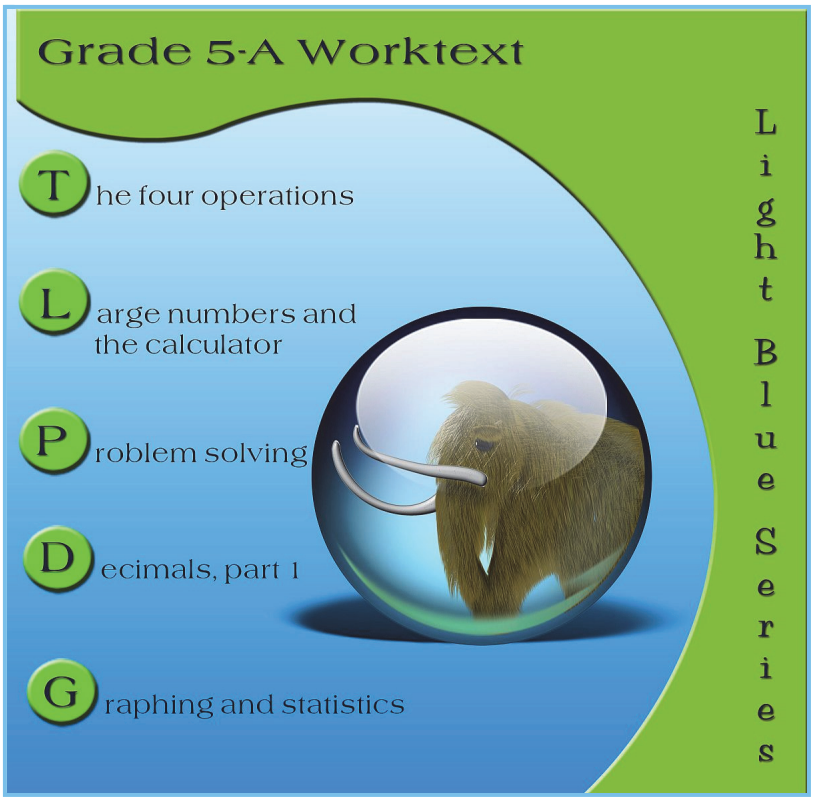
Math Mammoth
Grade 5-A Worktext



By Maria Miller

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Foreword

Math Mammoth Grade 5-A and Grade 5-B worktexts comprise a complete math curriculum for the fifth grade mathematics studies that meets and exceeds the Common Core Standards.

Fifth grade is the time to focus on fractions and decimals and their operations in great detail. Students also deepen their understanding of whole numbers, get introduced to the calculator, learn more problem solving and geometry, and study statistical graphs.

The year starts out with a study of whole numbers and their operations. Students review multi-digit multiplication and learn long division with two-digit divisors. We also review divisibility and prime factorization from fourth grade.

In the second chapter, the focus is on large numbers and using a calculator. This is the first time a calculator is introduced in Math Mammoth complete curriculum—thus far, all calculations have been done with mental math or with paper and pencil. I want students to learn to be critical in their use of the calculator and use it with good judgment. Every exercise where calculator use is allowed is marked with a little picture of a calculator.

The third chapter is about equations and problem solving. We study simple equations with the help of a balance and bar models. The main goal is to get students used to the concept of an equation and what it means to solve an equation. Students also solve a fair amount of word problem with the help of the visual bar model.

The fourth chapter is about decimals and some of the operations with decimals (the rest will be studied in chapter 6). Fifth grade is the time when students learn all the basic operations with decimals. In this chapter, we focus on place value with decimals, addition and subtraction of decimals, and multiplication and division of decimals by whole numbers. Multiplying decimals by decimals and dividing decimals by decimals is covered in chapter 6.

In chapter 5 we study graphing in a coordinate grid, line and bar graphs, and average and mode. Today's world has become increasingly complex with lots of data presented in the media, so our children need a good grasp of statistical graphs to be able to make sense of all of that information.

In part 5-B, students study more about decimals, operations with fractions, and geometry.

I wish you success with teaching math!

