

SAXONTM Math
HOMESCHOOL
5/4

CONTENTS

Letter from Author Stephen Hake	xi
Preface	xiii
List of Materials	xxi
LESSON 1 Review of Addition • Addition Stories • Missing Addends, Part 1	1
LESSON 2 Missing Addends, Part 2	6
LESSON 3 Sequences • Digits	9
LESSON 4 Place Value	13
LESSON 5 Ordinal Numbers • Months of the Year	17
LESSON 6 Review of Subtraction • Addition and Subtraction Fact Families	21
LESSON 7 Writing Numbers Through 999	24
LESSON 8 Adding Money	28
LESSON 9 Adding with Regrouping	31
LESSON 10 Even Numbers • Odd Numbers	35
INVESTIGATION 1 Number Lines	39
LESSON 11 Addition Stories with Missing Addends	45
LESSON 12 Missing Numbers in Subtraction	48
LESSON 13 Adding Three-Digit Numbers	52
LESSON 14 Subtracting Two-Digit and Three-Digit Numbers • Missing Two-Digit Addends	55
LESSON 15 Subtracting Two-Digit Numbers with Regrouping	60
LESSON 16 Expanded Form • More on Missing Numbers in Subtraction	64
LESSON 17 Adding Columns of Numbers with Regrouping	68
LESSON 18 Reading Scales	71
LESSON 19 Reading Time from a Clock	75
LESSON 20 Rounding Numbers to the Nearest Ten • Rounding Money to the Nearest Dollar	79

INVESTIGATION	Units of Length • Perimeter	83
2		
LESSON 21	Triangles, Rectangles, Squares, and Circles	87
LESSON 22	Naming Fractions • Adding Dollars and Cents	92
LESSON 23	Lines, Segments, Rays, and Angles	96
LESSON 24	More About Missing Numbers in Addition and Subtraction	102
LESSON 25	Subtraction Stories	106
LESSON 26	Drawing Pictures of Fractions	111
LESSON 27	Multiplication as Repeated Addition • Elapsed Time	115
LESSON 28	Multiplication Table	119
LESSON 29	Multiplication Facts (0's, 1's, 2's, 5's)	124
LESSON 30	Subtracting Three-Digit Numbers with Regrouping	127
INVESTIGATION	Multiplication Patterns • Area •	131
3	Squares and Square Roots	
LESSON 31	Word Problems About Comparing	136
LESSON 32	Multiplication Facts (9's)	141
LESSON 33	Writing Numbers Through Hundred Millions, Part 1	145
LESSON 34	Writing Numbers Through Hundred Millions, Part 2	151
LESSON 35	Naming Mixed Numbers • Two Forms of Money	156
LESSON 36	Fractions of a Dollar	161
LESSON 37	Reading Fractions and Mixed Numbers from a Number Line	165
LESSON 38	Multiplication Facts (Memory Group)	169
LESSON 39	Reading an Inch Scale to the Nearest Fourth	172
LESSON 40	Capacity	176
INVESTIGATION	Decimal Numbers	181
4		
LESSON 41	Subtracting Across Zero • Missing Factors	189
LESSON 42	Multiplying Multiples of 10 and 100 • Rounding Numbers to the Nearest Hundred	194

LESSON 43	Adding and Subtracting Decimal Numbers, Part 1	199
LESSON 44	Multiplying Two-Digit Numbers, Part 1	203
LESSON 45	Parentheses • Associative Property • Naming Lines and Segments	206
LESSON 46	Division	212
LESSON 47	Other Ways to Show Division	216
LESSON 48	Multiplying Two-Digit Numbers, Part 2	220
LESSON 49	Stories About Equal Groups, Part 1	224
LESSON 50	Adding and Subtracting Decimal Numbers, Part 2	228
INVESTIGATION 5	Percents	232
LESSON 51	Adding Numbers with More Than Three Digits • Checking One-Digit Division	236
LESSON 52	Subtracting Numbers with More Than Three Digits • Stories About Equal Groups, Part 2	240
LESSON 53	One-Digit Division with a Remainder	245
LESSON 54	The Calendar • Rounding Numbers to the Nearest Thousand	250
LESSON 55	Multiples • Factors	255
LESSON 56	Using Pictures to Compare Fractions	260
LESSON 57	Rate Word Problems	264
LESSON 58	Multiplying Three-Digit Numbers	268
LESSON 59	Estimating Arithmetic Answers	272
LESSON 60	Rate Problems with a Given Total	276
INVESTIGATION 6	Displaying Data Using Graphs	280
LESSON 61	Remaining Fraction • Two-Step Equations	286
LESSON 62	Multiplying Three or More Factors • Exponents	290
LESSON 63	Polygons	294
LESSON 64	Division with Two-Digit Answers, Part 1	298
LESSON 65	Divisor, Dividend, and Quotient • Division with Two-Digit Answers, Part 2	303
LESSON 66	Similar and Congruent Figures	309

