

Arithmetic

Work-text

6

Fourth Edition

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$$F = \frac{9}{5}C + 32$$

$$F = \frac{9}{5} \times \frac{20}{1} + 32$$

$$F = 36 + 32$$

$$F = 68^\circ$$

$$\frac{843}{1,000} = .843$$

$$46 \times 7.3 = 335.8$$

Learning Objectives

- Recognize place value of numbers through billions.
- Know addition, subtraction, multiplication, and division facts/terminology. Carry in addition and borrow in subtraction. Multiply by one to four digits. Divide by one to four digits. Find missing process terms. Check answers using casting out 9s.
- Solve story problems with one or more steps or with unnecessary information.
- Average numbers.
- Read/write Roman numerals.
- Estimate answers.
- Round off whole numbers, money, and decimals.
- Use English and metric measures.
- Convert measures within the same system and solve measurement equations. Know how to add, subtract, and multiply compound measures.
- Measure line segments in centimeters/inches.
- Know divisibility rules for 2, 3, 4, 5, 6, 9, and 10.
- Use prime factoring to find greatest common factor and least common multiple.
- Use exponents.
- Know fraction terminology and how to work problems containing fractions. Use cross multiplication to prove that fractions are equivalent. Add/subtract fractions and mixed numbers with a common denominator or by having to find a common denominator. Recognize proper/improper fractions. Change mixed numbers to improper fractions/change improper fractions to mixed or whole numbers. Subtract fractions with borrowing. Multiply fractions using cancellation. Write a fraction as a decimal and a percent. Work division problems involving fractions.
- Write decimals as fractions/percents. Add, subtract, multiply, and divide decimals. Compare decimals. Rename decimals. Recognize terminating/repeating decimals. Learn common fraction-decimal equivalents. Learn decimal/percent equivalents.
- Write ratios/proportions. Set up a proportion to find a missing number.
- Write percents as fractions, decimals, and ratios. Subtract from 100 percent. Find percentages, percents, and bases. Find percent of increase/decrease. Find commission, rate of commission, and amount of sales. Find amount of discount/rate of discount. Find sales tax.
- Find the amount of profit for a business transaction.
- Understand probability.
- Read/draw pictographs, bar graphs, line graphs, and circle graphs. Plot point on a line graph.
- Find range, mean, and median for statistics.
- Read scale drawings. Use a proportion to find distances on scale drawings.
- Recognize/draw geometric shapes/figures.
- Find perimeter of a polygon. Find perimeter of a rectangle, square, and parallelogram using formulas.
- Find area of a rectangle, square, parallelogram, triangle, and circle using formulas.
- Find perimeter/area of unusual shapes.
- Work with congruent triangles.
- Find circumference of a circle.
- Know how to use protractor/compass.
- Identify angles/triangles.
- Bisect angles with protractor or compass.
- Use order of operations.
- Understand how to represent multiplication/division in algebra.
- Solve one/two-step equations using four axioms of algebra.
- Read thermometer/convert temperatures from one scale to other.
- Extract a square root from a perfect square.
- Compare negative numbers.
- Work with latitude, longitude, and time zones.
- Have an introduction to banking, find simple interest, and understand installment buying.
- Read electric/gas meters.

Arithmetic 6 Teacher Edition

Fourth Edition

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A *Beka Book*, a Christian textbook ministry affiliated with Pensacola Christian College, is designed to meet the need for Christian textbooks and teaching aids. The purpose of this publishing ministry is to help Christian schools reach children and young people for the Lord and train them in the Christian way of life.

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Contents

Preliminary Information . . .	T1
Arithmetic is...	T1
Scope and Sequence.	T2
Teaching Materials	T4
About the Text.	T4
Teacher Information	T5
Time Allotment.	T5
Teaching Procedure	T5
Tests and Speed Drills	T5

Student Work-text

Arithmetic is...

