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Introduction

Math Mammoth Grade 7 Review Workbook is intended to give students a thorough review of seventh grade math. The book has both topical as well as mixed (spiral) review worksheets, and includes both topical tests and a comprehensive end-of-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:

- algebraic expressions
- integers
- rational numbers
- one- and two-step equations and inequalities
- ratios and proportions
- percent
- geometry (angle relationships, drawing triangles, area and circumference of a circle, area, volume, and surface area)
- basic probability concepts
- statistics (random sampling, comparing distributions)

The content for this book is taken from the *Math Mammoth Grade 7* curriculum. However, this workbook can be used no matter which math curriculum you follow.

Please note the book does not contain lessons or instruction for the topics. It is not intended for initial teaching or if the student has not learned the topics at all. For that purpose, please consider the *Math Mammoth Grade 7 Curriculum*, which has all the necessary instruction and lessons.

I wish you success with teaching math!

Maria Miller, the author

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Mixed Review 3

1. Write an expression.

a. 10 less than x squared.

b. The quotient of 154 and k cubed.

c. The quantity x plus 2 to the fifth power.

d. x plus 2 to the fifth power.

2. The sides of a square are $(x + 2)$ long.

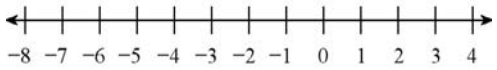
a. Sketch the square.

b. Write an expression for the area of the square.

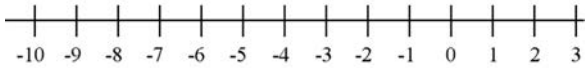
c. Write an expression for the perimeter of the square.

d. Evaluate your expression for the area of the square when $x = 1.5$.

3. Draw a number line jump for each addition or subtraction.



a. $-2 + 6 =$ _____



b. $-3 - 5 =$ _____

4. Draw counters for the addition $3 + (-5)$. Explain how to perform the addition using the counters.

5. Solve.

a. $89 + (-35) =$	**b.** $-45 + (-29) =$	**c.** $-78 + 60 =$

6. Change each addition into a subtraction or vice versa. Then solve whichever is easier.

a. $-2 + (-18)$ ↓ ____ − ____	**b.** $56 - (-34)$ ↓ ____ + ____ = _____	**c.** $-14 + (-24)$ ↓ ____ − ____ = _____	**d.** $2 + 9$ ↓ ____ − ____ = _____

7. Write comparisons using > , < , and integers. Include the units, too.

a. The temperature at the North Pole is −34 degrees Celsius, whereas in New York, it is −8 degrees Celsius.

b. The total electric charge of 12 electrons is $-12e$. The total electric charge of 3 protons is $+3e$.

8. Name the property of arithmetic illustrated by the equation $2x = x \cdot 2$.

9. Evaluate the expression $|a - b|$ for the given values of a and b. Check that the answer you get is the same as if you had used a number line to figure out the distance between the two numbers.

a. a is 8 and b is 54	**b.** a is −12 and b is −5

10. Describe a situation where one person has a positive account balance and another has a negative balance, and the one person's balance is $30 more.

11. Use the distributive property "backwards" to write the expression as a product.

a. $42s + 28 =$ ____ (____ + ____)

b. $54z - 18 =$ ____ (____ − ____)

12. Find the missing numbers.

a. _____ ÷ (−5) = 35	**b.** 35 ÷ _____ = −5	**c.** 5 · _____ = −35
d. 2 + (−5) = _____ + 7	**e.** 2 · 9 = −3 · _____	**f.** 40 ÷ _____ = −5 · 4

13. Write the equation and then solve it using "guess and check." Each root is between −20 and 20.

a. 2 plus 14 equals x minus 1
b. x cubed equals 27

14. Add or subtract.

a. $(-9) + (-18) =$ _____	**b.** $-21 - (-3) =$ _____	**c.** $17 - 51 =$ _____

15. Give a real-life situation for the sum $3 + (-10)$.

16. Simplify.

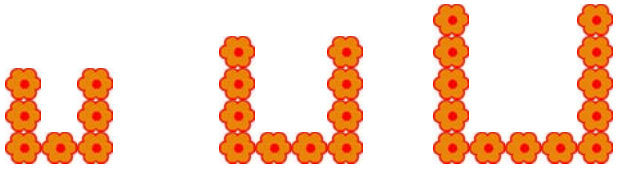
a. $|-2|$ **b.** $-(-2)$ **c.** $-|2|$ **d.** -0