LESSON 67	Multiplying by Multiples of 10	313
LESSON 68	Division with Two-Digit Answers and a Remainder	318
LESSON 69	Millimeters	322
LESSON 70	Stories About a Fraction of a Group	327
INVESTIGATION 7	Collecting Data with Surveys	331
LESSON 71	Division Answers Ending with Zero	334
LESSON 72	Finding Information to Solve Problems	338
LESSON 73	Geometric Transformations	342
LESSON 74	Fraction of a Set	347
LESSON 75	Measuring Turns	351
LESSON 76	Division with Three-Digit Answers • Dividing Money	355
LESSON 77	U.S. Customary Units of Weight • Metric Units of Mass	359
LESSON 78	Classifying Triangles	363
LESSON 79	Symmetry	367
LESSON 80	Division with Zeros in Three-Digit Answers	372
INVESTIGATION 8	Graphing Relationships	376
LESSON 81	Angle Measures	379
LESSON 82	Tessellations	384
LESSON 83	Sales Tax • Change Back	388
LESSON 84	Decimal Numbers to Thousandths	392
LESSON 85	Multiplying by 10, by 100, and by 1000	396
LESSON 86	Multiplying Round Numbers Mentally	400
LESSON 87	Multiplying Two Two-Digit Numbers, Part 1	404
LESSON 88	Remainders in Stories About Equal Groups	408
LESSON 89	Mixed Numbers and Improper Fractions	412
LESSON 90	Multiplying Two Two-Digit Numbers, Part 2	415
INVESTIGATION 9	Investigating Fractions with Manipulatives	419
LESSON 91	Decimal Place Value	424

LESSON 92	Classifying Quadrilaterals	429
LESSON 93	Estimating Multiplication and Division Answers	433
LESSON 94	Two-Step Word Problems	437
LESSON 95	Two-Step Problems About a Fraction of a Group	441
LESSON 96	Average	445
LESSON 97	Mean • Median • Range • Mode	449
LESSON 98	Geometric Solids	453
LESSON 99	Decimal Numbers and Money	458
LESSON 100	Constructing Geometric Models	462
INVESTIGATION 10	Probability	466
LESSON 101	Tables • Schedules	470
LESSON 102	Decimal Number Line: Tenths and Hundredths	474
LESSON 103	Fractions Equal to 1 • Fractions Equal to $\frac{1}{2}$	479
LESSON 104	Changing Improper Fractions to Whole or Mixed Numbers	484
LESSON 105	Dividing by 10	488
LESSON 106	Evaluating Expressions	492
LESSON 107	Adding and Subtracting Fractions with Common Denominators	495
LESSON 108	Formulas • Distributive Property	499
LESSON 109	Equivalent Fractions	504
LESSON 110	Dividing by Multiples of 10	509
INVESTIGATION 11	Volume	513
LESSON 111	Estimating Area	517
LESSON 112	Reducing Fractions	521
LESSON 113	Multiplying a Three-Digit Number by a Two-Digit Number	525
LESSON 114	Simplifying Fraction Answers	529
LESSON 115	Renaming Fractions	533
LESSON 116	Common Denominators	537
LESSON 117	Rounding Whole Numbers Through Hundred Millions	541

LESSON 118	Dividing by Two-Digit Numbers	545
LESSON 119	Adding and Subtracting Fractions with Different Denominators	549
LESSON 120	Adding and Subtracting Mixed Numbers with Different Denominators	552
INVESTIGATION 12	Solving Equations	556
TOPIC A	Using Money Manipulatives to Represent Decimal Place Value	561
TOPIC B	Roman Numerals Through 39	563
TOPIC C	Roman Numerals Through Thousands	565
TOPIC D	Base 5	566
	Supplemental Practice Problems for Selected Lessons	569
	Glossary	585
	Index	611

LETTER FROM AUTHOR STEPHEN HAKE

Dear Student,

We study mathematics because of its importance to our lives. Our study schedule, our trip to the store, the preparation of our meals, and many of the games we play involve mathematics. You will find that the word problems in this book are often drawn from everyday experiences.

*As you grow into adulthood, mathematics will become even more important. In fact, your future in the adult world might depend on the mathematics you have learned. This book was written to help you learn mathematics and to learn it well. For this to happen, you must use the book properly. As you work through the pages, you will see that similar problems are presented over and over again. **Solving each problem day after day is the secret to success.***

Your book is made up of daily lessons and investigations. Each lesson has four parts. The first part is a Warm-Up that includes practice of basic facts and mental math. These exercises improve your speed, accuracy, and ability to do math "in your head." The Warm-Up also includes a problem-solving exercise to familiarize you with strategies for solving complicated problems. The second part of the lesson is the New Concept. This section introduces a new mathematical concept and presents examples that use the concept. In the next section, the Lesson Practice, you have a chance to solve problems involving the new concept. The problems are lettered a, b, c, and so on. The final part of the lesson is the Mixed Practice. This problem set reviews previously taught concepts and prepares you for concepts that will be taught in later lessons. Solving these problems helps you remember skills and concepts for a long time.