- studying one aspect of the order of the real world and indirectly learning more about the God Who created the world using mathematics.
- learning to see the addition/multiplication tables as part of the truth/order that God has built into reality.
- knowing that there is a right answer.
- working hard to get the right answer.
- learning to go from the concrete to the abstract, from the particular to the general, from content to concept.
- learning to see relationships between one truth and another.
- learning to be precise/exact in thinking.
- learning to apply mathematics skillfully in order to function in daily life.
- learning to believe in absolutes (2+2 always equals 4).
- establishing the extremely important skill of learning things by memory.
- learning to be fast/accurate in thinking.
- seeing how things work together.
- being prepared.

Arithmetic

Work-text

6

Fourth Edition

Judy Howe

Story Problem
Solution Key
is behind the
student text.



$$F = \frac{9}{5}C + 32$$

$$F = \frac{9}{5} \times \frac{20}{1} + 32$$

$$F = 36 + 32$$

$$F = 68^{\circ}$$

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- finishing the job.
- working at a set pace.
- participating in healthy competition.
- learning to be thorough, orderly, careful, alert, obedient, persistent, cooperative, honest.
- learning to master a received body of knowledge and apply it as one way to obey the command of Genesis 1:28 to subdue the earth/exercise dominion over it.

Contents

Teaching Materials

Student Materials

Arithmetic 6 Work-text

Quizzes, Tests, & Speed Drills

Teacher Materials

Arithmetic 6

Teacher Edition

Quiz, Test, & Speed Drill Key

Curriculum

Addition Flashcards

Subtraction Flashcards

Multiplication Flashcards

Division Flashcards

Concept Cards 5–8

Rapid Calculation Drills B

Felt Fractional Circles

Arithmetic 3–8 Tables

and Facts Charts

Arithmetic 3–8 Charts

About the Text

Arithmetic 6 contains a variety of exercises involving new/review material in each lesson. The work-text includes 169 lessons (excluding tests), Supplementary Exercises, and Homework Exercises. The handbook at the end of the book contains facts, rules, and measures which are given throughout the work-text.

Although all new material is presented at top of a work-text page, the work-text is not designed to be used without a teacher. Students need to *hear* a thorough explanation of each concept and *see* procedures demonstrated step by step by the teacher.

Arithmetic 6 Curriculum/Lesson Plans, available separately or as part of the Grade 6 Curriculum, and the Teacher Edition provide complete daily plans for teaching, reviewing, and testing. The Teacher Edition also includes solutions to all exercises in the text. Student Quizzes, Tests, & Speed Drills is correlated with the work-text.

1 WHOLE NUMBERS pp. 1–14

Lessons 1–7

- Addition with carrying
- Story problems with whole numbers
- Subtraction with borrowing
- Multiplication by a multi-digit factor
- Division by a multi-digit divisor
- Rounding
- Checking by casting out 9s

Additional Skills

- Finding missing terms
- Estimation

2 MEASURES pp. 15–34

Lessons 8–18

- English and metric linear
- Story problems with measures
- English and metric capacity
- Time
- English and metric weight (mass)
- Converting English measures
- Converting metric measures

Math Matters—Teachers

Additional Skills

- Four-digit divisors
- Averaging
- Roman numerals
- Divisibility rules

Problem Solving Strategy

- Multistep problems

3 FACTORING pp. 35–50

Lessons 19–27

- Introduction
- Prime and composite numbers
- Prime factoring
- Factoring tree
- Greatest common factors
- Least common multiples

Additional Skills

- Story problems with averaging
- Measure of dozen
- Exponents

Problem Solving Strategy

- Making a table

4 FRACTIONS pp. 51–68

Lessons 28–37

- Concept of fractions
- Proper and improper
- Fraction bar
- Addition
- Story problems with fractions
- Subtraction
- Multiplication
- Cancellation
- Division

Additional Skills

- Cross multiplication
- Reciprocals
- Measuring line segments
- Time elapse

Problem Solving Strategy

- Conversion factor

5 DECIMALS pp. 69–98

Lessons 38–54

- Concept of decimals
- Comparing
- Addition and subtraction
- Multiplication
- Story problems with decimals
- Division into a decimal
- Fraction-decimal equivalents
- Rounding
- Division by a decimal
- Measures and decimals

Math Matters—Pharmacist

Additional Skills

- Greater than and less than symbols
- Aztec numeration
- Egyptian numeration
- Multiplying and dividing by powers of ten
- Estimating products
- Ratios and proportions
- Using a proportion to solve story problems

Problem Solving Strategy

- Using logic charts

Teacher Information

Time Allotment

In the *A Beka Book* 6th grade curriculum, arithmetic is taught/practiced for 45–50 minutes.

