

math

MAMMOTH

Skills Review Workbook

- The language of algebra
- Integers
- Solving one-step equations
- Rational numbers
- Equations and inequalities
- Ratios and proportions
- Percent
- Geometry
- Pythagorean Theorem
- Probability and statistics



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Foreword

Math Mammoth Grade 7 Skills Review Workbook has been created to complement the lessons in *the Math Mammoth Grade 7* complete curriculum. It gives the students practice in reviewing what they have already studied, so the concepts and skills will become more established in their memory.

These review worksheets are designed to provide a spiral review of the concepts in the curriculum. This means that after a concept or skill has been studied in the main curriculum, it is then reviewed repeatedly over time in several different worksheets of this book.

This book is divided into chapters, according to the corresponding chapters in the *Math Mammoth Grade 7* curriculum. You can choose exactly when to use the worksheets within the chapter, and how many of them to use. Not all students need all of these worksheets to help them keep their math skills fresh, so please vary the amount of worksheets you assign your student(s) according to their needs.

Each worksheet is designed to be one page, and includes a variety of exercises in a fun way without becoming too long and tedious.

The answer key is available as a separate book.

I wish you success in teaching math!

Maria Miller, the author

Skills Review 1

1. Evaluate.

a. 0.3^3

b. 2^5

c. 0.1^4

2. Find the value of these expressions.

a. $\frac{1}{12-6} \cdot \frac{20}{40}$

b. $\frac{7 \cdot 8}{2} - \frac{2 \cdot 9}{3 \cdot 2}$

c. $1 - \frac{7-5}{4+2}$

3. Rewrite each expression using a fraction line, then simplify. Compare the expression in the top row with the one below it. *Hint: Only what comes right after the “÷” sign goes into the denominator.*

a. $3 \cdot 6 \div 2$

b. $2 + 24 \div (3 + 1)$

c. $42 \div 6 + 1 \div 5$

d. $3 \div 6 \cdot 2$

e. $2 + 24 \div 3 + 1$

f. $12 - 1 + 2 \div 3$

4. Write an expression.

a. y minus x squared.

b. The quantity y minus x , squared.

c. The quotient of x minus 5 and x to the third power.

5. a. A wooden board is m units long, and another board is $\frac{3}{4}$ as long.
Write an expression for the length of the second board.

b. Write another, different expression for the length of the second board.
(Hint: if you used a fraction in a., use a decimal now, or vice versa.)

c. Write an expression for the total length of the two boards, if put end-to-end.
Then simplify it.

Skills Review 2

Chapter 1

1. Circle the equation(s) that matches the situation. You do *not* have to solve the equation.

The amount of land used for parks decreased by $\frac{1}{5}$, and now it is 2,600 acres.

$$\frac{5p}{4} = 2,600$$

$$\frac{4p}{5} = 2,600$$

$$p - \frac{1}{5} = 2,600$$

$$\frac{p}{5} = 2,600$$

$$p - \left(\frac{1}{5}\right)p = 2,600$$

2. Find the root(s) of the equation $x^2 - x = 12$ in the set of positive even numbers that are less than 10.

3. Are the expressions equal, no matter what value n has? Give n some test values to check.

a. $\frac{n}{2} + \frac{n}{2}$
 n

b. $(10 - n) - 1$
 $10 - (n - 1)$

c. $(10 - n) + 1$
 $10 - (n + 1)$

4. Write an equation. Then solve it.

a. The product of a number and 5 is 75.

b. One decreased by a certain number is two sevenths.

5. Find the value of these expressions.

a. $(0.5 + 0.5) \cdot (9 - 7)^4$

b. $(0.7 - 0.3) \cdot 4^2$

c. $(2 \cdot 6^2 - 70)^2$

6. Write a single mathematical expression (“number sentence”) for each situation. Don’t write just the answer.

a. The side of a square is $2x$ units long.
Write an expression for its perimeter.

perimeter =

b. Cindy earns \$15 per hour, and \$20 per hour for overtime. Write an expression for how much she earns for working x hours with the normal pay and y hours overtime.

earnings =

Skills Review 3

1. Write an expression.

- a. the sum of a squared and b squared
- b. the quantity s minus 2, squared, minus 10
- c. 10 less than the quantity x plus 3

2. Which expression from the right matches with (a) and (b) below?

- a. The area of a square with sides 3 cm long.
- b. The volume of a cube with sides 3 cm long.

