
11. Mr. Hayes took 48 pounds of cantaloupes to the market. Each cantaloupe weighed about  $1\frac{1}{5}$  pounds. How many cantaloupes did he take to the market?
12. The Boy Scouts went on a 45-mile hike. They planned to hike  $7\frac{1}{2}$  miles each day. How many days would it take them?
13. How long would it take to get 32 gallons out of a water tank, if it is taken out at the rate of  $\frac{2}{3}$  gallon per minute?

(Division of fractions - continued)

14. Mrs. Keeley baked 4 pies for her dinner party. She cut each pie into eighths. How many pieces did she get?
15. If a candy box holds  $\frac{1}{4}$  pound of candy, how many boxes can be filled with 16 pounds of candy?
16. If Jim saves  $\frac{3}{4}$  of a dollar a day, how many days will it take him to save \$30.00?
17. Janet's notepaper is 9 inches wide. How many columns, each  $\frac{3}{4}$  inch wide, can she draw?
18. Todd has  $\frac{2}{3}$  of an hour to finish 5 problems. If he takes the same amount of time for each problem, what part of an hour should he spend on each problem?
19. A pint is  $\frac{1}{8}$  of a gallon. How many pints is  $\frac{3}{4}$  of a gallon?
20. If a brick is  $\frac{3}{4}$  of a foot long, how many bricks will it take to make a row  $7\frac{1}{2}$  feet long?

## X. DECIMALS

1. Find the batting average to the nearest thousandth: 57 hits, 200 times at bat.
2. From Phoenix to Tempe is 4.9 miles, and from Tempe to Scottsdale is 2.3 miles. Name the total mileage from Phoenix to Scottsdale by way of Tempe.
3. One sheet of metal is 0.37 cm thick, and the other is 0.51 cm thick. What is the difference in thickness?
4. An engineer has two pieces of wire. One measures 0.47 inch and the other measures 0.36 inch. What is their combined length?
5. Jim took a bike ride. He went 0.4 mile to the grocery store. Then he went 0.3 mile to the library and rode 0.7 mile back home. How far did he ride?
6. Mark paid \$0.39 for a loaf of bread and \$0.89 for milk. How much did he spend altogether?
7. A scientist measured 0.19 units of a liquid. She added 0.36 units. What was the new total?
8. The odometer on the new car read 0.7. The mechanic test-drove it for 2.9 miles. What did the odometer read then?
9. Gail's times for each quarter of her record mile run were 58.3, 58.1, 59.1, and 58.9 seconds. What was her total time in seconds?
10. The radio announcer said at noon that the temperature was 61.7 degrees. At 1 p.m., she announced that the temperature had gone up 0.5 of a degree. What was the temperature at 1 p.m.?
11. Mr. Nelson cut 0.74 cm from a piece of wire 0.93 cm long. How long was the piece of wire which was left?
12. Lucille had a \$10-bill. She spent \$0.69. How much was left?
13. Alicia's fever dropped from 102.3° to 98.6°. How many degrees had it dropped?

(Decimals - continued)

14. Carla made 4.5 gallons of preserves. She wants to put them in jars that hold 0.25 gallons each. How many jars will she need?
15. Liz is thinking of a number. She says that 0.07 times the number is 0.91. What is the number?
16. Mrs. Paul paid \$2.52 for 3 dozen cookies. How much did each cookie cost?
17. Jay bought 5 basketballs for \$6.39 each. How much change should he receive from a \$50-bill?
18. Mr. Brown used 18.6 gallons of gasoline to drive 306.9 miles. How many miles per gallon did he average?
19. Mr. Micke has 432.6 feet of copper wire. He cuts it into pieces each 0.6 feet long. How many of these pieces can he get?
20. Mr. Smith found it was a 13.7 mile round-trip between his home and his office. If he makes 250 of these trips each year, how many miles is this?