Investigations are variations of the daily lesson that often involve activities. Investigations contain their own set of questions instead of a problem set.

Remember, solve every problem in every practice set, every problem set, and every investigation. Do not skip problems. With honest effort, you will experience success and true learning that will stay with you and serve you well in the future.

*Stephen Hake
Temple City, California*

PROGRAM COMPONENTS

Saxon Math 5/4—Homeschool consists of three components: 1) textbook, 2) Tests and Worksheets, and 3) Solutions Manual. **Before using the program, please ensure that you have each component.**

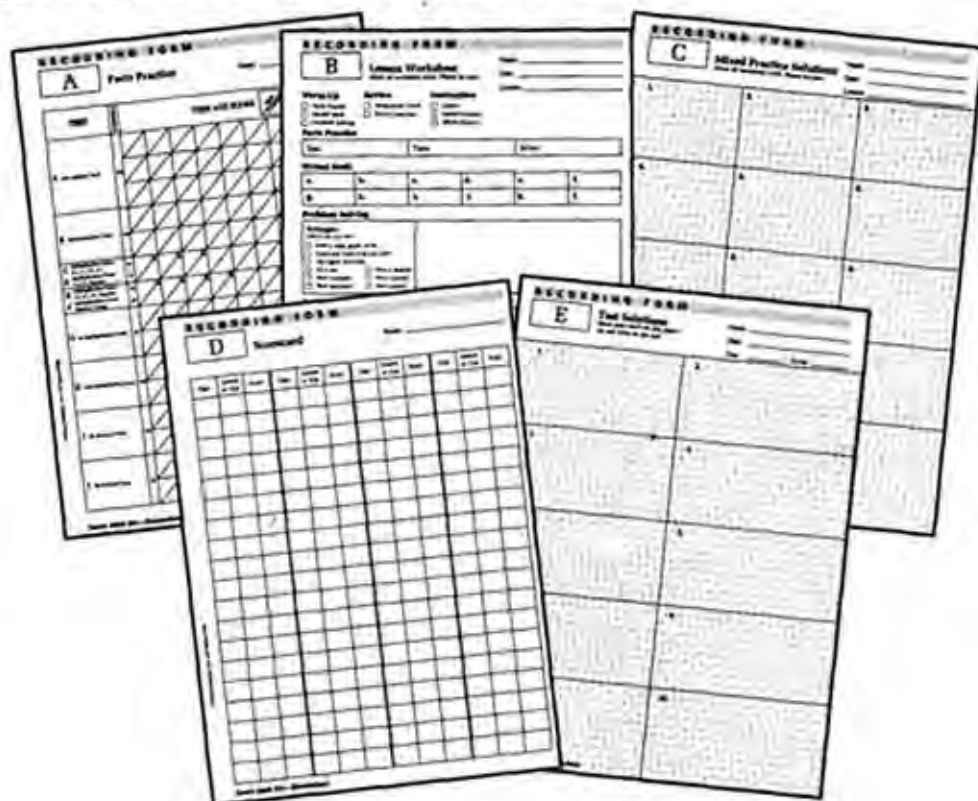
Textbook The *Saxon Math 5/4—Homeschool* textbook is divided into 120 lessons and 12 investigations. The textbook also contains appendix topics that present additional instruction, supplemental practice problems for remediation, an illustrated glossary, and a comprehensive index.

Tests and Worksheets The *Saxon Math 5/4—Homeschool Tests and Worksheets* booklet provides all the worksheets and tests needed by one student to complete the program. It also contains the following recording forms for students to show their work and for parents to track student progress:

- Recording Form A: Facts Practice
- Recording Form B: Lesson Worksheet
- Recording Form C: Mixed Practice Solutions
- Recording Form D: Scorecard
- Recording Form E: Test Solutions

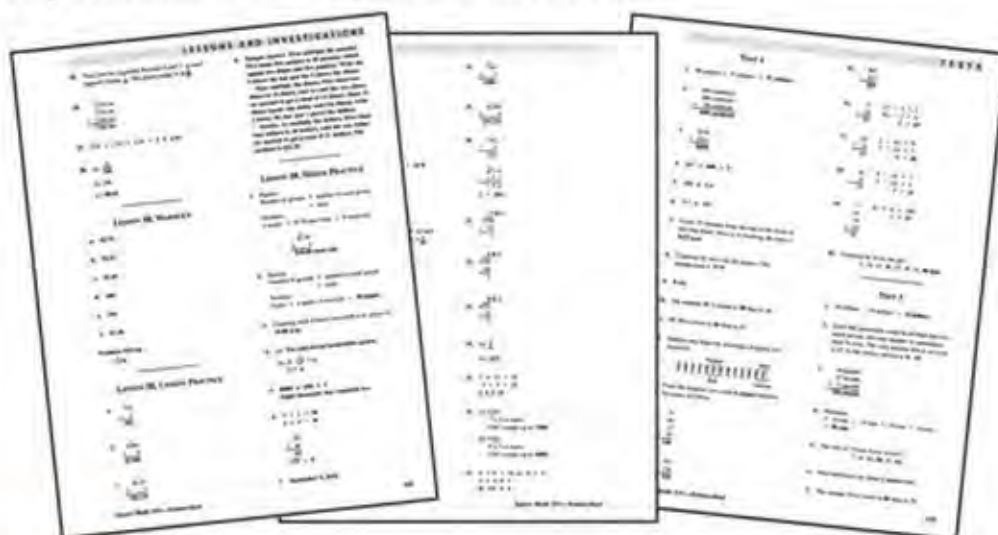
Directions for using the recording forms are provided in the Program Overview (below), as well as in the introduction to the Tests and Worksheets booklet.

