**WHAT YOU NEED TO KNOW FOR:**

**INVESTIGATIONS IN MATHEMATICS**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Due on the second Friday of the school year!**

**The Investigations into Mathematics teachers have selected the following topics for summer review.** Students should complete the attached practice problems. Online resources for students who need help are provided in each section. Additional online practice can be found at the resource sites and are listed below.

**Topics:**

* Ratios, Rates and Percentages
* Arithmetic Operations
* Negative Numbers
* Properties of Numbers
* Variables and Expressions
* Equations and Inequalities

**For online practice, go to one of these websites and search the topic:**

* Cool Math for Kids <https://www.coolmath4kids.com/math-games/sixth>
* Math Playground <https://www.mathplayground.com/grade_6_games.html>
* Hooda Math <https://www.hoodamath.com/games/sixth-grade.html>
* Math Play <http://www.math-play.com/6th-grade-math-games.html>
* Math Game Time <http://www.mathgametime.com/grade/6th-grade>

**Ratios, Rates, and Percentages.**

For assistance, go to Khan Academy, 6th Grade Mathematics: Ratios, Rates, and Percentages. <https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-ratios-prop-topic>. You can login with your school Google account.

*Note: To determine the percent of a number, we must first convert the percent into a decimal by dividing by 100 (which can be short-cut as moving the decimal point in the percentage two places to the left).*

*When you find equal ratios, it is important to remember that if you multiply or divide one term of a ratio by a number, then you need to multiply or divide the other term by that same number. You can determine the unit rate by dividing the first term of the ratio by the second term.*

1. The ratio of red to white flowers is 2:5. If both the number of red and white flowers are doubled, what is the new ratio of red to white flowers?
2. Write the following as percents:
3. $\frac{1}{2}$= b) 0.75 = c) $\frac{3}{8}$= d) 1.5 =

 e) $\frac{2}{3}$= f) 5.3 = g) $\frac{7}{6}$= h) 1 =

1. A $200 bicycle is on sale with a 30% discount. How much is the sale price?
2. Maria ran a total of 12 miles over the course of 6 track practices. How many track practices would it take for Maria to run 16 miles? Solve using unit rates.
3. Becky grew 6 plants with 2 seed packets. How many seed packets does Becky need to have a total of 12 plants in her backyard? Solve using unit rates.
4. Last week, Janelle's Ice Creamery sold 8 sundaes with nuts and 42 sundaes without nuts. What is the ratio of the number of sundaes with nuts to the number of sundaes without nuts?
5. $60 is what percent of $80?
6. \_\_\_\_\_\_ % of 60 = 15
7. Sarah walked a total of 3 miles by making 2 trips to school. How many trips will Sarah have to make in all to walk a total of 12 miles? Solve using unit rates.
8. 75% of \_\_\_\_\_\_\_\_\_ = 36

**Arithmetic Operations.** For assistance, go to Khan Academy, 6th Grade Mathematics: Arithmetic Operations. <https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-arithmetic-operations>. You can login with your school Google account.

*Note: When adding and subtracting decimals, the key is to line up the decimals above each other, add zeros so all of the numbers have the same place value length, then use the same rules as adding and subtracting whole numbers, with the answer having a decimal point in line with the problem.*

*To multiply decimals, the rules are the same as with multiplying whole numbers, until the product is determined and the decimal point must be located. The decimal point is placed the same number of digits in from the right of the product as the number of decimal place values in the numbers being multiplied.*

*To divide decimals by a whole number, the process of division is the same, but the decimal point is brought straight up from the dividend into the quotient.*

*Exponents are shorthand for repeated multiplication of the same thing by itself. The thing that's being multiplied is called the "base". This process of using exponents is called "raising to a power", where the exponent is the "power".*

1. 0.3 x 0.7 = \_\_\_\_\_ 6. 6.168 − 0.432 = \_\_\_\_\_
2. 2.2 x 0.5 = \_\_\_\_\_ 7. 20 − 15.729=\_\_\_\_\_
3. 10.5 x 3 = \_\_\_\_\_ 8. 8.54 + 0.251=\_\_\_\_\_
4. 25$÷0.5$= \_\_\_\_\_ 9. $2^{4}$= \_\_\_\_\_
5. 100 $÷2.5$= \_\_\_\_ 10. $4^{3}$= \_\_\_\_\_

**Negative Numbers.** For assistance, go to Khan Academy, 6th Grade Mathematics: Negative Numbers. <https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-negative-number-topic>. You can login with your school Google account.