## XI. PERCENTS

1. Kathy swam for 12 minutes underwater to a coral reef. This was 40% of the time she spent underwater. How many minutes did she spend underwater?
2. The St. Thomas football team won 8 games. This was 80% of the games played. How many games were played?
3. Jack completed 5 passes in the final game. He completed 25% of those attempted. How many were attempted?
4. Joe ran for 36 yards on a play. This was 72% of the yards he ran that day. How many yards did he run?
5. In the final game, Beth hit 60% of her foul shots. She made 12 foul shots. How many shots did she attempt?
6. The St. Thomas boys' basketball team won 14 games. This was 50% of the games played. How many games were played?
7. There are 24 students on the team. Four percent of all students in the school are on the team. How many students are in the school?
8. Aaron made 9 hits. This was 25% of the team's hits. How many hits did the team get?
9. The swimming team won 8 meets. The team won 40% of its meets. In how many meets did the team participate?
10. Seven girls can swim the butterfly stroke. This is 20% of all the girls on the team. How many girls are on the team?
11. Jane scored 8 points in the final swimming meet. This was 10% of the team's total score. How many points did her team score?
12. At basketball practice, Tom made 36 free throws out of 48 attempts. What percent did he make?
13. Jill scored 21 points in a swimming meet. This was 75% of the team's total score. How many points did the team score?

## (Percents - continued)

14. A baseball bat that usually sells for \$6.90 is reduced 20%. What is the amount of reduction?
15. If a city spends 20% of a special fund of \$700,000, how much does it spend?
16. Liz wants to save 30% of the \$35 birthday money she received. How much will she save?
17. Forty percent of the students in a class of 80 are athletes. How many are athletes?
18. There are 36 students in Beverly's class. Thirty-three was the average attendance for May. What was the attendance as a percent of the possible attendance?
19. A \$40 radio is marked down \$10. What is the percent of markdown?
20. People usually leave a tip of 15% of the bill when they go to a restaurant. How much should be left for a tip if the bill is \$16.90?

## XII. METRIC MEASURES

- 1 kilometer (km) = 1000 meters (m)
- 1 meter = 100 centimeters (cm)
- 1 meter = 1000 millimeters (mm)
- 1 meter = about 39 inches
- 1 centimeter = 10 millimeters
- 1 kilogram (kg) = 1000 grams (g)
- 1 kilogram = about 2.2 pounds
- 1 liter (l) = 1000 milliliters (ml)

1. Mark is how much taller than Debbie? Mark's height: 205 cm. Debbie's height: 148 cm.
2. A DC-10 has a takeoff distance of 3126.25 miles and a landing distance of 1634.80 miles. How much longer must a runway be for takeoff than for landing?
3. The weight of a DC-10 on takeoff was 252,272.73 kg. The weight on landing was 183,191.84 kg. How many kilograms of fuel were burned during the flight?
4. Sarah rode 2.4 km to Judy's house to pick up Judy's homework. Then she rode to school. She traveled 4.2 km in all. How far is Judy's house from school?
5. Susan recorded 1.3 cm of rain at noon one day. During the entire day, 3.2 cm of rain fell. How much rain fell after noon?
6. The Larsons traveled 3.78 km in 7 days. What was the average distance traveled per day?
7. Jane bought how many liters of gasoline? Monday - 14.9 liters, Thursday - 3.2 liters, and Saturday - 11.6 liters.
8. Chris bought two packages of meat. The package weighed 4.3 kg in all. One package weighed 1.9 kg. How much did the other package weigh?
9. Height of oak tree: 0.017 km, or \_\_\_\_m.
10. Distance from floor to ceiling: 2.6 m, or \_\_\_\_cm.
11. Thickness of eraser: 1.4 cm, or \_\_\_\_mm.
12. Bunch of grapes: 0.36 kg, or \_\_\_\_g.

(Metric measures - continued)

13. Airmail package: 2.8 kg, or \_\_\_\_\_g.
14. Water in bucket: 3.87 l, or \_\_\_\_\_ml.
15. A caterpillar is crawling at a speed of 7.4 cm per minute. How many cm will the worm crawl in 7 minutes?
16. Jeff's model train is 1.3 m long. The real train would be 88 times as long. What is the length of the real train?
17. There are four vitamin tablets, all the same. Their total weight is 1 g. How many milligrams are in each?
18. How many kilograms in 100 pounds?
19. A factory produces 350,000 cm of rope per day. How many meters is this? How many millimeters?
20. How many grams is 12 kilograms? 1.2 kg? 1000 kg?