Note: The recording forms are blackline masters that should be photocopied, as they will be used more than once.



Solutions Manual

The *Saxon Math 5/4—Homeschool Solutions Manual* contains step-by-step solutions to all textbook and test exercises.

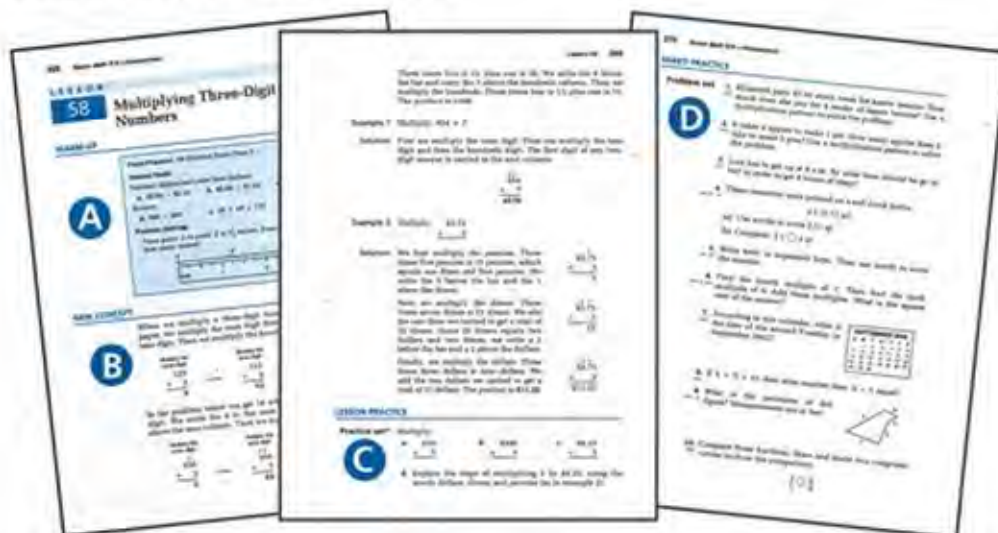


PROGRAM OVERVIEW

Saxon Math 5/4—Homeschool contains three types of math “sessions”: lessons, investigations, and tests. Concepts are introduced and reviewed in a carefully planned sequence. **It is therefore crucial to complete all the lessons and investigations in *Saxon Math 5/4—Homeschool* in the given order.** If lessons are skipped or presented out of sequence, students will encounter problems on the tests and in the problem sets that they might not be equipped to solve.

By completing one lesson, investigation, or test per day, you can finish the entire program in thirty-one or thirty-two weeks. However, faster or slower paces may be appropriate, depending on students' individual learning styles.

Lessons Each of the program's 120 lessons is divided into four sections: Warm-Up, New Concept(s), Lesson Practice, and Mixed Practice. Below we show a lesson from the textbook.



A Warm-Up (10–15 minutes)

The Warm-Up promotes mental math and problem-solving skills and sets the tone for the day's instruction. It consists of three activities:

Facts Practice: Begin the Warm-Up with the suggested Facts Practice Test (found in the Tests and Worksheets). Facts Practice covers content students should be able to recall immediately or to calculate quickly. Have your student write his or her answers directly on the test. Make Facts Practice an event by timing the exercise—emphasizing speed helps automate the recall of basic facts. Because each test is encountered multiple times, encourage your student to improve upon previous timed performances. *The time limit for Facts Practice should be five minutes or less.* After the test, quickly read aloud the answers from the Solutions Manual as your student checks his or her answers. If desired, Facts Practice scores and times can be tracked on Recording Form A (from the Tests and Worksheets) or in a math notebook. The time invested in Facts Practice is repaid in students' ability to work more quickly.