Teaching Procedure

Arithmetic class begins with 8–13 minutes of *oral drill* (until Lesson 136 when additional time is allotted to check homework). The *written speed drill* follows oral drill. Speed drills are exchanged/checked; speed drills are recorded once a week as a quiz grade.

After a thorough review time, *new concepts* are introduced/practiced. The time allotted depends on the difficulty/newness of the concept.

Story problems are included in the Arithmetic 6 Curriculum to teach students to think/plan solving of problems by themselves.

The *Review/Boardwork* time includes a spiral review of important concepts/facts presented throughout the year. This review time helps students master the concepts/facts, and also provides opportunity for them to work at the chalkboard.

Additional Practice problems are included in each lesson.

Homework problems are included three times a week for Lessons 6–168.

Tests and Speed Drills

Four speed drills and either a test or a quiz are included in Student Quizzes, Tests, & Speed Drills for each week. Answers/point values are available in the Quiz, Test, & Speed Drill Key.

6 PERCENTS pp. 99–140

Lessons 55–77

- Concept of percents
- Subtracting from 100%
- Story problems with percents
- Writing decimals as percents
- Writing percents as decimals
- Finding percentages
- Percents and fractions
- Finding discounts
- Estimating
- Percents ending in fractions
- Percents over 100
- More or less in percent
- Writing fractions as percents
- Less than 1%
- Percent by comparison
- Percent of increase or decrease
- Rate of discount

Additional Skills

- Fractional part of a whole
- Profit
- Probability ratio

Problem Solving Strategies

- Finding a pattern
- Using a graph
- Testing a hunch

7 GRAPHS pp. 141–166

Lessons 78–92

- Pictograph
- Range, mean, and median
- Bar graph
- Line graph
- Circle graph
- Scale drawings
- Finding distances on maps

Math Matters—Sales personnel

Additional Skills

- Making change
- Finding commission
- Setting up a proportion

Problem Solving Strategy

- Making a table

8 GEOMETRY pp. 167–244

Lessons 93–135

- Concepts and Ideas
- Shapes
- Perimeter

- Story problems with geometry
- Area
- Congruent triangles
- Circles
- Circumference
- Area of a circle
- Angles
- Triangles

Math Matters—Farmer

Additional Skills

- Finding the base in a percent problem
- Irrational numbers

Problem Solving Strategies

- Making a sensible guess
- Drawing a geometric model
- Formulas and percents

9 ALGEBRA pp. 245–266

Lessons 136–147

- Order of operations
- Algebraic multiplication
- Solving equations
- Two-step equations

Additional Skill

- Problems with compound measures

Problem Solving Strategy

- Using proportions

10 PRACTICAL ARITHMETIC pp. 267–306

Lessons 148–169

- Temperature
- Time zones
- Latitude
- Banking
- Simple interest formula
- Installment buying
- Planning a budget
- Electricity
- Gas meters

Math Matters—Parents

Additional Skills

- Extracting the square root
- Negative numbers

Supplementary Exercises	pp. 307–356
Homework Lessons	pp. 357–389
Handbook	pp. 390–412

Multiplying Whole Numbers

Facts:

- Multiplication** is a quick way to put equal numbers together.
- The numbers being multiplied are the **factors**. Sometimes the factors are called the multiplicand and the multiplier. The answer is the **product**. The order of the factors may be switched without changing the product ($5 \times 4 = 4 \times 5$).
- If the multiplier has more than one non-zero digit, the problem will have two or more **partial products**.
- To check multiplication, reverse the factors and find the product. The two products should be the same.