## XIII. POST-TEST FOR GRADE SIX

Solve the following problems:

1. Suppose a street is 3000 meters long. How many kilometers is this?
2. In the grocery store, the price of fryer chickens is 59¢ per pound. Edith wants 3.6 pounds of chicken. How much will this cost?
3. Billy has  $\frac{3}{4}$  pound of candy and Sally has  $\frac{2}{3}$  pound of candy. In pounds, how much more candy does Billy have than Sally?
4. In an art contest, Susie earned 436 points, Barb earned 732 points, and Bill earned 528 points. How many points did the two girls earn?
5. Karen made some chocolate chip cookies. She used  $\frac{2}{3}$  cup brown sugar and  $\frac{1}{2}$  cup granulated sugar. How much sugar did she use in all?
6. The odometer on Mr. Knutson's car reads 46,116 and the odometer on Mr. Krueger's car reads 27,236. How many more miles are on Mr. Knutson's car than on Mr. Krueger's?
7. One gallon of water weighs  $8\frac{1}{3}$  pounds. It takes 325 pounds of water to produce a pound of paper. How many gallons of water are needed?
8. Mary bought a bike. She saved 20%. The regular price was \$80. Find the discount.
9. Height of a table: .76m, or \_\_\_\_\_ mm.
10. A construction team can pave  $2\frac{5}{6}$  miles of road in 1 day. How many miles can they pave in 5 days?
11. How many  $\frac{3}{4}$  inch segments can be marked off on a line segment 9 inches long?
12. There are 1,440 minutes in one day. How many minutes are in 365 days?
13. Gold costs \$10,980 for 90 ounces. How many dollars per ounce is this?
14. A full box of soap weighs  $2\frac{2}{3}$  pounds. How many pounds would  $1\frac{1}{3}$  boxes of soap weigh?
15. Susan scored 24 points in all. This was 75% of the team's total. How many points did the team score?

## XIV. ANSWERS TO PROBLEMS FOR GRADE SIX

Pre-test

1. Addition - 156718 miles
2. Multiplication - 4596 points
3.  $\div$  Fraction - 1-1/2 hours
4. Div. Fraction - 32 slices
5. Percent - 200 boys
6. Metric - 2900 ml.
7. Subtraction - 57 comics
8. Division - 38 pupils
9.  $-$  Fraction - 3/7 of the room
10.  $\times$  Fraction - 2 lbs.
11. Decimals - 137.5 feet
12. Percent - 15 games
13. Metric - 96500 meters
14.  $\times$  Fraction - 16 girls, 8 boys
15. Div. Fraction - 6 pieces

Addition Problems

1. \$62.44
2. 1132 miles
3. \$4.56
4. 370 points
5. \$98.26
6. \$4.48
7. \$1.85
8. \$453
9. 85499 miles
10. 37293 people
11. 1561 animals
12. \$88369
13. 13631 orders
14. 4000 francs, \$16
15. 1531 miles
16. 1474 miles
17. 11910 passengers
18. 90088 miles
19. 40812 books
20. 261803 miles

Subtraction Problems

1. 2665 books
2. 33 issues
3. 87 books
4. 148 pages
5. 17 coins
6. \$160
7. \$.34
8. \$.37
9. 142 accidents
10. 111 students
11. \$10.49
12. 267 inches
13. 532 calories
14. \$4.61
15. 6388 people
16. 139718 books
17. 192 points
18. 1462 people
19. 52246 miles
20. 30003 orders

Multiplication Problems

1. 528 passengers
2. 3270 meals
3. 14992 parts
4. 369 rocks
5. 744 pictures
6. 312 cards
7. 864 pounds
8. 828 hours
9. 22672 machines
10. 104224 miles
11. 34128 bars
12. 1776 hamburgers
13. 312 packs
14. 6675 trees
15. 11820 workers
16. 1728 cans
17. \$16092
18. \$179.52
19. 4320 words
20. 11220 watts

Division Problems

1. 19 guides
2. 965 bags
3. 16 strips, 8 left
4. 29 $\frac{1}{2}$
5. 37 days
6. 17 pair
7. 13356 persons
8. 565 persons
9. 305 cars
10. 68 boxes, 1
11. 530 cartons, 5
12. 308 months, 5
13. 75 hours
14. 225 seats
15. 752 grapefrt. 28
16. 7 toys
17. 77 blocks, 15
18. 121 orbits, 25
19. 11 colors
20. \$1.32

(Answers to Grade Six problems - continued)