FACTS PRACTICE TEST											
No. Minutes: _____											
Name: _____											
Date: _____											
1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81	82	83	84
85	86	87	88	89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104	105	106	107	108
109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132
133	134	135	136	137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152	153	154	155	156
157	158	159	160	161	162	163	164	165	166	167	168
169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192
193	194	195	196	197	198	199	200	201	202	203	204
205	206	207	208	209	210	211	212	213	214	215	216
217	218	219	220	221	222	223	224	225	226	227	228
229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252
253	254	255	256	257	258	259	260	261	262	263	264
265	266	267	268	269	270	271	272	273	274	275	276
277	278	279	280	281	282	283	284	285	286	287	288
289	290	291	292	293	294	295	296	297	298	299	300

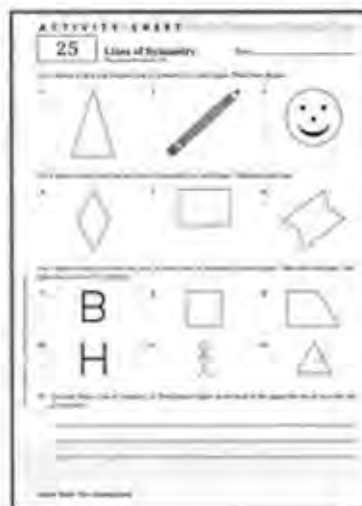
Mental Math: Follow Facts Practice with Mental Math. Read the problems aloud while your student follows along in the textbook. Have your student perform the calculations mentally and write the answers on a copy of Recording Form B or on blank paper. (Note: Students should not use pencil and paper to perform the calculations.) Mental math ability pays lifelong benefits and improves markedly with practice. *Complete the Mental Math activity in two to three minutes.* Mental Math answers are provided in the Solutions Manual.

Problem Solving: Finish the Warm-Up with the daily Problem Solving exercise. Problem Solving promotes critical-thinking skills and offers opportunities for students to use such strategies as drawing diagrams and pictures, making lists, acting out situations, and working backward. If the Problem Solving exercise presents difficulties for your student, you are encouraged to suggest strategies for tackling the problem, referring to the Solutions Manual as necessary. Students may write their answers on Recording Form B and check off the strategies they used in solving the exercise. *Most Problem Solving exercises can be solved in a few minutes.* In a few Warm-Ups, Problem Solving is either omitted because of time considerations or replaced with an exercise called *Patterns* or *Vocabulary*.

B New Concept(s) (5–15 minutes for most lessons)

After completing the Warm-Up, present the New Concept(s). In this section you will find the new instructional increment as well as example problems to work through with your student. Important vocabulary terms are highlighted in color, and each of these terms is defined in the textbook's glossary. It is recommended that you read through the New Concept(s) before presenting a lesson to become familiar with the content. Because students learn most effectively by actually working math problems, keep the presentation of the New Concept(s) brief. This will maximize the time your student has to solve problems in the Lesson Practice and Mixed Practice problem sets (which are described in the next sections).

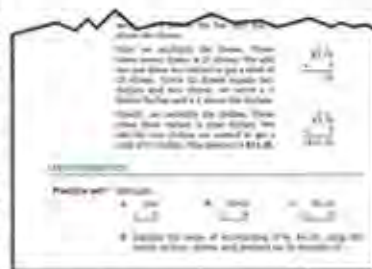
Some lessons involve activities that require the use of household items. Refer to page xxi for a list of necessary materials and the lessons in which they are used. Certain lessons also call for students to use Activity Sheets (see example at right). Activity Sheets are referenced in the Tests and Worksheets booklet.



C Lesson Practice (5–10 minutes)

The Lesson Practice provides practice on the New Concept. Closely monitor student work on the Lesson Practice problems, providing immediate feedback as appropriate. Have your student solve **all** the problems in the Lesson Practice before proceeding to the next section of the lesson. Answers may be written on Recording Form B or on blank paper. If your student has difficulty with the Lesson Practice, you may wish to reteach the relevant examples in the New Concept section in order to identify the particular aspect of the concept that is causing problems.

Some Lesson Practice sets are marked with an asterisk (see example at right). An asterisk indicates that additional problems on the lesson's concept appear in the Supplemental Practice section of the textbook's appendix. Supplemental Practice problems are intended for remediation. Assign your student these problems only if he or she has difficulty with a concept several lessons after it is presented.



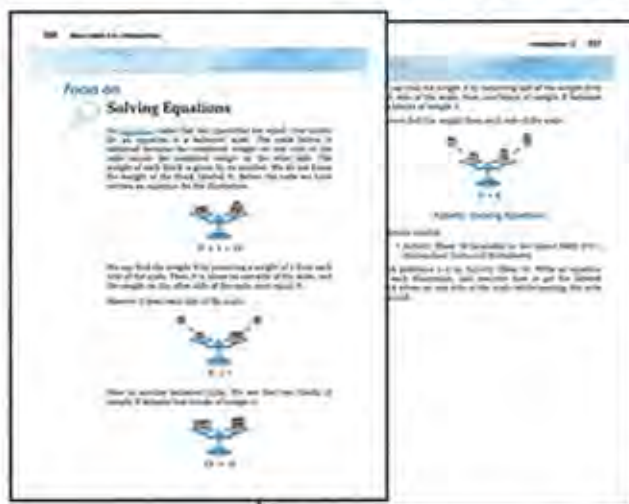
D Mixed Practice (20–40 minutes)

The Mixed Practice is the fourth and most important component of the lesson. This section contains twenty-five to thirty problems that prepare students for upcoming lessons, allow them to work with several strands of mathematics concurrently, and provide them with the distributed practice that promotes long-term retention of concepts. **Have your student work independently on the Mixed Practice, and ensure that no problem is skipped.** Students may show their work on a copy of Recording Form C or on blank paper.