(i) 27 cm^3 (ii) $(3 \text{ cm})^2$ (iii) 9 cm^3 (iv) 3 cm^2

3. Simplify the expressions.

a. $a + a + 7 + n + 2n$	b. $5 \cdot y \cdot 4 \cdot y \cdot \frac{1}{2}$	c. $3x \cdot x \cdot y \cdot y \cdot x \cdot x$
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4. Evaluate the expressions. (Give your answer as a fraction or mixed number, not as a decimal.)

a. $5x - x^2$, when $x = 1$	b. $3mx - 2 + 2m$, when $m = 10$ and $x = 5$
c. $\frac{y^2 - 1}{y - 1}$, when $y = 3$	d. $\frac{z}{z - 1} + 1$, when $z = 5$

5. Find the value of these expressions.

a. $2 \cdot (4 - 2)^2 \cdot (200 - 100)^2$	b. $9 + \frac{2 \cdot (5 - 3)^3}{2^3}$	c. $\frac{(1 + 1)^4}{4} + \frac{15 - 12}{2}$
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6. Some of these are wrong. Find which ones, and correct them.

a. $r \cdot r \cdot r = 3r$	b. $7 \cdot x + x = 7x^2$	c. $\frac{x}{x} = 1$
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Skills Review 15

1. Find the value of the expressions using the correct order of operations.

a. $4 + 8 - 5 \cdot (-8)$	b. $(3 + (-4)) \cdot 9$	c. $4 - 5 \cdot 7 + 6$
d. $-1 + \frac{1}{2 - 5}$	e. $8 - \frac{1}{-4}$	f. $\frac{-12}{4} \cdot 2 + 9$

2. Factor these expressions (write them as products) using the distributive property “backwards”.

a. $54x + 36 =$	b. $32x - 40y + 8 =$
c. $45a - 85b + 50 =$	d. $28 + 49a - 77b =$

3. A computer game adds 300 bonus points to your initial point count when you complete a level. Also, if you finished in less than 4 minutes, your points are doubled.

- Write an expression for your final point count if you finish a level in less than 4 minutes. Use p for the initial point count (before the bonus points and doubling).
- Let's say someone finishes a level in 3 minutes with lots of errors, and ends up with -200 points initially. What will be their final point count?
- Let's say Eric finishes a level quickly and the computer calculates that he gets -100 points. What was his initial point count?
Write an equation for this situation. Then solve it using guess and check or logical thinking.

4. The area of a two-part rectangle is given by the equivalent expressions $m(x + 8)$ and $mx + 8m$. Sketch the rectangle and mark the side lengths m , x , and 8 in it.

5. Find the missing numbers. Use guess and check and logical thinking.

a. $10 \cdot \square + 7 = -23$	b. $\frac{\square}{-2} = 4 \cdot (-5)$	c. $14 - 3 \cdot \square = -7$
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Skills Review 27

1. Solve.

a. $2\frac{3}{8} - x = \frac{1}{2}$

b. $1\frac{1}{5} + v = \frac{3}{10}$

2. Choose the correct way to enter these calculations into a calculator and solve the expressions.



a. Calculation: $\frac{4}{11} \cdot 24.06$

1. $4 \div 11 \cdot 24.06$

2. $4 \cdot 24.06 \div 11$

3. It does not matter; both will give the correct answer.

b. Calculation: $120 \div \frac{7}{8}$

1. $120 \div 7 \div 8$

2. $120 \div (7 \div 8)$

3. It does not matter; both will give the correct answer.

c. Calculation: $156 \cdot \frac{29}{100}$

1. $156 \cdot 29 \div 100$

2. $156 \cdot (29 \div 100)$

3. It does not matter; both will give the correct answer.

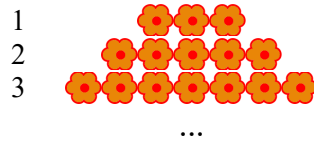
3. Make many different division and multiplication problems with an answer of negative four. Try to be creative!