Maria Miller, the author

Warm-up: Mental Math

Add in parts.	**Use rounded numbers, then correct the error.**
57 + 34 = ? Add the tens: 50 + 30 = 80. Add the ones: 7 + 4 = 11. Lastly, add the two sums: 80 + 11 = 91.	29 + 18 = ? 29 is close to 30, and 18 is close to 20. 30 + 20 = 50. But that is 3 too many, so the correct answer is 47.
Subtract in parts.	**Use rounded numbers, then correct the error.**
81 − 34 = ? Subtract 30 first: 81 − 30 = 51. Then subtract four: 51 − 4 = 47.	75 − 39 = ? 39 is close to 40, so subtract 75 − 40 = 35. You subtracted one too many, so add one to get the correct answer 36.

1. Add and subtract using the tricks explained above.

a.	**b.**	**c.**
19 + 19 = _____ 28 + 47 = _____	19 + 19 + 57 = _____ 44 + 12 + 29 = _____	100 + 200 + 2,000 + 5,500 = _____ 400 + 12,000 + 5,000 + 320 = _____
d.	**e.**	**f.**
33 − 17 = _____ 81 − 47 = _____	34 − 19 + 12 = _____ 85 − 12 + 55 = _____	1,500 − 250 − 250 = _____ 400 − 7 − 40 − 100 = _____

2. A track has four legs of different lengths: (a) 1 km 200 m, (b) 700 m, (c) 1 km 500 m, and (d) 900 m. What is the total length of the track?

3. A cold front just arrived, and the temperature dropped 14 degrees. It is now 74°F. How hot was it before?

4. Four crates of apples weigh a total of 56 kg. The first one weighs 12 kg, the second one 15 kg, and the third one 22 kg. Find the weight of the fourth crate of apples.

5. Solve in your head.

a. 127 + _____ = 200	**b.** 250 + _____ + 300 = 760	**c.** _____ − 34 = 56

6. Multiply.

a. $20 \times 6 =$ _____	**b.** $10 \times 35 =$ _____	**c.** $400 \times 500 =$ _____
$200 \times 6 =$ _____	$100 \times 35 =$ _____	$60 \times 80 =$ _____
$200 \times 600 =$ _____	$20 \times 100 =$ _____	$100 \times 430 =$ _____

7. Continue the patterns for the next five numbers.

a. 60, 120, 180, 240, ...

b. 1,080, 960, 840, 720, ...

c. 130, 170, 210, 250, ...

8. Estimate the cost of buying two skirts for $26.95 and three pairs of socks for $3.29 each. (Use rounded numbers.)

Multiply part-by-part Multiply ones, tens, and hundreds separately. Add. **$3 \times 62 =$ $\underline{3 \times 60}$ + $\underline{3 \times 2}$**	**5 times a number** Find 10 times half of the number. $5 \times 28 =$ $\underline{10 \times 14}$ $= 140$.
9 times a number Find 10 times a number and subtract that number once. $9 \times 55 =$ $\underline{10 \times 55 - 55}$ $= 550 - 55 = 495$	**11 times a number** Find 10 times the number, and then add that number. $11 \times 38 =$ $\underline{10 \times 38 + 38}$ $= 380 + 38 = 418$

9. Multiply using the "tricks" explained above.

a. $5 \times 26 =$ _____ **b.** $5 \times 43 =$ _____ **c.** $6 \times 41 =$ _____

d. $5 \times 107 =$ _____ **e.** $9 \times 15 =$ _____ **f.** $9 \times 32 =$ _____

g. $7 \times 205 =$ _____ **h.** $3 \times 211 =$ _____ **i.** $11 \times 25 =$ _____

j. $11 \times 18 =$ _____ **k.** $4 \times 32 =$ _____ **l.** $9 \times 109 =$ _____

The Order of Operations and Equations

- ***First* solve whatever is inside parentheses.**
- ***Next,* solve multiplications and divisions, from left to right.**
  For example, in 36 ÷ 9 + 2 × 5, solve 36 ÷ 9 first.
- ***Last,* solve additions and subtractions, from left to right.**
  For example, in 200 − 50 + 30 + 7, solve 200 − 50 first.