Addition of Fractions

1.  $\frac{1}{2}$  gallon
2.  $1-\frac{1}{4}$  inches
3.  $1-\frac{1}{4}$  hours
4.  $\frac{5}{12}$  hour
5.  $1-\frac{1}{10}$  hours
6.  $4-\frac{1}{4}$  yards
7.  $39-\frac{1}{6}$  yards
8.  $\frac{9}{10}$  mile
9.  $\frac{3}{5}$  batch
10.  $\frac{11}{12}$  cup
11.  $8-\frac{1}{6}$  feet
12.  $\frac{11}{15}$  pint
13.  $\frac{9}{10}$  candy bar
14.  $4-\frac{1}{8}$  rolls
15.  $8-\frac{1}{3}$  cups
16.  $5-\frac{7}{40}$  pounds
17.  $1-\frac{3}{8}$  inches
18.  $4-\frac{1}{6}$  hours
19.  $9-\frac{11}{12}$  hours
20.  $1-\frac{11}{15}$  hours

Multiplication of Fractions

1.  $\frac{3}{8}$  gallon
2.  $\frac{8}{15}$  reading
3.  $\frac{4}{7}$  are girls
4.  $\frac{1}{6}$  of the room
5.  $\frac{2}{9}$  English
6.  $\frac{1}{2}$  the order
7.  $\frac{1}{2}$  of the pie
8.  $8-\frac{1}{3}$  hours
9.  $10-\frac{1}{2}$  inches
10.  $9-\frac{3}{8}$  inches
11.  $2-\frac{1}{4}$  hours
12.  $7-\frac{1}{2}$  hours
13. 6 hours
14.  $31-\frac{7}{8}$  pounds
15.  $4-\frac{1}{12}$  miles
16. 24 vertebrae
17. 6 pounds
18. 76 inches
19. 48 girls
20.  $\frac{3}{5}$  playground

Subtraction of Fractions

1.  $\frac{5}{8}$  pound
2.  $\frac{1}{6}$  hour
3.  $\frac{5}{8}$  inch
4.  $\frac{1}{3}$  of the wall
5.  $\frac{1}{12}$  mile
6.  $\frac{19}{30}$  of the pie
7.  $\frac{1}{21}$  inch
8.  $\frac{4}{35}$  mile
9.  $\frac{23}{32}$  inch
10.  $\frac{1}{20}$  min.
11.  $\frac{1}{12}$  cup
12.  $1-\frac{1}{3}$  feet
13.  $1-\frac{3}{4}$  inches
14.  $1-\frac{1}{3}$  yards
15.  $2-\frac{1}{4}$  pounds
16.  $1-\frac{1}{2}$  miles
17.  $2-\frac{1}{4}$  pounds
18.  $3-\frac{7}{24}$  yards
19.  $1-\frac{5}{12}$  pounds
20.  $2-\frac{1}{3}$  yards

Division of Fractions

1. 19 slices
2. 30 patties
3. 24 servings
4.  $13-\frac{1}{3}$  minutes
5. 32 days
6. 162 gallons
7. 12 canteens
8. 16 containers
9. 100 ribbons
10. 6 pieces
11. 40 cantaloupes
12. 6 days
13. 48 minutes
14. 32 pieces
15. 64 boxes
16. 40 days
17. 12 columns
18.  $\frac{2}{15}$  hour
19. 6 pints
20. 10 bricks

## (Answers to Grade Six problems - continued)

Decimals

1. 0.285 batting average
2. 7.2 miles
3. 0.14 cm
4. 0.83 inches
5. 1.4 miles
6. \$1.28
7. 0.55 liquid
8. 3.6 miles
9. 234.4 seconds
10. 62.2 degrees
11. 0.19 cm
12. \$9.31
13. 3.7 degrees
14. 18 jars
15. 13
16. \$0.07
17. \$18.05
18. 16.5 miles
19. 721 pieces
20. 3425 miles

Percents

1. 30 minutes
2. 10 games
3. 20 passes
4. 50 yards
5. 20 shots
6. 28 games
7. 600 students
8. 36 hits
9. 20 meets
10. 35 girls
11. 80 points
12. 75%
13. 28 points
14. \$1.38
15. \$140,000
16. \$10.50
17. 32 athletes
18. 92%
19. 25%
20. \$2.54

Metric Measures

1. 57 cm
2. 1491.45 miles
3. 69080.89 kg
4. 1.8 km
5. 1.9 cm
6. 0.54 km
7. 29.7 liters
8. 2.4 kg
9. 17 m
10. 260 cm
11. 14 mm
12. 360 g
13. 2800 g
14. 3870 ml
15. 51.8 cm
16. 114.4 m
17. 250 mg
18. 220 kg
19. 3500 m, 3.5 mm
20. 12000 g, 1200 g, 1 g

