McSummer McMath McPacket

Congratulations on surviving 7th grade math!

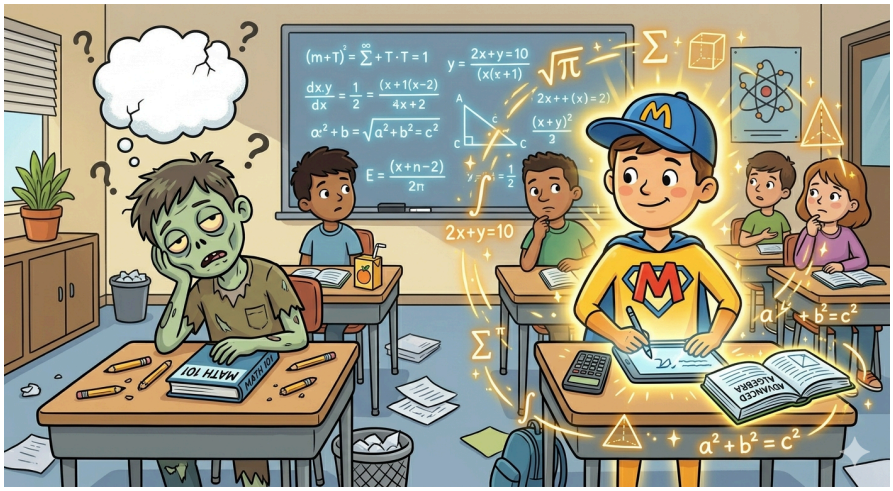
Mrs. Matthews and I have prepared some math for you so that your brain doesn't completely shrivel up this summer and forget that 2 + 2 = idk… 4?

Mrs. Matthews has graciously provided guided notes and problems.

Mr. McMath has offered up some IXLs that will give you instant feedback on whether or not things are clicking for you.

"Do I have to do this?" – this is optional. It will not be collected or assessed in any form next year, but… it would be helpful to keep you on the right track for next year. I mean… just look at that kid on the left. He didn't do math this summer. And that kid on the right? I mean… WOW right?! Wait… why are all the other kids so concerned? I love random ai images. I love math. I love summer! And I love that I'll see you around next semester!

- Seeya, Mr. McMath



Week 1: Master the Signs (Integers: Positives, Negatives)
This is the most common place for "silly mistakes"

- ☐ Add and subtract integers.
- ☐ Multiply and divide integers.
- ☐ Integer addition and subtraction rules.
- ☐ Absolute value.

Week 2: Rational Number Refresher

We didn't shy away from "ugly numbers" and 8th grade won't either. Don't fear fractions and decimals. Tackle them head on!

- ☐ Add, subtract, multiply, and divide rational numbers.
- ☐ Convert between decimals and fractions.
- ☐ Put rational numbers in order.

Week 3: I speak Algebra! (Expressions)

To solve equations, you first need to know how to clean them up. This week is about simplifying.

- ☐ Identify terms and coefficients.
- ☐ Simplify expressions by combining like terms.
- ☐ Multiply using the distributive property.
- ☐ Write variable expressions from word problems.

Week 4: Equations = Algebra

Mastering these, and not just using logic, will make 8th grade feel significantly easier.

- ☐ Solve one-step equations.
- ☐ Solve two-step equations.
- ☐ Solve equations without parentheses.
- ☐ Solve equations with parentheses.
- ☐ Write and solve equations from diagrams/models.

Week 5: Proportional Relationships

In 8th grade, you'll spend a lot of time on linear functions ($y = mx + b$). Understanding the "Constant of Proportionality" is the first step.

- ☐ Find the constant of proportionality from a table.
- ☐ Write equations for proportional relationships from tables and graphs.
- ☐ Identify proportional relationships from graphs and equations.
- ☐ Calculate unit rates.

Week 6: Cha-ching!

Final week! We're tying it all together with multi-step logic and percents.