1. Solve what is in the parentheses first. You can enclose the operation to be done first in a "bubble."

$(36 + 4) \div (5 + 5)$ $= 40 \div 10$ $= 4$	**a.** $(50 - 2) \div (3 + 5)$	**b.** $20 \times (1 + 7 + 5)$
	c. $2 \times (600 \div 60) + (19 - 8)$	**d.** $180 \div (13 - 7 + 3)$

2. Solve. When there are many multiplications and divisions, do them from left to right.

$24 \div 3 \times 2 \div 4$ $= 8 \times 2 \div 4$ $= 16 \div 4 = 4$	**a.** $36 \div 4 \div 3$	**b.** $1{,}200 \div 4 \times 5 \div 3$
	c. $7 \times 90 \div 2 \times 2 \div 10$	**d.** $5 \times 6 \div 3 \div 2 \times 20$

3. Solve in the right order. You can enclose the operation to be done first in a "bubble" or a "cloud."

a. $(8 + 16) \div 3 \div 2 =$ _____

b. $10 + 2 \times 9 + 8 =$ _____

c. $25 + 8 \times 5 \div 2 =$ _____

d. $10 + 2 \times (9 + 8) =$ _____

e. $120 - 2 \times (11 - 5) =$ _____

f. $2 \times (100 - 80 + 20) =$ _____

4. Division can also be written with a fraction line. Solve in the right order.

a. $6 + \frac{24}{2} =$ _____	**b.** $40 + \frac{32}{2} - 6 =$ _____	**c.** $\frac{54}{6} - 3 \times 2 =$ _____

An **expression** contains numbers, letters, and operation symbols—but no equal sign. For example, "40 × 2 + 6 × 5" is an expression. A single number or letter, such as 9, is also an expression.

An **equation** contains two expressions separated by an equals sign, "=".
Here are two examples: $24 = 11 + 13$ and $2x - 13 = 6/y$. Even $0 = 0$ is an equation.

5. Equation or expression? (Do not solve these.)

a. $4t = 180$ **b.** $2 + 60 \times 345 \div 9$ **c.** $15 = x + y$

d. $\dfrac{5.4 - 2.12}{0.4} = 8.2$ **e.** $1{,}000 = 1{,}000$ **f.** $12 - \dfrac{24 \div 0.8}{189}$

6. Which expression matches each problem? Also, solve the problems.

a. Mark bought three light bulbs for $8 each and paid with $50. What was his change?

(1) $3 \times \$8 - \$50$ **(2)** $\$50 - \$8 + \$8 + \$8$
(3) $\$50 - 3 \times \$8$ **(4)** $\$50 - (\$8 - \$8 - \$8)$

b. Shirts that cost $16 each are discounted by $5, so Mom bought 6 of them. What was the total cost?

(1) $\$16 - \$5 \times 6$ **(2)** $6 \times (\$16 - \$5)$
(3) $\$16 \times 6 - \$5$ **(4)** $(\$16 - 6) \times 5$

c. Andy bought a salad for $8 and a pizza for $13, and shared the cost evenly with his friend. What was Andy's share of the cost?

(1) $\$8 + \$13 \div 2$ **(2)** $\$2 \div (\$8 + \$13)$
(3) $2 \times \$8 + 2 \times \$13$ **(4)** $(\$8 + \$13) \div 2$

d. Melissa shared equally the cost of a meal with three other people and the cost of a taxi with two other people. The meal cost $48 and the taxi cost $30. How much did Melissa pay?

(1) $\$48 \div 4 + \$30 \div 3$ **(2)** $(\$48 + \$30) \div 3 \div 2$
(3) $\$48 \div 3 + \$30 \div 2$ **(4)** $(\$48 + \$30) \div 5$

$120 - 75 = 3 \times 15$ This is the left side of the equation. This is the right side of the equation. Do the left and right sides have the same value? Just calculate $120 - 75$, then calculate 3×15, and check. If yes, it's a **true equation**. If not, it's a **false equation**.	$2 = 5$ left side right side This is a very simple equation—but it is false! $4 + 5 = 21 - 3$ left side right side This is also a false equation!	$18 = x - 3$ left side right side Solving the equation means finding the value of the **unknown** (x) that makes it true. The value $x = 21$ makes this equation true, so we say $x = 21$ is the solution.

