

math

# MAMMOTH

## Math Mammoth Grade 7 Review Workbook

**T**he language of algebra

**I**ntegers

**S**olving one-step equations

**R**ational numbers

**E**quations and  
inequalities

**R**atios and  
proportions

**P**ercent

**G**eometry

**P**ythagorean theorem

**P**robability and statistics



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## Introduction

*Math Mammoth Grade 7 Review Workbook* is intended to give students a thorough review of seventh grade math, following the main areas of Common Core Standards for grade 7 mathematics and typical pre-algebra study topics. The book has both topical as well as mixed (spiral) review worksheets, and includes both topical tests and a comprehensive end-of-the-year test. The tests can also be used as review worksheets, instead of tests.

You can use this workbook for various purposes: for summer math practice, to keep the child from forgetting math skills during other break times, to prepare students who are going into eighth grade or algebra 1, or to give seventh grade students extra practice during the school year.

The topics reviewed in this workbook are:

- algebra
- integers
- one-step equations
- rational numbers
- equations and inequalities
- ratios and proportions
- percent
- geometry
- Pythagorean Theorem
- probability
- statistics

In addition to the topical reviews and tests, the workbook also contains many cumulative (spiral) review pages.

The content for these is taken from the *Math Mammoth Grade 7 Complete Curriculum*. However, the content follows a typical pre-algebra course, so this workbook can be used no matter which math curriculum you follow.

Please note this book does not contain lessons or instruction for the topics. It is not intended for initial teaching. It also will not work if the student needs to completely re-study these topics (the student has not learned the topics at all). For that purpose, please consider the *Math Mammoth Grade 7 Complete Curriculum*, which has all the necessary instruction and lessons.

*I wish you success with teaching math!*

*Maria Miller, the author*



# The Language of Algebra Review

1. Find the value of these expressions.

a. $(6 + 4)^2 \cdot (12 - 9)^3$	b. $3 \cdot (5 - (7 - 5))$	c. $\frac{(5 - 3) \cdot 2}{2^3} + 7$
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2. Name the property of arithmetic illustrated by the fact that  $(5 \cdot z) \cdot 3$  is equal to  $5 \cdot (z \cdot 3)$ .

3. Evaluate the expressions.

a. $100 - 2x^2$ , when $x = 5$	b. $\frac{2s}{s^3 + 3}$ , when $s = 4$
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4. Which equation matches the situation? *Hint: give the variable(s) some value(s) to test the situation.*

a. The shorter beam (length  $l_1$ ) is 1.5 meters shorter than the longer beam (length  $l_2$ ).

$$l_1 = 1.5 - l_2$$

$$l_2 = 1.5 - l_1$$

$$l_2 = l_1 - 1.5$$

$$l_1 = l_2 - 1.5$$

b. The dog lost  $1/6$  of its original weight ( $w$ ), and weighs now 23 kg.

$$\frac{w}{6} = 23$$

$$\frac{5w}{6} = 23$$

$$\frac{6w}{5} = 23$$

$$w - 1/6 = 23$$

$$w - 5/6 = 23$$

5. Is subtraction commutative? In other words, is it true that  $a - b$  has the same value as  $b - a$ , no matter what values we use for  $a$  and  $b$ ? Explain your reasoning.

6. Write a SINGLE expression to match these situations.

a. A pair of jeans costs  $p$  dollars. The jeans are now discounted by  $1/5$  of that price.  
Write an expression for the discounted price.

b. It costs Mandy \$0.18 to drive her car one mile.  
How much does it cost her to drive  $y$  miles? Write an expression.

c. The pet store sells dog food in bags of two different sizes: 3-kg and 8-kg.  
What is the total weight of  $n$  of the smaller bags and  $m$  of the larger bags?

7. Simplify the expressions.

<b>a.</b> $x + 2 + x + x$	<b>b.</b> $x \cdot 2 \cdot x \cdot x \cdot x$	<b>c.</b> $8v + 12v$
<b>d.</b> $8v \cdot 12v$	<b>e.</b> $4z \cdot 9z \cdot z$	<b>f.</b> $f + 2f + 10g - f - 4g$

8. **a.** Sketch a rectangle that is  $5x$  tall and  $2x$  wide.

- b.** What is its area?  
**c.** What is its perimeter?

9. Use the distributive property to multiply.

<b>a.</b> $12(v - 9)$	<b>b.</b> $3(a + b + 2)$	<b>c.</b> $3(0.5t - x)$
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10. Draw a diagram of two rectangles to illustrate that the product  $11(x + 7)$  is equal to  $11x + 77$ .