If your student encounters difficulty with Mixed Practice problems, have him or her refer to the Lesson Reference Numbers that appear in parentheses below each problem number. Lesson Reference Numbers indicate which lessons explain concepts relevant to the problems they label. Because many problems involve multiple concepts, more than one reference number might be given for a problem.

At the end of the math period, check your student's work, referring to the Solutions Manual as necessary. If there are incorrect answers, help your student identify which solution steps led to the errors. Then have the student rework the problems to achieve the correct answers. If desired, track the completion of your student's daily assignments on Recording Form D.

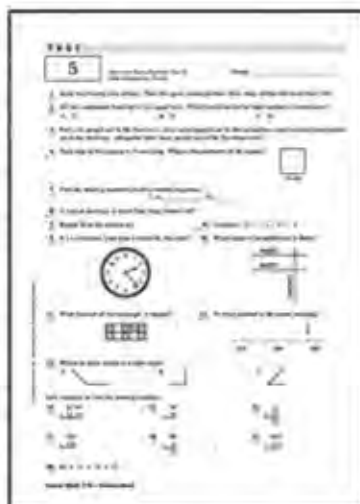
Investigations Following every tenth lesson is an investigation. Investigations are in-depth treatments of concepts that often involve activities. Because of the length of investigations, no Warm-Up or Mixed Practice is included. As with lessons, investigations might call for students to use Activity Sheets, which can be found in the Tests and Worksheets booklet.



Tests Twenty-three cumulative tests are provided in *Saxon Math 5/4—Homeschool*. The problems on the tests are similar to those in the textbook, and the tests are scheduled so that students have about five days to practice concepts before being assessed on them. For detailed information regarding when to give each test, refer to the Testing Schedule in the Tests and Worksheets booklet.

Begin each test day with Facts Practice. The appropriate Facts Practice Test is specified at the top of the scheduled cumulative test (see example at right). After the Facts Practice, administer the cumulative test. Have your student show his or her work and record his or her answers on a copy of Recording Form E. The textbook should not be used during the test.

After the test, compare each student answer to the one given in the Solutions Manual. Note any incorrect answers and review the test with your student. Determine whether errors were caused by computational mistakes or conceptual misunderstandings. If necessary, stress to your student that computational errors can be prevented by writing neatly and by checking the work. If he or she misunderstands a concept, be sure to address the misunderstanding promptly. Work through textbook examples that demonstrate the concept (identify the appropriate lesson by referring to the Lesson Reference Numbers on the test), and assign additional practice problems for the student to solve. (Check for additional practice problems in the textbook's appendix.)



LIST OF MATERIALS

The following materials are used throughout *Saxon Math 5/4—Homeschool*. We suggest you acquire these materials before beginning the program.

- inch/centimeter ruler
(*Note:* A ruler that shows both customary and metric scales is preferred. However, separate customary and metric rulers are acceptable.)
- compass (for drawing circles)
- scissors

Certain lessons and investigations contain activities that call for additional materials. Refer to the following list before beginning the specified lessons/investigations.

Investigation 2

- dollar bill
- meterstick (optional)
- yardstick (optional)

Lesson 40

- empty, clean plastic or paper containers of the following sizes: 1 gallon, 1 half gallon, 1 quart, 1 pint, 1 cup, and 1 liter (or 2 liters)
- supply of water
- funnel

Investigation 4

- calculator
- envelope or zip-top plastic bag
- digital stopwatch

Lesson 41 (Warm-Up)

- calendar

Lesson 79

- small, rectangular mirror

Lesson 81

- 3-by-5-in. rectangle of unlined paper

Investigation 9

- colored pencils or markers (optional)
- envelope or zip-top plastic bag

Lesson 98

- closed, rectangular box (such as a tissue box)

Lesson 100

- glue or tape
- cereal box

Investigation 10

- 4 dot cubes

Lesson 102

- meterstick (or centimeter ruler)

Investigation 11

- yardstick or tape measure

Lesson 111

- masking tape
- yardstick

Review of Addition • Addition Stories • Missing Addends, Part 1

WARM-UP

Facts Practice: 100 Addition Facts (Test A)[†]

Mental Math:

Add ten to a number:

a. $\begin{array}{r} 20 \\ + 10 \\ \hline \end{array}$

b. $\begin{array}{r} 34 \\ + 10 \\ \hline \end{array}$

c. $\begin{array}{r} 10 \\ + 53 \\ \hline \end{array}$

d. $5 + 10$

e. $25 + 10$

f. $10 + 8$

Patterns:

Count by twos from 2 through 40 as you list the numbers in a column on your paper. Study the list. Which digits appear as final digits? Which digits do not appear as final digits?