7. If the equation is false, change one number in it to make it true.

a. $6 + \frac{32}{8} = 5$	**b.** $(6 - 2) \times 3 = 5 + 5$	**c.** $5 \times 2 = 16 \div 2 + 2$

8. Place parentheses into these equations to make them true.

a. $10 + 40 + 40 \times 2 = 180$	**b.** $144 = 3 \times 2 + 4 \times 8$	**c.** $40 \times 3 = 80 - 50 \times 4$

9. Find a number to fit in the box so the equation is true.

a. $40 = (\square + 9) \times 2$	**b.** $4 \times 8 = 5 \times 6 + \square$	**c.** $4 + 5 = (20 - \square) \div 2$
d. $81 = 9 \times (2 + \square)$	**e.** $\square \times 11 = 12 + 20 \times 6$	**f.** $(4 + 5) \times 3 = \square \div 2$

10. Solve these simple equations.

a. $s \times 2 = 660$ $s =$ _____	**b.** $\frac{x}{2} = 5$ $x =$ _____	**c.** $200 - y = 60$ $y =$ _____

11. Build at least three true equations using only the symbols and numbers given. You may use the same number or symbol many times.

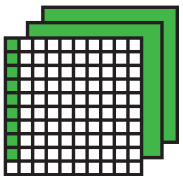
11, 3, 1, −, +, ×, ( ), =

Review: Tenths and Hundredths

Example 1. Read the decimal 2.07 as "two and seven hundredths".

(The letters H, T, and O in the chart mark the hundreds, the tens, and the ones places. Then, "t" is for tenths and "h" is for hundredths.)

H	T	O		t	h
		2	**.**	**0**	**7**

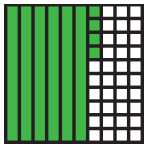
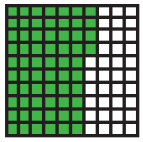
$= 2\frac{7}{100} = \frac{207}{100} =$ 

Example 2. The number 0.64 has six tenths and four hundredths. Yet, we read it as 64 hundredths. How can that be?

It is because its 6 tenths are equal to 60 hundredths. Therefore:

6 tenths + 4 hundredths
= 60 hundredths + 4 hundredths = 64 hundredths

H	T	O		t	h
		0	**.**	**6**	**4**

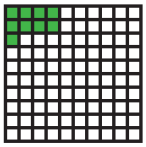
=  = 

0.6 + 0.04 = 0.64

$\frac{6}{10} + \frac{4}{100} = \frac{64}{100}$

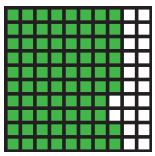
1. Write as fractions/mixed numbers and as decimals.

a. ☐/☐ = _____

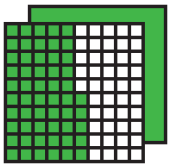


b. ☐/☐ = _____

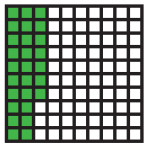
c. ☐/☐ = _____



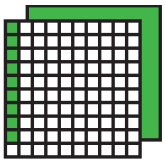
d. ☐/☐ = _____



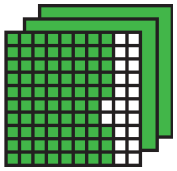
e. ☐ ☐/☐ = _____



f. ☐/☐ = _____

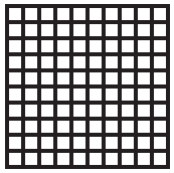


g. ☐ ☐/☐ = _____



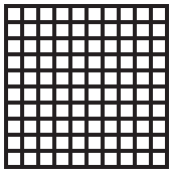
h. ☐ ☐/☐ = _____

2. Color parts to show the decimals, and then write each as a single decimal number.



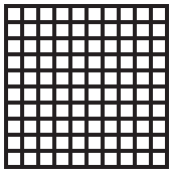
a. 32 hundredths

= _____



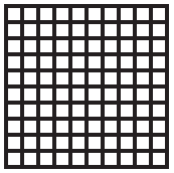
b. one tenth

= _____



c. 0.2 + 0.07

= _____



d. 0.04 + 0.6

= _____