Example:

58	factor	27	<u>check</u>
$\times 27$	factor	$\times 58$	
406	partial product	216	
$+ 116$	partial product	$+ 135$	
<u>1,566</u>	product	<u>1,566</u>	✓

Class Practice

1. Write the correct terms beside each number in a and b. Work the problems. (For additional practice, see Supplementary Exercises, pp. 315–317.)

<p>a. 4,598 <u>factor</u></p> $\begin{array}{r} \times 7 \\ \hline 32,186 \\ \hline \end{array}$ <p><u>product</u></p>	<p>b. 95 <u>factor</u></p> $\begin{array}{r} \times 56 \\ \hline 570 \\ +475 \\ \hline 5,320 \\ \hline \end{array}$ <p><u>partial product</u> <u>partial product</u> <u>product</u></p>	<p>c. 156</p> $\begin{array}{r} \times 782 \\ \hline 312 \\ 1248 \\ +1092 \\ \hline 121,992 \\ \hline \end{array}$	<p>d. 29</p> $\begin{array}{r} \times 29 \\ \hline 261 \\ +58 \\ \hline 841 \\ \hline \end{array}$
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<p>e. 3,742</p> $\begin{array}{r} \times 6 \\ \hline 22,452 \\ \hline \end{array}$	<p>f. 89</p> $\begin{array}{r} \times 36 \\ \hline 534 \\ +267 \\ \hline 3,204 \\ \hline \end{array}$	<p>g. 478</p> $\begin{array}{r} \times 382 \\ \hline 956 \\ 3824 \\ +1434 \\ \hline 182,596 \\ \hline \end{array}$	<p>h. 27</p> $\begin{array}{r} \times 52 \\ \hline 54 \\ +135 \\ \hline 1,404 \\ \hline \end{array}$	<p>i. 509</p> $\begin{array}{r} \times 671 \\ \hline 509 \\ 3563 \\ +3054 \\ \hline 341,539 \\ \hline \end{array}$
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2. Multiply and check.

<p>a. 64 87</p> $\begin{array}{r} \times 87 \\ \hline 448 \\ +512 \\ \hline 5,568 \\ \hline \end{array}$	<p>b. 462 585</p> $\begin{array}{r} \times 585 \\ \hline 2310 \\ 3696 \\ +2310 \\ \hline 270,270 \\ \hline \end{array}$	<p>c. 294 668</p> $\begin{array}{r} \times 668 \\ \hline 2352 \\ 1764 \\ +1764 \\ \hline 196,392 \\ \hline \end{array}$
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3. Solve these story problems.

- Hilary's father is a truck driver. Each day of the 278 days he drove last year, he averaged 476 miles. How many miles did he drive? (132,328) mi.
- To manufacture a new car, 39,090 gallons of water are needed. How many gallons are needed to manufacture 25 new cars? (977,250) gal.

Introduce multiplication. (11 min.)

Ex. 1–2

- Concept Card 13:** Teach terms. You may want to point out that 1st factor is sometimes called a multiplicand/ 2nd factor a multiplier. Be sure students understand that if 2nd factor has more than 1 digit, there are partial products. The number of non-zero digits in 2nd factor determines number of partial products.

- Multiply 1st problem for class. Be sure students understand carrying process. Stress to students the importance of knowing mult. tables well. If a student has not mastered them, be sure he spends extra time on tables until he knows them completely. If students wish, allow them to write the carrying numbers. However, encourage students to learn how to carry in their head.

Check by reversing the factors. (The order of the factors may be switched without changing the product.)

Students explain how to work/check 2nd problem as you do it on ckbd. The 2nd partial product must begin in tens' place since we are multiplying by a tens' digit. Student can leave ones' place empty or put a 0 in ones' place. If carrying numbers are written when 2nd factor is more than 1 digit, carrying number must be marked out after it is used.

- Students read **box** and do Ex. 1–2. If they are doing well with multiplication, allow several students to work at ckbd. They should explain each problem to class. If any problem is not put on ckbd, teacher or students should call out answers so class can check their work.