*Note: The number line has no beginning and no ending, indicated by the arrow on both ends of the line. Negative numbers increase as you move to the left of the line, but the negative sign means the value of the number actually decreases. The negative sign tells you how far away the number is from the zero. So -3 means you are 3 steps away from 0 and -5 means you are 5 steps away from zero. Therefore, -5 is smaller than -3 because you are further away from zero.*

1. The employees were looking at their debts. Gomez is in $143.00 of debt; Cole has $203.00 of debt. Ford has $178.00 of debt. Simpson has a positive bank balance of $350.00. Who owes the most money?
2. Henry’s room rent is $40. His electricity bill is $10 and food expenses are $15. His job deposited his salary of $60 into his bank account. What would be the balance remaining after paying his monthly expenses?
3. John’s hotel room rent is $80. His food bill is $30 and the taxi costs him $20. His company deposits his salary of $100 into his bank account. What would be the balance remaining after paying his monthly expenses?
4. Use > , < or = to compare.
	1. -59 \_\_\_ -60
	2. -47 \_\_\_ -46
	3. -24 \_\_\_ -69
	4. -34 \_\_\_ 38
	5. -73 \_\_\_ 76
	6. 55 \_\_\_ -55
	7. -100 \_\_\_ 10

**Properties of Numbers.** For assistance, go to Khan Academy, 6th Grade Mathematics:Properties of Numbers. <https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-factors-and-multiples>. You can login with your school Google account.

*Note: When we find all the factors of two or more numbers, and some factors are the same ("common"), then the largest of those common factors is the Greatest Common Factor (GCF).*

*The smallest positive number that is a multiple of two or more numbers is the Least Common Multiple (LCM).*

Find the Least Common Multiple of the following: Find the Greatest Common Factors of the following:

1. 2 and 5 4. 12 and 16
2. 6 and 9 5. 18 and 24
3. 7 and 12 6. 32 and 36

5. Jose has 39 pairs of headphones and 13 music players. Tim wants to sell all of the headphones

and music players in identical packages. What is the greatest number of packages Tim can make?

6. Maria practices the trumpet every 11th day and the flute every 3rd day. Maria practiced both the

trumpet and the flute today. How many days until Maria practices the trumpet and flute again in the

same day?

**Variables and Expressions.** For assistance, go to Khan Academy, 6th Grade Mathematics: Variables and Expressions.<https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-expressions-and-variables>. You can login with your school google account.

1. Students are trying to raise $250 for the track club. They have already made $50. How much do they need to earn to meet their goal?
2. Sam was planting flowers for his garden. He had to plant 4 rose flowers for every jasmine flower he planted. If he plants 100 flowers in all, how many will be jasmine flowers?
3. Julien has 20 songs. His friend bought him M more songs. Write an expression that shows how many songs Julien has now.
4. Susi earned 80 points on the math project. Peyton earned B fewer points than Susi. Write an expression that shows how many extra points Susi earned.
5. Write the expressions for each of the following:
6. The sum of y and 7. 2
7. The difference of z and 8
8. The product of r and 15

d) The quotient of 8 and y

**Equations and Inequalities.** For assistance, go to Khan Academy, 6th Grade Mathematics:Equations and Inequalities. <https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-equations-and-inequalities>. You can login with your school Google account.

*Note: The key in equation solving is to isolate the variable, to get the letter by itself. In one-step equations, we merely undo the operation - addition is the opposite of subtraction and multiplication is the opposite of division. Remember the golden rule of equation solving: If we do something to one side of the equation, we must do the exact same thing to the other side.*

1. 32 < b

Which value for y would make the inequality true?

a) 61 b) 32 c) 19 d) 27

2. 20 < y

Which value for y would make the inequality false?

a) 25 b) 42 c) 21 d) 13 3

3. 64 < y

Which value for y would make the inequality false?

a) 88 b) 64 c) 71 d) 37

Complete the following problems:

1. 19 + f = 28
2. 77 = 43 + g
3. 7 + h = 19
4. 45 ÷ \_\_\_\_\_ = 9
5. 63 ÷ \_\_\_\_\_ = 7
6. 8 x \_\_\_\_\_ = 72
7. \_\_\_\_ x 6 = 42