Incoming 8th Grade Summer Math Packet

This packet will help you retain the skills you learned in 7th grade so we can continue to build on these when you return in August!

This packet is due the second day of class and will be graded on work accuracy and completion. It will be one of your first grades of 8th grade. You will also be tested on these skills when you return to school in August. Be sure to answer every question and SHOW ALL WORK!! NO WORK = NO CREDIT

Please follow instructions and do not use a calculator where specified!

If students split the number of problems up per week, it's around 13 problems per week. Students can wait until July and do around 20-25 problems per week.

Thank you!
Jamie Koons

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.

1. 9 + -4

2. -1 + -6

3. 2 + -6

4. -14 + -7

5. 5 + -10

6. 13 + -12

7. 12 + -4

8. -4 + 6 + 5

9. -45 + -67

10. -13 + -4

11. 14 + -62

12. 15 + -8

13. 7 + -7

TOPIC TWO: MULTIPLYING AND DIVIDING INTEGERS

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.

Instructions: 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. $-3(6)$
2. $-50 \div 5$
3. $-7(10)$
4. $6\ (-7)$
5. $-3\ (-4)$
6. $-12 \div (-3)$
7. $-6(-9)$
8. $-32 \div 4$
9. $-18 \div 6$
10. $-5(12)$
11. $-45 \div 9$
12. $3(-15)$

TOPIC THREE: ORDER OF OPERATIONS

When you have a number sentence that contains several operations, you use the order of operations 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.

$$x + 7 = -12$$
$$-7 \quad -7$$

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

$$x - 8 = 10$$
$$+8 \quad +8$$

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)

$\frac{9}{3} = \frac{3x}{3}$

$3 = x$

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. $-2 = 10d - 3$

2. $7 = -2 + 3b$

3. $-8 + 2g = 4$

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.
  - $0.64 \rightarrow 0.64(100) = 64\%$
  - $1.05 \rightarrow 1.05(100) = 105\%$
  - $0.05 \rightarrow 0.05(100) = 5\%$

- To convert a percent into a decimal, divide it by 100.
  - $89.5\% \rightarrow 89.5 \div 100 = 0.895$
  - $107\% \rightarrow 107 \div 100 = 1.07$
  - $0.03\% \rightarrow 0.03 \div 100 = 0.0003$

- 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: $1 \div 4 = 0.25$

  Next we convert the decimal into a percent $0.25 \rightarrow 0.25(100) = 25\%$

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

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

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

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

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

1. 70%

2. 93%

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

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. $\frac{6}{7} - \frac{1}{2}$

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

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

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

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

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

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

$\frac{15}{4} + \frac{9}{5}$

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. $\frac{12}{45}$

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

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

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

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

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

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

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

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) $\frac{10}{8}=\frac{n}{10}$

2) $\frac{7}{5}=\frac{x}{3}$

3) $\frac{9}{6}=\frac{x}{10}$

4) $\frac{7}{n}=\frac{8}{7}$

5) $\frac{4}{3}=\frac{8}{x}$

6) $\frac{7}{b+5}=\frac{10}{5}$