17. Find the value of the expressions when $x = -2$ and $y = 8$.

a. $5x^2$	**b.** $-5y + 6$	**c.** $-(y + x)$

18. Jeremy is 2 years older than Larry. Write an expression for Larry's age, if Jeremy is y years old.

19. Here is a growing pattern. Draw the steps 4 and 5 and answer the questions.



Step 1 2 3

a. How do you see this pattern grow?

b. How many flowers will be in step 39?

c. In step n?

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Mixed Review 7

1. Find the missing numbers and terms.

a. ____ $(6x - 5) = 72x - 60$	**b.** $12($ _____ $-$ _____ $+$ _____ $) = 108y - 36x + 4.8$

2. Write an expression with two terms: the coefficient of the first term is 5, its variable part is x cubed, and the second term is the constant $-1/2$.

3. **a.** Which equation matches the situation?

A town of population p lost 2/3 of its population, and now it has 2600 residents.

$p - 2/3 = 2600$ | $\frac{2p}{3} = 2600$ | $p - 1/3 = 2600$ | $p - (2/3)p = 2600$

b. How many people lived in the town originally?

4. Rewrite each expression without parentheses.

a. $2 + (-g) =$	**b.** $15 - (-r) =$	**c.** $7x + (-2y) =$

5. Solve. Check your solutions.

a. $-8 + (-x) = 65$	**b.** $-22 - (-17) = 7 + x + 19$
c. $-5 + 16 = -5 - y + 10$	**d.** $42 + (-9) + s = 9 - 14$

6. Find the value of each expression.

a. $(-14) + 7 + (-8) + 2 =$	**b.** $-3 + (-12) + 21 + (-19) + (-5) =$
c. $-8 - (-7) - (-12) =$	**d.** $63 - (-11) + (-5) =$

7. **a.** Write an expression for the distance between x and 8.

b. Evaluate your expression if $x = -52$.

8. Divide and simplify.

a. $2 \div (-8) =$	**b.** $4 \div (-24)$	**c.** $-18 \div 5$
d. $-2 \div (-9)$	**e.** $42 \div (-49)$	**f.** $-32 \div (-28)$

9. Explain a strategy for finding the value of $8 \cdot (2\ ¾)$ without changing the mixed number into a fraction.

10. Solve (*without* a calculator).

a. $\frac{2}{5} \cdot (-0.8) \cdot \frac{1}{8} \cdot 5 \cdot (-30)$	**b.** $-\frac{5}{6} \cdot \frac{2}{3} \div \frac{4}{3} \div 2$

11. Solve 0.25 ÷ 0.3 using both decimal and fraction arithmetic.

Decimal division:	**Fraction division:**

12. Find the value of each expression (*without* a calculator).

a. 11% of \$15	**b.** 90% of −12	**c.** 75% of −200 m
d. $\dfrac{-7}{\frac{8}{9}}$	**e.** $\dfrac{\frac{1}{2}}{\frac{1}{5}}$	**f.** $0.5 \cdot \frac{11}{12}$

13. Find the value of each expression (*without* a calculator). Check that your answer is reasonable by using estimation and mental math.

a. $-\frac{5}{4} \cdot 0.2 + 0.7 \cdot \frac{2}{5}$	**b.** $\dfrac{\frac{5}{7}}{-\frac{2}{3}}$

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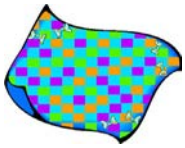
Percent Review

1. All these items are on sale. Calculate the new, discounted prices. Use mental math.

 **a.** Price: $20 20% off New price: $_____	 **b.** Price: $12 25% off New price: $_____	 **c.** Price: $150 30% off New price: $_____

You may use a calculator for all the problems in the lesson from this point onward.

