Ansonia Public Schools ✦ Ansonia, Connecticut

MATH Summer Practice for a Student <u>Entering Grade 8</u>

Name:_____

In an effort to maintain the learning growth from this school year, it is **<u>highly encouraged</u>** that your child completes the summer math packet. This material will provide students a review of priority math concepts from his/her current grade-level and will extend learning opportunities over summer break.. When school resumes, you will hand in your stapled, handwritten work to your teacher. Students who successfully hand in the packet in its entirety will engage in an incentive activity (i.e. ice cream social, pizza, etc).

<u>SUMMER MATH PACKET</u>

• Please do not use a calculator on this assignment. Please use a separate piece of paper or show your work directly underneath each question
• The goal of this assignment is not to "get it done as fast as possible." **Don't try to complete the assignment all at once. Similarly, don't put it off until the last week in August.**

To help you pace yourself, I'm asking that you and your parent/guardian keep track of your work. Try your best to complete one worksheet per week. I understand that it is summer, and that this might not be possible every week. Please use the chart on the back of this page to keep track of the work you do this summer. We will collect this form when we collect your work in September. Do you best at pacing yourself, and be honest in reporting how you complete your work.

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8ᵗʰ Grade Summer Mathematics Review Packet

Please complete this chart as you complete the assignments. You may complete assignments any order you like, as long as you stay on track to finish by the end of August.

Assignment	Parent/Guardian Signature	Date Completed
Topic One: Adding and Subtracting Integers		
Topic Two: Multiplying and Dividing Integers		
Topic Three: Order of Operations		
Topic Four: Solving One-step Equations		
Topic Five: Solving Two-Step Equations		
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TOPIC ONE: ADDING AND SUBTRACTING INTEGERS

Instructions: Find the Sum or Difference **without using a calculator**. Calculators will not be allowed on the quiz in the fall. If you do work on a separate sheet of paper, please staple that sheet to this worksheet.

7.   12 + -4

1.   9 + -4

8.   -4 + 6 + 5

2.   -1 + -6

9.   -45 + -67

3.   2 + -6

10.   -13 + -4

4.   -14 + -7

11.   14 + -62

5.   5 + -10

12.   15 + -8

6.   13 + -12

13.   7 + -7

14.   9 – (-1)

15.   5 – 8   21.   11 – (-25)

16.   6 – 9   22.   -28 – 28

17.   -16 – (-2)   23.   -28 – (-28)

18.   27 – 52   24.   -36 – 29

19.   19 – (-12)   25.   10 – (-14)

20.   -10 – (-8)

<u>TOPIC TWO: MULTIPLYING AND DIVIDING INTEGERS</u>

Review

To multiply two integers, multiply their absolute values.
- If the signs are the same, the product is positive.
- If the signs are different, the product is negative.

To divide two integers, find the quotient of their absolute values.
- If the signs are the same, the quotient is positive.
- If the signs are different, the quotient is negative.

<u>*Instructions:*</u> Find the product or quotient **without using a calculator.** Calculators will not be allowed on the quiz in the fall. If you do work on a separate sheet of paper, please staple that sheet to this worksheet.

1. $-3(6)$

7. $-6(-9)$

2. $-50 \div 5$

8. $-32 \div 4$

3. $-7(10)$

9. $-18 \div 6$

4. $6(-7)$

10. $-5(12)$

5. $-3(-4)$

11. $-45 \div 9$

6. $-12 \div (-3)$

12. $3(-15)$

13. $-64 \div 8$

14. $-54 \div (-9)$

15. $-2(-8)$

16. $-28 \div (-7)$

17. $-600 \div 30$

18. $-8(-80)$

19. $-0.4 \div (-1)$

20. $-14 \div 7$

21. $-72(-3)$

22. $-7 \div 14$ (Different problem than #20)

23. $-6(\frac{1}{2})(-30)$

24. $-6 \div \frac{1}{3}$

25. $-1.5(6)$

TOPIC THREE: ORDER OF OPERATIONS

When you have a number sentence that contains several operations, you use the <u>order of operations</u> to know which operation must be completed first.