Discuss story problems. (10 min.) Ex. 3

- Call out these story problem clue words/have students give process they indicate.
in all (+) each (÷) total (+)
sum (+) less (–) difference (–)
- Work Ex. 3 together as a class. Guide students these first few days in their reasoning. Gradually students will be left to solve these problems on their own.

Review place value. (3 min.) **Ex. 4**

- Students write numbers that you dictate for Ex. 4. Dictate each number only once and give students 10 sec. to write.

- a. 5,426 e. 7,000
 b. 8,937 f. 6,218
 c. 4,016 g. 9,070
 d. 7,935 h. 6,249

Students exchange workbook pages. Write numbers on ckbd for checkers to see when checking. Return pages to owners. Recognize all students who missed 0 or 1.

Review/Boardwork (11 min.) **Ex. 5–7**

Note: To be sure every student gets to work at ckbd, an entire row or several students can work the same problem at ckbd. If a student works a problem at ckbd, he can just copy answer in workbook.

4. Write the numbers your teacher dictates.

- a. 5,426 b. 8,937 c. 4,016 d. 7,935
 e. 7,000 f. 6,218 g. 9,070 h. 6,249

Review**5. Follow the signs.**

- a. $\begin{array}{r} 978 \\ 492 \\ 673 \\ +824 \\ \hline 2,967 \end{array}$ b. $\begin{array}{r} 293 \\ 587 \\ 652 \\ +944 \\ \hline 2,476 \end{array}$ c. $\begin{array}{r} 16,329 \\ -8,409 \\ \hline 7,920 \end{array}$ d. $\begin{array}{r} 38,000 \\ -29,732 \\ \hline 8,268 \end{array}$ e. $\begin{array}{r} 5,432 \\ 6,879 \\ 3,721 \\ +4,832 \\ \hline 20,864 \end{array}$ f. $\begin{array}{r} 48 \\ \times 84 \\ \hline 192 \\ +384 \\ \hline 4,032 \end{array}$

- g. $\begin{array}{r} \$325 \\ \times 406 \\ \hline 1950 \\ +13000 \\ \hline \$131,950 \end{array}$ h. $\begin{array}{r} \$16.75 \\ 23.89 \\ 7.42 \\ 11.83 \\ 92.41 \\ +73.88 \\ \hline \$226.18 \end{array}$ i. $\begin{array}{r} \$4,321.61 \\ -3,291.88 \\ \hline \$1,029.73 \end{array}$ j. $\begin{array}{r} 954 \\ 683 \\ 295 \\ 478 \\ 516 \\ +832 \\ \hline 3,758 \end{array}$ k. $\begin{array}{r} 6,329 \\ -5,468 \\ \hline 861 \end{array}$ l. $\begin{array}{r} 432 \\ \times 916 \\ \hline 2592 \\ 432 \\ +3888 \\ \hline 395,712 \end{array}$

6. Write the products.

×	3	7	5	1	8	11	0	12	6	2	9	4
10	30	70	50	10	80	110	0	120	60	20	90	40
9	27	63	45	9	72	99	0	108	54	18	81	36
12	36	84	60	12	96	132	0	144	72	24	108	48
5	15	35	25	5	40	55	0	60	30	10	45	20
8	24	56	40	8	64	88	0	96	48	16	72	32

7. Write the value of each red digit.

- a. $\begin{array}{r} 3,286 \\ \underline{200} \end{array}$ b. $\begin{array}{r} 9,052 \\ \underline{9,000} \end{array}$ c. $\begin{array}{r} 6,318 \\ \underline{8} \end{array}$ d. $\begin{array}{r} 4,592 \\ \underline{90} \end{array}$ e. $\begin{array}{r} 1,006 \\ \underline{1,000} \end{array}$

Dividing Whole Numbers

Facts:

1. **Division** is the process of finding how many times one number is contained in another number.
2. The number being divided is the **dividend**. The dividend is divided by the **divisor**. The answer is the **quotient**.
3. To check division, multiply the quotient times the divisor and add the remainder.
4. The six steps of division are estimate (e), divide (+), multiply (x), subtract (-), compare (c), and bring down (↓).
5. To **estimate the quotient** is to make a judgment about what number to place in the quotient. To estimate the quotient when the **second digit of the divisor is 0-4**, divide by the first digit. If the **second digit of the divisor is 5-9**, divide by one more than the first digit of the divisor. Multiply the quotient by the real divisor rather than the estimated divisor.
6. Division often involves trial and error. The comparison step is important to make sure the correct digit was placed in the quotient.