NEW CONCEPTS

Review of addition **Addition** is the combining of two groups into one group. For example, when we count the dots on the top faces of a pair of dot cubes (dice), we are adding.

$$\begin{array}{|c|} \hline \bullet \bullet \\ \bullet \bullet \\ \hline \end{array} + \begin{array}{|c|} \hline \bullet \bullet \\ \bullet \\ \hline \end{array} = \begin{array}{|c|c|} \hline \bullet \bullet & \bullet \bullet \\ \bullet \bullet & \bullet \\ \hline \end{array}$$

4 + 3 = 7

The numbers that are added are called **addends**. The answer is called the **sum**. The expression $4 + 3 = 7$ is a **number sentence**. A number sentence is a complete sentence that uses numbers and symbols instead of words. Here we show two ways to add 4 and 3:

$$\begin{array}{rcl} 4 & \text{addend} & \\ + 3 & \text{addend} & \\ \hline 7 & \text{sum} & \end{array} \qquad \begin{array}{rcl} 3 & \text{addend} & \\ + 4 & \text{addend} & \\ \hline 7 & \text{sum} & \end{array}$$

[†]For instructions on how to use the Warm-up activities, please consult the preface.

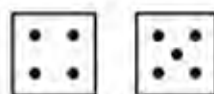
Notice that if the order of the addends is changed, the sum remains the same. This property of addition is true for any two numbers and is called the **commutative property of addition**. When we add two numbers, either number may be first.

$$4 + 3 = 7 \qquad 3 + 4 = 7$$


When we add zero to a number, the number is not changed. This property of addition is called the **identity property of addition**. If we start with a number and add zero, the sum is identical to the starting number.

$$4 + 0 = 4 \qquad 9 + 0 = 9 \qquad 0 + 7 = 7$$

Example 1 Write a number sentence for this picture:



Solution A number sentence for the picture is $4 + 5 = 9$. The number sentence $5 + 4 = 9$ is also correct.

When adding three numbers, the numbers may be added in any order. Here we show six ways to add 4, 3, and 5. Each way the answer is 12.

4	4	3	3	5	5
3	5	4	5	4	3
+ 5	+ 3	+ 5	+ 4	+ 3	+ 4
12	12	12	12	12	12

Example 2 Show six ways to add 1, 2, and 3.

Solution We can form two number sentences that begin with the addend 1.

$$1 + 2 + 3 = 6 \qquad 1 + 3 + 2 = 6$$

We can form two number sentences that begin with the addend 2.

$$2 + 1 + 3 = 6 \qquad 2 + 3 + 1 = 6$$

We can form two number sentences that begin with the addend 3.

$$3 + 1 + 2 = 6 \qquad 3 + 2 + 1 = 6$$

Addition stories Many word problems tell a story. Some stories are about putting things together. Look at this story:

*John had 5 marbles. He bought 7 more marbles.
Now John has 12 marbles.*

There is a pattern to this story. John had **some** marbles. Then he bought **some more** marbles. When he put the marbles together, he found the **total** number of marbles. "**Some and some more**" stories like this have an addition pattern.

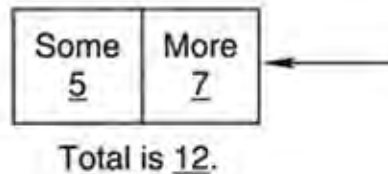
PATTERN	PROBLEM
Some	5 marbles
+ Some more	+ 7 marbles
Total	12 marbles

Here we show the pattern written sideways.

PATTERN: Some + some more = total

PROBLEM: 5 marbles + 7 marbles = 12 marbles

Here we show a diagram for the story:



Example 3 Miguel saw 8 ducks. Then he saw 7 more ducks. How many ducks did Miguel see in all?

Solution This problem follows the idea of "some and some more." We show the addition pattern below.

PATTERN: Some + some more = total

PROBLEM: 8 ducks + 7 ducks = 15 ducks

We find the total number by adding 8 and 7. Miguel saw **15 ducks** in all.

Example 4 Samantha saw rabbits in the field. She saw 5 rabbits in the east field. She saw 3 rabbits in the west field. She saw 4 rabbits in the north field. How many rabbits did Samantha see in all?

Solution In this story there are three addends.

PATTERN	PROBLEM
Some	5 rabbits
Some more	3 rabbits
+ Some more	+ 4 rabbits
Total	12 rabbits

Samantha saw **12 rabbits** in all.

**Missing
addends,
part 1**

Some of the problems in this book will have an addend missing. When one addend is missing and the sum is given, the problem is to find the missing addend. Can you figure out the missing addend in this number sentence?

$$\begin{array}{c} \boxed{\begin{array}{c} \bullet \\ \bullet \end{array}} + \boxed{} = \boxed{\begin{array}{c} \bullet \\ \bullet \end{array}} \boxed{\begin{array}{c} \bullet \\ \bullet \\ \bullet \end{array}} \\ 2 \quad + \quad ? \quad = \quad 7 \end{array}$$

Since we know that $2 + 5 = 7$, the missing addend is 5. We will often use a letter to represent a missing number, as we see in the example below.