Post-test

1. Metric - 3 km
2. Decimal - \$2.12
3. - Fraction -  $\frac{1}{12}$  pound
4. Addition - 1168 points
5.  $\neq$  Fraction -  $1\frac{1}{6}$  cup
6. Subtraction - 18880 miles
7. Div. Fraction - 39 gallons
8. Percent - \$16
9. Metric - 760 mm
10. x Fraction -  $14\frac{1}{6}$  miles
11. Div. Fraction - 12 segments
12. Multiplication - 525,600 mi
13. Division - \$122
14. x Fraction -  $3\frac{5}{9}$  pounds
15. Percent - 32 points

## CHAPTER VII

### SUMMARY

In summary, mathematics teaching involves working with children in three distinct, yet frequently related, areas. The first area involves the learning of mathematical content - the ideas, concepts, and relationships that are the heart of the subject. The second area involves learning specific techniques and skills that are necessary for being able to move facilely in the world of everyday experience. Finally, from mathematical ideas and skills come applications that relate mathematics to a variety of other situations. All three of these areas are equally important. The mathematics program must become more than a curriculum of computational and measurement skills studied in isolation from its other aspects. It is most important to maintain an overall balance among content, skills and application.

Word problems are a real challenge to teacher and pupil due to the many factors that must be accurately considered. However, participation in a developmental approach to the logical solution of problems may help to clarify the processes involved. The teacher must provide many opportunities for the children to become actively engaged in these procedures.

It was the purpose of this paper to place in the hands of teachers in grades three, four, five and six, a tool with which they would be able to help students develop their ability to apply mathematics in everyday life situations. There are several problems in each of the skills area to choose from in teaching each new concept. The teacher should find this very helpful and also may wish to provide her own verbal problems or let the children make up their own. The pre-test and post-test will be a valuable aid in determining which areas a child will require additional help. The type of problem dealt with in the pre-test and post-test is noted in the answer section for each level. After a weak spot is noted by the teacher, it is up to her to provide the skills and practice to strengthen the student's ability to solve verbal problems. Hopefully this handbook will be that tool she will use.

## BIBLIOGRAPHY

## A. BOOKS

- Bingham, Alma, Improving Children's Facility in Problem Solving. New York: Bureau of Publications, 1958.
- Bolster, L. Carey, Gloria Felix Cox, and E. Glenadine Gibb. Mathematics Around Us. Glenview, Illinois: Scott, Foresman and Company, 1975.
- Brown, Gertrude Ann, Vincent J. Glennon, and Jacqueline Perreault. New Mathematics Write-in Text. Boston: Ginn and Company, 1964.
- Duncan, Ernest R., Lelon R. Capps, and Mary P. Dolciani. School Mathematics. Boston: Houghton Mifflin Company, 1975.
- France, Norman, and Betty T. Clarke. Spectrum Mathematics Series. River-Forest, Illinois: Laidlaw Brothers, 1973.
- Gates, James D., Mathematics Learning in Early Childhood. Virginia: The National Council of Teachers of Mathematics, 1975.
- Grossnickle, Foster E., and Leo J. Bruickner. Discovering Meanings in Arithmetic. Philadelphia: John C. Winston Company, 1959.
- Howard, Charles F., and Enoch Dumas. Basic Procedures in Teaching Arithmetic. Boston: D. C. Heath and Company, 1963.
- Monroe, Walter S., and Max D. Engelhart. A Critical Summary of Research Relating to the Teaching of Arithmetic. Urbana: University of Illinois, 1931.
- Newcomb, Ralph S. Modern Methods of Teaching Arithmetic. New York: Houghton Mifflin Company, 1926.
- Nichols, Eugene D., and others. Holt School Mathematics. New York: Holt, Rinehart and Winston Company, 1974.
- Ogilvy, C. Stanley. Tomorrow's Math. New York: Oxford University Press, 1972.