Example:

	quotient	check
	↓	437
divisor 437	807 r. 125	× 807
	↓	3059
	-3496 ↓	+34960
	3184	352659
	-3059	+ 125
	125	352,784 ✓

Note: When a 0 is placed in the quotient, the next digit in the dividend can be brought down without multiplying. (0 times any number is 0.) Use 807 as the multiplier in the check so there are two partial products instead of three.

Class Practice

1. Divide. Write the correct terms beside each number in a. (For additional practice, see Supplementary Exercises, pp. 318-321.)

a. divisor _____ $47\overline{)25,228}$ quotient
dividend

$$\begin{array}{r} 53 \\ 47 \overline{)25,228} \\ \underline{-474} \\ 652 \\ \underline{-632} \\ 201 \\ \underline{-158} \\ 43 \end{array}$$

b. $305\overline{)20,435}$

$$\begin{array}{r} 67 \\ 305 \overline{)20,435} \\ \underline{-1830} \\ 2135 \\ \underline{-2135} \\ 0 \end{array}$$

c. $799\overline{)66,317}$

$$\begin{array}{r} 83 \\ 799 \overline{)66,317} \\ \underline{-6392} \\ 2397 \\ \underline{-2397} \\ 0 \end{array}$$

2. Divide. Check by multiplying. Only b has a remainder.

a. $47\overline{)303,056}$

$$\begin{array}{r} 6,448 \\ 47 \overline{)303,056} \\ \underline{-282} \\ 210 \\ \underline{-188} \\ 225 \\ \underline{-188} \\ 376 \\ \underline{-376} \\ 0 \end{array}$$

b. $29\overline{)73,205}$ r. 9

6,448	x	47
45136		
25792		
303,056		

$$\begin{array}{r} 2,524 \\ 29 \overline{)73,205} \\ \underline{-58} \\ 152 \\ \underline{-145} \\ 70 \\ \underline{-58} \\ 125 \\ \underline{-116} \\ 9 \end{array}$$

c. $925\overline{)186,850}$

$$\begin{array}{r} 202 \\ 925 \overline{)186,850} \\ \underline{-1850} \\ 1850 \\ \underline{-1850} \\ 0 \end{array}$$

- Introduce division.** (17 min.) Ex. 1-2
- **Arith Chart 4:** Teach 6 steps of division. Show how each step was used to find quotient. Students stand/say 6 steps of div. in order several times. They need to memorize steps.
 - **Concept Card 14:** Teach terminology for div. problem.
 - Work 1st problem for students. Emphasize 6 steps in div.

$$\begin{array}{r} 682 \text{ r. } 43 \\ 79 \overline{)53,921} \\ \underline{-474} \\ 652 \\ \underline{-632} \\ 201 \\ \underline{-158} \\ 43 \end{array}$$

1. **Estimate:** Increase the 7 by one more.
2. **Divide:** Divide 8 into 53. Put the 6 over the 9 because you are really dividing 79 into 539.

3. Multiply 79 times 6. Be sure to multiply the real divisor rather than the estimated divisor.
4. Subtract 474 from 539.
5. Compare the difference 65 with the divisor 79. The difference needs to be less. This is the step that shows if your estimation worked. If the difference is greater than the divisor, try a greater number in the quotient.

6. Bring down the 2. Start the six steps all over. Check the problem by multiplying the quotient times the divisor and adding the remainder. (Division is the opposite of multiplication. If $36 \div 4 = 9$, then $9 \times 4 = 36$.)

$$\begin{array}{r} 682 \\ \times 79 \\ \hline 6138 \\ +4774 \\ \hline 53878 \\ + 43 \\ \hline 53,921 \end{array}$$

Work 2nd problem for students again emphasizing 6 steps.