$8 \cdot (-1/2)$

4. If a boat travels at a constant speed of 12 km/h, how long will it take to travel a distance of 5.6 km?

Skills Review 34

1. A section of a flower garden has rows of flowers. The first row has three flowers, and each row after that has two more flowers than the previous row.



Row	Flowers
1	3
2	$3 + 2$
3	
4	
n	

- Write a formula that tells the gardener the number of flowers in row n .
- How many flowers are in the 28th row?
- In which row will there be 97 flowers?

2. Write an expression with *three* terms: one has variable part x and coefficient 2, another is a constant equal to one dozen, and yet another has variable part y and coefficient 5.

3. Find the missing factors.

a. $7 \cdot \underline{\hspace{2cm}} = -56$

b. $-9 \cdot \underline{\hspace{2cm}} \cdot 2 = 108$

c. $5 \cdot 3 \cdot \underline{\hspace{2cm}} = -600$

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

- Mary owes the bank at least \$2,000.
- You have to be at least 21 to buy this.
- This medicine should be kept at 5° or colder.

5. Solve.

a. $-10x = \frac{9}{8}$

b. $\frac{4}{5} - x = \frac{2}{3}$

Skills Review 54

1. Use the formula $d = vt$ to solve the problems.



- a. A helicopter flies at a constant speed of 95 mph. How long will it take it to fly 215 miles?

$$\begin{array}{ccc} d & = & v \quad t \\ \downarrow & & \downarrow \quad \downarrow \end{array}$$

- b. Beth leaves at 7:05 a.m. to drive 35 miles to work. If her average speed is 42 mph, when will she arrive at work?

$$\begin{array}{ccc} d & = & v \quad t \\ \downarrow & & \downarrow \quad \downarrow \end{array}$$

2. The table shows the relationship between the number of people and the time it takes to decorate a large room for a wedding.

Number of people	1	2	3	4	5	6
Time (hours)	27	22	18	15.5	13	10.8

- a. Are these two quantities in proportion?
b. If so, write an equation relating the two and state the constant of proportionality.

3. A stove is discounted by 34%, and now it costs \$349.80.
Let p be its price before the discount.



- a. Find the proportion on the right that matches the problem.
b. Solve the problem.

$$\begin{array}{l} 349.80/p = 66/100 \\ p/349.80 = 66/100 \\ p/66 = 349.80 \end{array}$$

4. Solve (without a calculator).

a. $0.83 - 1.49$

b. $-6.21 - 0.7$

c. $3.5 - (-7.2) + (-0.3)$

Skills Review 61

1. Write an **expression** for the final price using a decimal for the percentage.

a. Jacket: price \$45, discounted by 32%. New price = _____

b. A chainsaw: price p , discounted by 17%. New price = _____

2. Use the distributive property to multiply.

a. $-0.7(w + 18) =$

b. $-0.2(9x - 13) =$

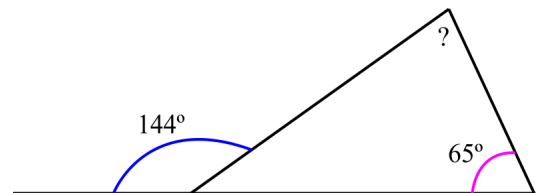
c. $-400(0.5x + 0.8) =$

3. a. Calculate the rate of physicians per 10,000 people in Nigeria, if the country is estimated to have 75,000 doctors and 205,700,000 people. Round your answer to one decimal.



b. Sri Lanka has 6.8 physicians per 10,000 people. How many doctors would you expect to find in an area in Sri Lanka that has 430,000 residents?