(Bibliography - continued)

- Rosenquist, Lucy Lynde. Young Children Learn to Use Arithmetic. New York: Ginn and Company, 1949.
- Rucker, Isabelle P., and others. Field Mathematics Program. Palo Alto: Field Educational Publications, Inc., 1974.
- Shipp, Donald E., and Sam Adams. Developing Arithmetic Concepts and Skills. New Jersey: Prentice-Hall, Inc., 1964.
- Spencer, Peter, and Marguerite Brydgaard. Building Mathematical Competence in the Elementary School. New York: Holt, Rinehart and Winston, Inc., 1966.
- Suppes, Patrick, and others. The Random House Mathematics Program. New York: Random House, Inc., 1972.
- Thorpe, Cleata B. Teaching Elementary Arithmetic. New York: Harper & Brothers, 1962.
- Weber, Rose and Ruth. The New Arithmetic. Wichita, Kansas: McCormick-Mathers Publishing Company, Inc., 1963.
- Wickelgren, Wayne A. How to Solve Problems. San Francisco: W. H. Freeman and Company, 1974.

#### B. PERIODICALS

- Balow, Irving H. "Reading and Computation Ability as Determinants of Problem Solving," The Arithmetic Teacher, XI (January, 1964), 18-22.
- Burton, Grace M. "Word Problems - a Mirror of Society," The Arithmetic Teacher, XXI (January, 1974), 33-36.
- Buswell, G. T. "Solving Problems in Arithmetic," Education, LXXIX (January, 1959), 287-290.
- Byrne, Mary Ann, and George E. Mason. "When Pictures and Words Conflict," The Elementary School Journal, LXXVI (February, 1976), 310-314.

(Bibliography - continued)

- Chase, Clinton I., "The Position of Certain Variables in the Prediction of Problem-Solving in Arithmetic," Journal of Education Research, LIV (September, 1960), 9-14.
- Earp, N. Wesley. "Problem Solving - Arithmetic's Persistent Dilemma," The Education Digest, XXXII (April, 1967), 46-51.
- Hagaman, Adaline P., "Word Problems in Elementary Mathematics," The Arithmetic Teacher, XI (January, 1964), 10-11.
- Hansen, Carl W., "Factors Associated With Successful Achievement in Problem Solving in Sixth Grade Arithmetic," Journal of Educational Research, XXXVIII (October, 1944), 111-118.
- Henney, Maribeth. "Improving Mathematics Verbal Problem-Solving Ability Through Reading Instruction," The Arithmetic Teacher, XVIII (April, 1971), 223-229.
- Herlihy, Kathryn V. "A Look at Problem Solving in Elementary School Mathematics," The Arithmetic Teacher, XI (May, 1964), 308-311.
- Herriott, Robert E. "An Aid in the Analysis of Verbal Problems," The Arithmetic Teacher, V (April, 1958), 143-145.
- Krulik, Stephen, and Ann M. Wilderman. "Mathematics Class and Strategy Games = Problem Solving," School Science and Mathematics, LXXVI (March, 1976), 221-225.
- Linville, William J., "Syntax, Vocabulary, and the Verbal Arithmetic Problem," School Science and Mathematics, LXXVI (February, 1976), 152-158.
- Lyda, W. J., and Frances M. Duncan. "Quantitative Vocabulary and Problem Solving," The Arithmetic Teacher, XIV (April, 1967), 289-291.
- Monroe, Walter S., and Max D. Engelhart. "The Effectiveness of Systematic Instruction in Reading Verbal Problems in Arithmetic," The Elementary School Journal, XXXIII (January, 1933), 377-381.

## (Bibliography - continued)

- Neureiter, Paul R., "Problem Solving Without Tears?," Instructor, LXXV (June, 1966), 36.
- Riedesel, C. Alan. "Verbal Problem Solving: Suggestions for Improving Instruction," The Arithmetic Teacher, XI (May, 1964), 312-316.
- Simms, Jacqueline. "Improving Problem-Solving Skills," The Arithmetic Teacher, XVI (January, 1969), 17-21.
- Skinner, Clarice. "The Problem of Problem Solving," The Arithmetic Teacher, VI (April, 1959), 158-160.
- Snyder, Barbara B. "Please Give Us More Story Problems?," The Arithmetic Teacher, XX (February, 1973), 96-98.
- Treacy, John P., "The Relationship of Reading Skills to the Ability to Solve Arithmetic Problems," Journal of Educational Research, XXXVIII (October, 1944), 86-96.
- Wilson, John W. "The Role of Structure in Verbal Problem Solving," The Arithmetic Teacher, XIV (October, 1967), 486-497.
- Wilson, John W. "What Skills Build Problem-Solving Power?," Instructor, LXXVI (February, 1967), 79-81.