Example 5 Find each missing addend:

$$\begin{array}{r} (a) \quad 4 \\ + N \\ \hline 7 \end{array}$$

$$(b) B + 6 = 10$$

Solution (a) The letter N stands for a missing addend. Since $4 + 3 = 7$, the letter N stands for the number 3 in this number sentence.

(b) In this problem the letter B is used to stand for the missing addend. Since $4 + 6 = 10$, the letter B stands for the number 4.

LESSON PRACTICE

Practice set Add:

a. $5 + 6$

b. $6 + 5$

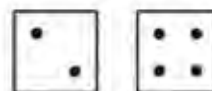
c. $8 + 0$

d. $4 + 8 + 6$

e. $4 + 5 + 6$

f. Diane ran 5 laps in the morning. She ran 8 laps in the afternoon. How many laps did she run in all?

g. Write two number sentences for this picture to show the commutative property:



h. Show six ways to add 1, 3, and 5.

Find each missing addend:

i. $7 + N = 10$

j. $A + 8 = 12$

LESSON

120

Adding and Subtracting Mixed Numbers with Different Denominators

WARM-UP

Facts Practice: 90 Division Facts (Test J)

Mental Math:

Find the stated percent of 100:

a. 75% of 100

b. 70% of 100

c. 100% of 100

Review:

d. 20×23

e. $\$20.00 - \12.75

f. $127 + 35$

Roman numerals:

g. Write MCM in our number system.

h. Write XCIX in our number system.

Patterns:

Find the next eight numbers in this sequence:

$\frac{1}{8}, \frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, \frac{7}{8}, 1, \underline{\hspace{0.5cm}}, \underline{\hspace{0.5cm}}, \underline{\hspace{0.5cm}}, \underline{\hspace{0.5cm}}, \underline{\hspace{0.5cm}}, \underline{\hspace{0.5cm}}, \underline{\hspace{0.5cm}}, \underline{\hspace{0.5cm}}, \dots$

NEW CONCEPT

To add or subtract mixed numbers, we first make sure the fractions have common denominators.

Example 1 Add: $4\frac{1}{6} + 2\frac{1}{2}$

Solution The denominators of the fractions are not the same. We can rename $\frac{1}{2}$ so that it has a denominator of 6 by multiplying $\frac{1}{2}$ by $\frac{3}{3}$. Then we add, remembering to reduce the fraction part of our answer.

$$\begin{array}{r}
 4\frac{1}{6} = 4\frac{1}{6} \\
 + 2\frac{1}{2} = 2\frac{3}{6} \\
 \hline
 6\frac{4}{6} = 6\frac{2}{3}
 \end{array}$$

Example 2 Subtract: $5\frac{3}{4} - 3\frac{5}{8}$

Solution We first rewrite the problem so that the fractions have common denominators. We can rename $\frac{3}{4}$ so that it has a denominator of 8 by multiplying $\frac{3}{4}$ by $\frac{2}{2}$. Then we subtract.

$$\begin{array}{r} 5\frac{3}{4} = 5\frac{6}{8} \\ - 3\frac{5}{8} = 3\frac{5}{8} \\ \hline 2\frac{1}{8} \end{array}$$

LESSON PRACTICE

Practice set Add. Reduce when possible.

a. $3\frac{1}{2} + 1\frac{1}{4}$

b. $4\frac{3}{4} + 1\frac{1}{8}$

c. $4\frac{1}{5} + 1\frac{3}{10}$

d. $6\frac{1}{6} + 1\frac{1}{3}$

Subtract. Reduce when possible.

e. $3\frac{7}{8} - 1\frac{1}{4}$

f. $2\frac{3}{5} - 2\frac{1}{10}$

g. $6\frac{7}{12} - 1\frac{1}{6}$

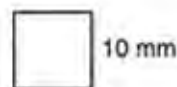
h. $4\frac{3}{4} - 1\frac{1}{2}$

MIXED PRACTICE

Problem set 1. The Martins drank 11 gallons of milk each week. How many quarts of milk did they drink each week?
(40)

2. Sixty fleas leaped onto Rover as he ran through the field. If one fourth of them perished from flea powder, how many survived? Draw a picture to illustrate the problem.
(95)

3. (a) What is the area of this square?
(Inv. 2, Inv. 3)
- (b) What is the perimeter of the square?



c. \$5.20

d. \$3.02

Now we will use bills and coins to represent decimal numbers that are not money amounts. Below we show an example of money representing the number 4.23 (four and twenty-three hundredths).



Use bills and coins to represent these decimal numbers:

e. 3.42 (three and forty-two hundredths)

f. 0.24 (twenty-four hundredths)

g. 12.03 (twelve and three hundredths)

h. 1.3 (one and three tenths)