2. Marsha is driving a distance of 240 km between two towns. So far, she has traveled 90 km. What percentage of her trip has she *not* covered?

3. A portable reading device costs $180. Now it is discounted and costs $153. What is the discount percentage?

4. Which is the greater amount, 1.6% of 24,300 miles or 37% of 990 miles? How much greater?

5. A wall painting was planned to be 5 m by 3 m in size. If both of its sides are increased by 20%, by what percentage will the area of the painting increase?

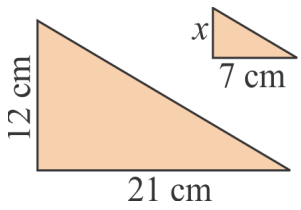
6. A flashlight is discounted by 18%, and now it costs $23.37. Let p be its price before the discount. Write an equation to solve for p and and solve it.

7. Two brothers, Andy and Jack, shared the price of a new computer so that Andy paid 2/5 and Jack paid 3/5 of the price. The computer cost $459, and the sales tax was 7%. Calculate Andy's and Jack's shares.

8. A standing desk is on sale for 22% off. Audrey pays $156.57 for it, including an 8.5% sales tax. What was the original price of the desk (without tax)?

9. Workers in a factory used to be paid $18.20 per hour. One year, this was increased to $18.85. The following year, it was increased to $19.55. Which year saw a greater percentage of increase in the hourly wage?

10. The bigger right triangle on the right was shrunk using a certain scale factor.



a. Calculate what percentage the area of the smaller triangle is of the area of the larger triangle.

b. In what ratio are their areas?

11. Michael borrowed $2,500 for 9 months and paid back $2,706.25. What was the annual interest rate?

12. Noah takes a $4,000 loan at a 7.8% annual interest rate to purchase a car. At the end of the first year, he pays back $2,000 of the principal of the loan. At the end of the second year, he pays back the rest of the principal and all of the interest. How much total interest does he have to pay? Assume simple interest, which is calculated and paid only at the end of the period of the loan.

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Probability Test

You may use a calculator for all the problems in this test.

1. You roll a number cube with numbers 1, 2, 3, 4, 5, and 6 printed on the faces.
   Find the probabilities as fractions.

   a. P(not 5)

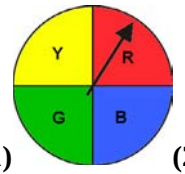
   b. P(2 or 6)

   c. P(less than 9)

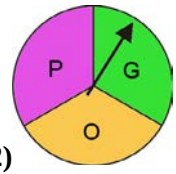
   d. P(not 2 nor 5)

2. Two spinners are spun.

   a. In the space below, draw a tree diagram showing all the possible outcomes of this experiment.



(1)



(2)

   Then find the probabilities.

   b. P(yellow; purple)

   c. P(red or yellow; orange)

   d. P(not red; not orange)

3. Two dice are rolled. Find the probabilities of these events:

a. You get a sum of six on the two dice.

b. You get less than 3 on each dice.

c. One dice is 6 and the other is not (in either order).

4. Logan and Alex tossed two coins 400 times.

a. List all the possible outcomes when two coins are tossed just one time.

b. Here are Logan's and Alex's results. Calculate and fill in the table the experimental and theoretical probabilities to the nearest tenth of a percent.

	Frequency	**Experimental probability**	**Theoretical probability**
TT	5		
TH	8		
HT	182		
HH	205		
TOTALS	400		

c. Suggest a reason for the large discrepancy between the experimental and theoretical probabilities.

5. What is the probability of getting tails, tails, tails when you toss a coin three times in a row?

6. Lily and Grace placed some stuffed animals in a bag. Then they randomly pulled out one animal and put it back, and repeated this 120 times. Here are their results:

Animal	Frequency
Elephant	58
Giraffe	29
Bear	17
Cat	11
Bird	5
Totals	**120**

a. Based on their results, what is the approximate probability of pulling the cat out of the bag?

b. If this experiment was repeated 300 times, approximately how many times should they expect to get the bear?