- Read/discuss **box**. Students do Ex. 1-2. You may need to work a few problems on ckbd as students work in text.

Introduce division. (cont.) **Ex. 3****Discuss story problems.** (8 min.) **Ex. 4**

- Read/discuss Ex. 4 together as a class. Help students to be real thinkers when solving these problems. They should read carefully/decide best procedure to use. Teach them to plan their strategy when working with story problems. Help students to notice that $4c$ has 2 steps. First, they find 4 times 12. Then, they subtract 5 from product. In $4d$ students should realize that a fraction of a bus cannot be used. Another bus must be taken for the remainder.

Review/Boardwork (10 min.) **Ex. 5–8**

- Circulate around room to make sure all students are doing their best work. Watch those at ckbd to make sure answers are correct.

3. Use symbols to write the six steps in division.

e + x - c ↓

4. Solve these story problems.

- a. At the rate of 65 miles per hour, how many hours will it take to travel 455 miles? **(7) hr.**
- b. Mr. Tyler has an annual salary of \$48,264. How much does he earn each month? **(\$4,022) each mo.**
- c. Sophia Thompson is 12 years old. Her mother is 5 years less than 4 times as old as Sophia. How old is Mrs. Thompson? **(43) yr.**
- d. Six classes of 31, 28, 27, 32, 24, and 26 students are to travel on buses that each hold 36 students. How many buses are needed? **(5) buses**

Review**5. Multiply. Check by reversing the factors.**

a. $\begin{array}{r} 672 \\ \times 487 \\ \hline 4704 \\ 5376 \\ +2688 \\ \hline 327,264 \end{array}$	$\begin{array}{r} 487 \\ \times 672 \\ \hline 974 \\ 3409 \\ +2922 \\ \hline 327,264 \end{array}$	b. $\begin{array}{r} 325 \\ \times 692 \\ \hline 650 \\ 2925 \\ +1950 \\ \hline 224,900 \end{array}$	$\begin{array}{r} 692 \\ \times 325 \\ \hline 3460 \\ 1384 \\ +2076 \\ \hline 224,900 \end{array}$	c. $\begin{array}{r} 889 \\ \times 728 \\ \hline 7112 \\ 1778 \\ +6223 \\ \hline 647,192 \end{array}$	$\begin{array}{r} 728 \\ \times 889 \\ \hline 6552 \\ 5824 \\ +5824 \\ \hline 647,192 \end{array}$
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6. Find the differences.

a. $\begin{array}{r} 572 \\ -397 \\ \hline 175 \end{array}$	b. $\begin{array}{r} 6,302 \\ -5,811 \\ \hline 491 \end{array}$	c. $\begin{array}{r} 9,781 \\ -8,847 \\ \hline 934 \end{array}$	d. $\begin{array}{r} 3,000 \\ -976 \\ \hline 2,024 \end{array}$	e. $\begin{array}{r} 2,540 \\ -1,946 \\ \hline 594 \end{array}$	f. $\begin{array}{r} 329 \\ -89 \\ \hline 240 \end{array}$
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7. Write only the quotients. The fraction bar means division.

a. $\frac{24}{6} = 4$ b. $\frac{42}{7} = 6$ c. $\frac{56}{8} = 7$ d. $\frac{28}{4} = 7$ e. $\frac{36}{9} = 4$ f. $\frac{44}{11} = 4$ g. $\frac{48}{6} = 8$ h. $\frac{16}{4} = 4$

8. Write the sums quickly.

+	3	8	14	10	16	9	5	2	11
11	14	19	25	21	27	20	16	13	22
9	12	17	23	19	25	18	14	11	20
7	10	15	21	17	23	16	12	9	18



Introduce writing large numbers.