1. Do all operations within parentheses first. This is called "clearing parentheses."
2. Perform all operations that involve exponents next.
3. Do multiplication and division **in the order that they appear from left to right**. There is no rule that multiplication comes **before** division. These two are on the same level. You have to make sure you work from left to right.
4. Do addition and subtraction **in the order that they appear from left to right** Again, these two are on the same level. We don't add before we subtract; we do whichever of the two comes first, when reading from left to right. You have to make sure to work from left to right.

Example: $8 \div (3 + -5)^2 (3 - 4 + 6)$: $8 \div (-2)^2 (7) = 8 \div (4)(7) = 2(7) = 14$

1. $8 + 3^4$

2. $800 \div 2^4 + 50$

3. $6(7^2 - 2^3)$

4. $5^3 + 56 \div 7$

5. $(26 - 17)^2 + 35$

6. $80 \div (20 \div 10)^2$

7. $(5) \, 3^2 - 75$

8. $-15 + 4^3$

9. $-9^2 - (-30)$

10. $3^4 + (40) - (5-3)^2$

11. $12 - 30 \, (8)^2$

12. $6^2 - 50(3^2)$

13. $(14 + 5^2) \, 7^0$

14. $23 + (9 - 14)^2$

15. $(14 - 16)^2 + 10$

16. $-4(2 - 8)^2$

17. $(-7 - 8)^2 (20)$

18. $-15 \div 3 \, * (-12)$

TOPIC FOUR: SOLVING ONE STEP EQUATIONS

There are five types of "one-step equations" that we learned to solve. In all cases, the goal is to "undo" whatever operation has been performed on the variable in order to get it alone. To do that, we just undo whatever has been done to the variable.

Addition Equations: To solve, we just subtract from both sides what was added to x.

$$x + 7 = -12$$
$$\underline{-7 \quad\ -7}$$

Subtraction Equations: To solve, we just add to both sides what was subtracted from x.

$$x - 8 = 10$$
$$\underline{+8 \quad +8}$$

Multiplication Equations: To solve, we just divide both sides by what was multiplied by x.

$$\frac{5x}{5} = \frac{-25}{5}$$

Division Equations: To solve, we just multiply both sides by what x was divided by.

$$3\left(\frac{x}{3}\right) = (-7)3$$

Fractional Equations: To solve, we just multiply both sides by the reciprocal of the fraction that multiplies x.

$$\frac{3}{2}\left(\frac{2}{3}x\right) = 16\left(\frac{3}{2}\right)$$

Instructions: Solve each equation, by undoing what has been done to the variable.

1.   b + 15 = 8

2. $\frac{2}{7}d = -10$

3. $\frac{d}{5} = -10$

4.   -4b = 76

5. $z - 20 = 32$

6. $\frac{3}{7}x = 21$

7. $-2 = 0.5 + c$

8. $7w = 280$

9. $-\frac{4}{9}x = 16$

10. $i - 9 = -19$

11. $-7 + h = 1$

13. $\frac{6}{5}x = 18$

14. $22 = p - 14$

15. $6p = -30$

16. $x + 20 = 8$

17. $p \div 8 = -9$

18. $-8 = 12 + q$

19. $-49 = -7x$

20. $25 + y = -10$

TOPIC FIVE: SOLVING TWO-STEP EQUATIONS

The goal of solving two-step equations is simple: get the variable alone on one side of the equal sign. To do this, we first undo addition or subtraction, and then we undo multiplication or division.

Solve each equation. Then check your solution.

Example:

$10 = 3x + 1$

$-1 \qquad -1$ (Subtract 1 from both sides) $\Rightarrow$

$9 = 3x$ (To get x alone, divide both sides by 3)

$\dfrac{9 = 3x}{3 \quad 3}$

$3 = x$

To check the solution, substitute it into the original equation for x: If we are correct and $x = 3$, then $3x + 1$ must equal

$3(3) + 1 = 9 + 1 = 10$

Because our original equation was $3x + 1 = 10$, and when we checked our answer, we got

10, we know we solved the problem correctly.