11. Fill in the table.

Expression	the terms in it	coefficient(s)	Constants
$a^8$			
$2x + 9y$			

12. The perimeter of a regular pentagon is  $30s + 45$ . How long is one side?

13. Factor these sums (write them as products). Think of divisibility!

<b>a.</b> $48x + 12 =$	<b>b.</b> $40x - 25 =$
<b>c.</b> $6y - 2z =$	<b>d.</b> $56t - 16s + 8 =$

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## Mixed Review 2

1. Rewrite each expression using a fraction line, then simplify.

<b>a.</b> $7 \div 8 \cdot 4$	<b>b.</b> $5 \cdot 2 \div 10 + 1$	<b>c.</b> $(10 + 3) \div (8 - 1)$
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2. Evaluate the expressions. (Give your answer as a fraction or mixed number, not as a decimal.)

<b>a.</b> $\frac{x+2}{x-2}$ , when $x = 21$	<b>b.</b> $3s^2 - 2t^2$ , when $s = 10$ and $t = 3$
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3. Name the property of arithmetic illustrated by the equation  $(5x)y = 5(xy)$ .

4. There are two broomsticks, one wooden and one metal.

**a.** Choose two variables to denote the lengths of the two broomsticks.

Let \_\_\_\_\_ be the length of the wooden broomstick.

Let \_\_\_\_\_ be the length of the metal one.

**b.** Write an equation that matches the sentence "The wooden broomstick is 20 cm longer than the metal one."

5. **a.** Circle the equation that matches the situation.

Let  $p$  be the normal price of one sun hat in a clothing store.

The store owner decides to discount them by \$5 each.

A customer buys three sun hats. The total cost is \$16.80.

$$3(p - \$5) = \$16.80$$

$$p - \$5 = 3 \cdot \$16.80$$

$$3p - \$5 = \$16.80$$

$$3(p - 0.5) = \$16.80$$

**b.** How much would one sun hat have cost before the discount?

Solve this problem using any strategy. You don't have to use the equation.

6. Simplify the expressions.

a. $6p + 2 + 5p - 1$	b. $6p \cdot p \cdot 7$	c. $f \cdot 2f \cdot 2f \cdot f \cdot 3$
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7. Simplify.

a. $ -71 $	b. $- -2 $	c. $ -9 + 5 $	d. $-(-84)$
e. $ -9  +  -5 $		f. $ -9  -  5 $	

8. Write an inequality. Use negative integers where appropriate.

- a. This hill is at least 200 ft high.
- b. Liz owes more than \$120.
- c. A maximum of 8 items per customer.
- d. The ride is only for children that are up to 120 cm tall.

9. Find the missing numbers. You can think of jumps on the number line.

a. $5 - \underline{\hspace{2cm}} = -2$	c. $2 + \underline{\hspace{2cm}} = -4$	e. $-30 + \underline{\hspace{2cm}} = -40$	g. $-51 + \underline{\hspace{2cm}} = 0$
b. $-1 - \underline{\hspace{2cm}} = -19$	d. $4 - \underline{\hspace{2cm}} = 5$	f. $0 - \underline{\hspace{2cm}} = -49$	h. $-9 + \underline{\hspace{2cm}} = -7$

10. Answer the questions about the pattern.

Step            1                            2                            3                            4                            5

- a. Draw steps 4 and 5.
- b. How do you see this pattern growing?
- c. How many flowers will there be in step 39?
- d. What about in step  $n$ ?

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# Pythagorean Theorem Test

*Do not use a calculator for problems 1-3 of the test.*

1. Calculate the values of the square roots.

a. $\sqrt{1,000,000}$	b. $\sqrt{400}$	c. $\sqrt{1}$
d. $\sqrt{75 - 11}$	e. $\sqrt{10^4}$	f. $\sqrt{53^2}$

2. Do  $\sqrt{-9}$  and  $-\sqrt{9}$  have the same value? Explain.

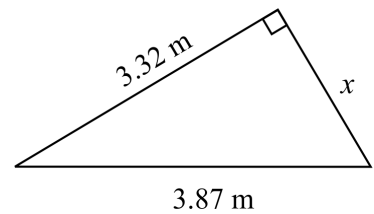
3. Solve the equations. Round the answers to three decimals.

a. $s^2 - 17 = 19$	b. $5y^2 = 89 + 36$
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*From this point on, you may use a basic calculator.*

4. Determine whether the lengths 13.4 m, 7 m, and 10.2 m form a right triangle using the Pythagorean Theorem.

5. Find the length of the unknown side.



6. Find the length of a diagonal of a square with 50-cm sides.

7. Calculate the area of this shape to the nearest tenth of a square foot.