- ☐ Solve two-step equation word problems.
- ☐ Multi-step word problems with positive rational numbers.
- ☐ Percent of change and "Tax/Discount" problems.
- ☐ Solve percent equations

This QR Code takes you to a google doc of the skills above. You can click and complete that way!

This QR Code takes you to a google doc of the skills that we worked on all year. You can click and complete those if you so choose.

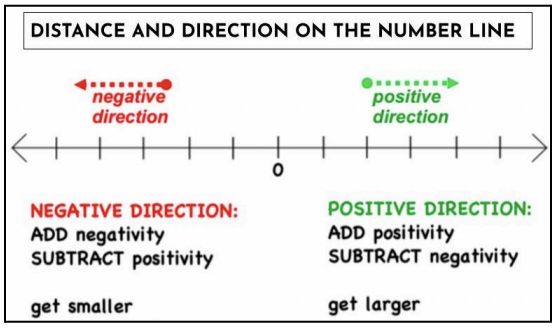
Next is Mrs. Matthews notes and problems. There is no set week by week schedule. She has them broken up into 3 sets, so perhaps you could do ½ of a set each week for 6 weeks. (Hey! That was math involving fractions! Love it!)

SET 1 – POSITIVES / NEGATIVES **7th Entering 8th Pre-Algebra B**

SKILLS:

I CAN use models of distance and direction on the number line.

I CAN compute efficiently and solve problems with signed rational numbers.



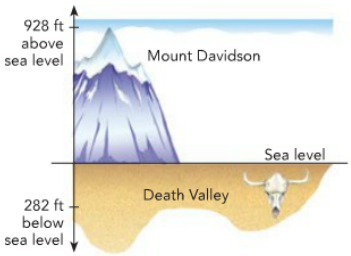
KEY UNDERSTANDINGS:

- **A number's distance and direction from zero *(absolute value, symbol: two straight lines)* form the basis for operating with signed numbers. There are two ways to move in each direction from a starting point. Adding a positive and subtracting a negative moves you larger. Subtracting a positive and adding a negative move you smaller.**
- **When multiplying and dividing two numbers, if signs are the same, solution is positive; if signs are different, solution is negative.**
- **In many situations reasoning is preferable to long computation algorithms. Look for ways to use number relationships, place value, and basic facts when computing.**

Use the positions on this number line.
Tell whether $x + y$ is positive or negative.
Clearly support your reasoning.

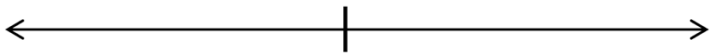


Death Valley is 282 feet ***below*** sea level.
Mount Davidson is 928 feet ***above*** sea level.
Find the difference between these two elevations. Is your answer sensible?

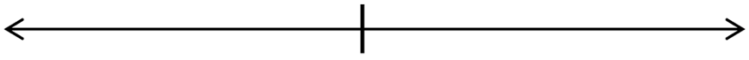


Show each of these equations on a number line.
Clearly show the *start* (S), an arrow to show the direction you *move*, and the *end* (E).
Make sure to write the answer on the line in the equation.

$-1 + 4 =$ _____



$-1 - 4 =$ _____



Find the sum or difference.

$-58 + 82$ $-64 + 37$

$-14 + 9$ $-73 - 15$

$-2 + 81 + (-25) + 2$ $-82 + (-17)$

$-5 - (-25)$ $-5 - |-25|$

Each of these is NOT ALWAYS true. Write two number examples – one showing a case when it IS true, and one showing when it is NOT.

a. The absolute value of a number is NOT ALWAYS equal to the opposite of that number.

b. The sum $x + 1$ is NOT ALWAYS positive.

Circle the expression or expressions that are positive. Think; do not calculate.

a.) $16 - 72$ b.) $72 - 16$

c.) $72 - (-16)$ d.) $-16 - 72$

Circle the expression with the *smallest* sum. Think; do not calculate.

a.) $-228 + 9$ b.) $-9 + (-228)$

c.) $-9 - (-228)$ d.) $-9 + 228$

A tourist bus at a national park starts at an elevation of 140 feet ***below*** sea level. It then ***ascends*** (goes up) 470 feet.