Instructions: Solve each equation. Then check your solution by plugging it into the original equation in place of the variable. Because there are two steps to each problem, I have only given you 10 problems to complete.

1. $-2 = 10d - 3$ 3. $-8 + 2g = 4$

2. $7 = -2 + 3b$ 4. $-3 - 5n = -1$

5.   2x + 8 = -6

6. $\frac{h}{-3} - 6 = 8$

7. $\frac{k}{5} + 11 = -4$

8. $7 + \frac{c}{-6} = -3$

9. $-1 = -4 + \frac{e}{8}$

10.   10. $-12 = \frac{m}{4} - 9$

TOPIC SIX AREA AND PERIMETER

The **perimeter** of a shape is the sum of the lengths of its sides. To find the perimeter, you simply add the lengths of the figure's sides. Remember to always write units–your answer should never be just a number!

The **area** of a shape is the amount of space it takes up. Use the formula sheet included in this review packet to help you with this activity. These formulas should be committed to memory, so that you can recall them quickly. **I expect everyone will have these memorized by the beginning of the year.**

Instructions.
1. Draw each figure. **You do not have to use a ruler; a rough sketch is fine**.
2. Find the Perimeter of the figure.
3. Find the Area of the figure.

1. Rectangle with length 8 cm and width 6 cm.

2. A parallelogram with base 12 inches and height 7 inches.

3. A square with sides 14 m.

4. A triangle with base 16 cm and height 9 cm.

5. A trapezoid with one base of 3 feet, another base of 8 feet, and a height of 6 feet.

TOPIC SEVEN: FRACTION –DECIMAL–PERCENT CONVERSIONS

A percent is a special fraction with a denominator of 100. You practiced going back and forth between percents, decimals, and fractions in 7th grade. Here is a quick review.

- 35% is the same as $\frac{35}{100}$ which is the same as 0.35

- To convert a decimal into a percent, multiply it by 100.
    - 0.64 → 0.64(100) = 64%
    - o 1.05 →1.05(100) = 105%
    - 0.05 → 0.05(100) = 5%

- To convert a percent into a decimal, divide it by 100.
    - 89.5%→89.5 ÷ 100 =0.895
    - o 107%→107 ÷ 100 = 1.07
    - 0.03%→0.03 ÷ 100 =0.0003

- To convert a fraction into a percent, first write the fraction as a decimal by dividing the numerator by the denominator. Then multiply that decimal by 100 to get a percent.

    o To convert $\frac{1}{4}$ into a percent, first we write it as a decimal: 1 ÷ 4 = 0.25

    Next we convert the decimal into a percent 0.25→0.25(100) = 25%

- To convert a percent into a fraction, first write it as a decimal. Then write that decimal as a fraction. Finish by reducing the fraction.

$$50\% = 0.50 \rightarrow \frac{50}{100}$$

o Now we simplify $\frac{50}{100}$ by dividing both the numerator and denominator by a "fancy 1" which in this case should be $\frac{50}{50}$.

$$\frac{50}{100} \div \frac{50}{50} = \frac{1}{2}$$

Write each decimal as a percent and as a simplified fraction.

1. 0.36

2. 0.04

3. 0.003

4. 5.2

Write each fraction as a decimal and as a percent. Use a calculator to help with division if needed.
You may use a calculator on this section if you wish.

1. $\dfrac{3}{5}$

3. $\dfrac{1}{6}$

2. $\dfrac{17}{20}$

4. $\dfrac{25}{8}$

Write each percent as a decimal and as a simplified fraction.