(12 min.) Ex. 1

- **Arith Charts 2, 29:** Review place value using *Chart 2*. Introduce billions using *Chart 29*. Emphasize to students that each period, except the one to far left, must contain 3 digits. The one to far left may have from 1 to 3 digits. This period does not always have to be billions but could be any of the periods, depending on the size of the number. Remind students that commas are used to separate digits into periods of 3 digits. Without commas, large numbers are difficult to read.

- **A** Students read numbers.
- **Concept Cards 1–10:** Students read numbers. Hand out cards to students. Five students bring cards to front of room/get in order from least to greatest. Repeat for other 5 cards.

Dictate these numbers for students to write. Say them twice since they are large numbers.

33,756,902,000 6,000,001
32,818,000,854 19,350,070
19,826,423 3,205,500,734

Read/discuss Fact 1 in box. Students do Ex. 1.

Note: Students need to stay busy at all times. If they finish their work before time is called, have them work problems at the end of text in *Supplementary Exercises*. Students especially enjoy the story problems. They should not waste arithmetic time. Also, occasionally use a portion of this time to hear individual students recite their mult. tables. Sixth graders should be able to say them quickly/accurately. **Special help/extra work should be given to those who are unsure of their tables.** Begin immediately to work with these students before they become discouraged. The problems in *Supplementary Exercises* plus a well-planned *Help Class* are great practice for students who are struggling.

Name _____ Date _____

Rounding off Whole Numbers

Facts:

1. Whole numbers containing 4, 5, or 6 digits contain **thousands**. Those with 7, 8, or 9 digits contain **millions**. Those with 10, 11, or 12 digits contain **billions**. To make it easier to read large numbers, the digits are separated into periods by **commas**. Each period must have three digits except the period to the far left, which may have fewer than three digits.

hundred billions	ten billions	one billion	hundred millions	ten millions	one million	hundred thousands	ten thousands	one thousand	hundreds	tens	ones
7	4	6,	2	0	7,	3	5	2,	6	8	4
Billions	Millions	Thousands	Units								

2. When a precise number is not necessary, a **rounded number** may be used. A number may be rounded to the nearest ten, hundred, thousand, etc. A population of about 500 is an example of rounding to the nearest hundred.
3. Any digit that is not used when rounding off whole numbers is replaced with a zero. 2,782 rounded to the nearest hundred is 2,800.

4. When rounding off numbers to a certain place, look at the digit to the right of that place. That digit is called the **determining digit**. If the determining digit is 5 or more, **round up**. If the determining digit is less than 5, **round down**.

Examples:

1. Look at the number line to see that 260 rounded to the nearest hundred is 300 because it is closer to 300 than to 200.



Using the rule to round 260 to the nearest hundred, 6 is the determining digit. Therefore, round up the hundreds' place from 2 to 3 to get 300.

2. To round 984 to the nearest ten, the determining digit is 4. Because 4 is less than 5, the 8 does not change. Replace the 4 with a zero to get 980.

$$\begin{array}{r} \downarrow \\ 98\cancel{4} \quad 980 \text{ (nearest ten)} \end{array}$$
3. To round 984 to the nearest hundred, the 8 is the determining digit. Because 8 is 5 or more, the 9 rounds up to 10. Replace the 8 and 4 with zeros to get 1,000.

$$\begin{array}{r} \downarrow \\ \cancel{9}84 \quad 1,000 \text{ (nearest hundred)} \end{array}$$

Class Practice

1. Read these exercises about large numbers. (For additional practice, see *Supplementary Exercises*, p. 322.)
 - a. Saturn is about 900,000,000 miles from the sun. This number is read 900 million.
 - b. The total egg production for the United States in a recent year was 66,083,000,000. This number is read 66 billion, 83 million. The zero written before the 83 is essential. (Notice that all the periods except the one to the far left must have three digits to be complete. Sometimes the entire period consists of three zeros.)
 - c. The number 66,083,000,000 is rounded to the nearest one million. If desired, it could be rounded to the nearest ten billion. That number is written as 70,000,000,000. (Statistics are often rounded numbers instead of exact numbers.)



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Lesson 5 • 9