What is the new elevation of the bus relative to sea level? A diagram may be helpful.

Find the quotient. No long division necessary; think math facts; place value, and relationships.

a.) $-4000 / 50$ b.) $-720 / -6$ c.) $-10 / 40$

Find the product. No long multiplication; think math facts, place value, and relationships.

a.) $-25 \cdot (-30)$ b.) $-8 \cdot 4000$ c.) $-3.5 \cdot 8$

SET 2 – PROPORTIONAL RELATIONSHIPS **7TH Math Entering 8th Pre Algebra B**

SKILLS:
I CAN understand proportions as a set of equivalent ratios.
I CAN describe proportions in words, ratio tables, equations, and graphs.
I CAN solve problems with proportions.

KEY UNDERSTANDINGS:
A set of equivalent ratios *(can show in a ratio table)* describes a proportional relationship.
In a proportion, each x-value *(independent)* is multiplied by the constant of proportionality to get the y-value *(dependent)*. We use the letter k for the constant of proportionality.
The constant of proportionality can be interpreted as a unit rate.
The equation $y = kx$ (*translated: y is k times x*) can be written to describe a proportion.
The graph of a proportion is a straight line through the origin.

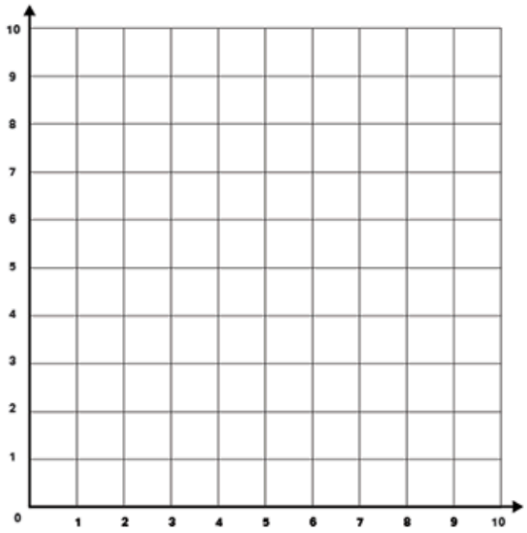
Follow directions to show this proportion in different ways.

Word Situation. ***I am training for a race. Every two days, I always run one mile.***

Ratio Table. Fill in the missing values to make equivalent ratios.

$Days\ (x)$	$Miles\ (y)$
0	0
1	
2	1
	1.5
4	
6	
	4
10	

Graph. Label the axes with the correct word- days or miles. Then graph the ordered pairs from the ratio table.



Constant of proportionality (k) = _____.
Think: unit rate

Equation in the form $y = kx$ _____.

It costs $5 to buy 2 pounds of gummy worms.
Fill in the ratio table models to figure out how much different pounds of candy would cost.

How much would 9 pounds cost? How many pounds can we buy for $17.50?

dollars					
pounds					

Choose which data set shows a proportion.

x	y
1	6
2	8
3	10

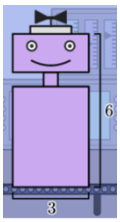
x	y
1	4
2	8
3	12

Fill in this table to show a proportional relationship between apples and their weight.

What is the constant of proportionality?

Number of apples (x)	Weight in kg (y)
2	
5	0.60
12	
	2.4
1	

In Robot Factory, a robot's height was proportional to its width. Fill in table and the blanks.



Width (w)	Height (h)
3	6
4.5	
8	
1	

Given a width, I multiply by _____ to find height.
Fill in the rows in the table to show this.

Since height is _____ times the width, I can write an **algebraic expression** for ***any*** height to fill in the last row.