1. 70%

3. $4\dfrac{3}{4}\%$

2. 93%

4. 782%

TOPIC EIGHT: OPERATIONS ON FRACTIONS

This is a topic I expect everyone to master by the beginning of eighth grade! Use have to become an expert on these operations. **You will not be allowed to use a calculator! Please keep that in mind while completing this worksheet.**

1. $\frac{6}{7} - \frac{1}{2}$ $\frac{15}{4} + \frac{9}{5}$

5. $5\frac{1}{10} - 2\frac{1}{3}$

2. $\frac{2}{5} - \frac{1}{3}$

6. $1\frac{1}{4} \times 1\frac{1}{3}$

3. $\frac{3}{5} \times \frac{5}{6}$

7. $\left(4\frac{1}{3} - 2\frac{3}{4}\right) \times 1\frac{1}{2}$

4. $\frac{2}{3} \div \frac{4}{7}$

Simplify the following fractions. **This is a skill at which you should become an expert. Your goal is to get yourself to a point (by September) where these problems come naturally for you.**

1. $\dfrac{12}{45}$

2. $\dfrac{20}{15}$

3. $\dfrac{18}{51}$

4. $\dfrac{42}{64}$

5. $\dfrac{25}{80}$

6. $\dfrac{60}{24}$

7. $\dfrac{15}{75}$

8. $\dfrac{32}{12}$

TOPIC NINE: PROPORTIONS

We have learned two ways of solving proportions: cross-multiplication and finding scale factor. Please try to complete these BOTH ways. Again, if you need help, check out Khan Academy or Google it!

Scale factor method: Cross-multiplication method:

1) $\dfrac{10}{8} = \dfrac{n}{10}$ 2) $\dfrac{7}{5} = \dfrac{x}{3}$

3) $\dfrac{9}{6} = \dfrac{x}{10}$ 4) $\dfrac{7}{n} = \dfrac{8}{7}$

5) $\dfrac{4}{3} = \dfrac{8}{x}$ 6) $\dfrac{7}{b+5} = \dfrac{10}{5}$

TOPIC TEN: AN ASSORTMENT OF WORD PROBLEMS

For these problems, please show your work when necessary. They are an assortment of challenge questions, logic puzzles, and open response questions. Have fun with them!

1. Denny and Brendan decide to start a paper delivery business to make money over the summer.   Use **tables, graphs, or equations** to help you solve!

    a. Denny can deliver 6 papers every 15 minutes and Brendan can deliver 5 papers in that same amount of time. How many papers can they deliver in an hour?

    b. In Brighton, 90 homes receive papers each day. When would Brendan and Denny need to wake up to deliver all their papers by 8am?

    c. On Sunday, Brendan and Denny can sometimes talk Will into helping them with the deliveries. His delivery rate is 8 papers every 15 minutes. How much longer could they sleep if they could convince Will to help?

2. There were 6 pizza pies at the summer barbeque at Gioia's house. She shares the pizza with her 7 friends. If all 8 people get the same amount of pizza, how much pizza can each person have? *Use pictures, diagrams, or math operations to show your work.*

3. The class decides to make chocolate chip cookies for Mr. Gertler's first day of school in September. Each student needs ¾ of a stick of butter for the recipe. If 14 students want to make cookies, how many sticks of butter do they need to buy? *Use pictures, diagrams, or math operations to show your work.*

4. Maeve's family recipe for macaroni and cheese makes 4 servings of 310 calories each. Maeve decided to make 1½ times the amount in the recipe. How many calories are in Maeve's batch of macaroni and cheese?

5. If 1 bucket + 5 jars = 1 tub, and 3 buckets + 2 jars = 2 tubs, how many jars are equal to 1 tub?

6. If x ☺ y is defined as xy + (x –y), what is the value of 4 ☺ 2?

7. Arlene has 1/3 as many goldfish as Isabelle. Isabelle has 5 times as many goldfish as Anaele. If Anaele has 18 goldfish, how many goldfish does Arlene have?

8. Meaghan started a baking service. During her first month in business, Meaghan spent $380 on supplies and drove 800 miles at an average cost of $0.30 per mile. In addition, her business phone and other expenses were $198. That month, Meaghan completed 60 jobs, earning $50 per job. What was Meaghan's **profit** during her first month in business? Show all your work!!!!