4. Find the angle measure of the angle marked with a question mark.



5. Solve.

a. $(-80) + 68 =$

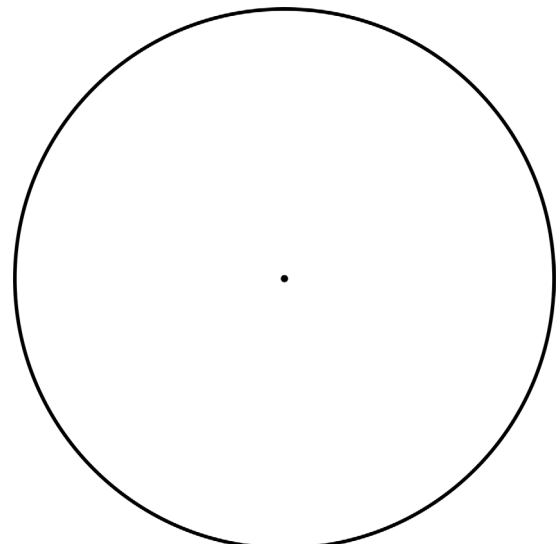
b. $-30 + (-23) =$

c. $-91 + 45 =$

6. The table lists by variety how many bags of dried beans a supermarket sold. Draw a circle graph. You will need a protractor and a calculator. Round the percentages to the nearest tenth of a percent. Round the angles to the nearest degree.

(With the rounded numbers, your totals might not add up to exactly 100% or 360° , but they are close enough to make the circle graph.)

Variety	Amount sold	Percentage of total	Central Angle
fava	16		
kidney	29		
navy	22		
pinto	37		
TOTALS			



Skills Review 73

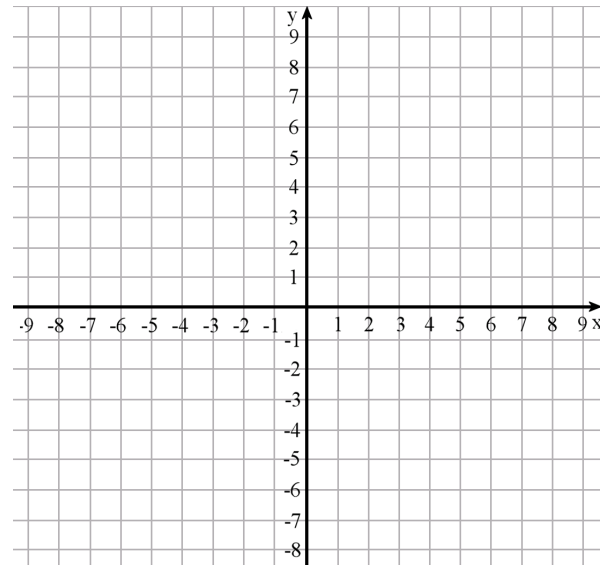
1. Determine the slope of each line from the table or from its graph.

a.

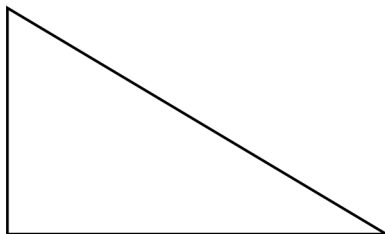
x	-7	-5	-3	-1	1	3	5
y	$-5\frac{1}{2}$	-5	$-4\frac{1}{2}$	-4	$-3\frac{1}{2}$	-3	$-2\frac{1}{2}$

b.

x	9	8	7	6	5	4	3
y	-4	-3	-2	-1	0	1	2



2. Below you see a scale drawing of a triangle, drawn at the scale 1 cm = 25 cm. Make a new scale drawing of the original figure, this time using the scale 1 : 15.



Scale 1 cm = 25 cm

3. Use a calculator to find these square roots. Round your answers to four decimal digits.

a. $\sqrt{10}$

b. $\sqrt{19}$

c. $\sqrt{27.43}$

4. Write and solve a percent proportion (according to the data below) in the form $\frac{\text{part}}{\text{total}} = \frac{\text{percent}}{100}$.

a. How much is 62% of 7,300 km?

b. Forty-three percent of a number is 8.17. What is the number?