That means the **constant of proportionality is** _____

The equation for a proportion is where is the constant of proportionality. In this problem, height is and width is
Write an equation for this proportion in the form

Equation: _____

SET 3 – EXPRESSIONS AND EQUATIONS **7TH Entering 8th Pre-Algebra B**

SKILLS:

- **I CAN "translate" to describe situations with algebraic language.**
- **I CAN simplify and write equivalent algebraic expressions.**
- **I CAN use models to illustrate situations, properties, and solutions.**
- **I CAN apply algebraic properties with formal algebraic steps to solve equations.**
- **I CAN write and solve equations to describe situations and solve problems.**

KEY UNDERSTANDINGS:

- **Variables represent unknowns and let us generalize relationships. Algebraic expressions are made up of terms. Coefficients tell "how many" of the variables there are and show how the variable changes; constants are fixed. Combining like terms and distributing are ways to simplify and write equivalent expressions.**
- **A solution of an equation is the value that makes the equation true – each side of the equal sign is balanced. Bar and hanger models show this and help you see why and formal steps make sense. Use inverse operations to both sides to "undo", isolate the variable, and keep balance. We solved several types of equations with formal steps.**

Identify the parts of this expression.

$$-a - 3b + 2c - 4$$

What are the three coefficients?

What is the constant term?

How many terms are there?

How many variables are there?

Write an ***expression***. Use x for the variable. Remember, no equal signs.

a.) One-fourth of a number x

b.) Nine less than twice a number x

c.) Four groups of the sum of a number x and one

d.) The sum of four times a number x and one

Which expression says, ***"ten less than product of 4 and*** x***"***?

$10 - 4x$ $4x - 10$

$10 - 4 + x$ $\frac{x}{4} - 10$

Which expression says, ***"three groups of the sum of a number*** x ***and 7"?***

$3(x + 7)$ $3 + (7x)$

$3x + 7$ $x + 3 + 7$

Ralphie says the expression $5x + 7$ is equivalent to the expression $12x$.

Tell whether you agree and why.

Distribute to write an equivalent expression. Watch negatives.

$5(3x + 12)$ $-7(8 + 2x)$

$-12(x - 7)$ $2(2x - 2)$

$8(2x - 5)$ $\frac{1}{2}(4x - 10)$

Identify and combine like terms to simplify.

$12 - 27 - 2x + 12x$

$3x - x + 2 - 5$

$\frac{1}{2}x + 8 - 10 + \frac{1}{4}x$

Simplify the expressions. How? Distribute first; then identify and combine like terms.

$3x + (2 - 8x) + 7$

$5(3x - 7) + 2(8x + 10)$

For this rectangle,



Write an expression for the PERIMETER.

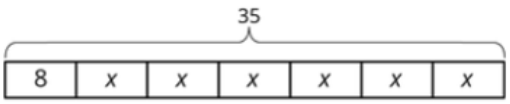
Write an expression for the AREA.

Write the letter of the equation under the diagram it matches. Each equation has a match.

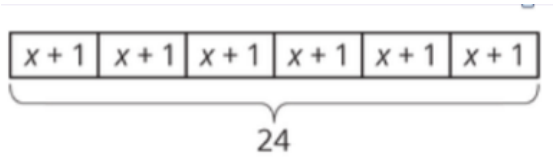
A. $3 \cdot x = 9$	B. $3 + x = 9$	C. $x = 9 - 3$	D. $x = 9 \div 3$	E. $x + x + x = 9$



Find the value of x shown in the model. Support your answer with the diagram. No equation or steps.



Find the value of x shown in the model. Support your answer with the diagram. No equation or steps.



Solve this equation – undo multiplication first. $-8+2x=-56$	Solve this equation – undo multiplication first. $-2x+12=28$
Solve this equation – undo division first. $\frac{x}{7}-0.3=-2.5$	Solve this equation – undo division first. $\frac{x}{5}+5=25$
Fraction coefficient – in the second step, divide by multiplying by the reciprocal. $\frac{5}{8}x+\frac{1}{2}=\frac{7}{4}$	Fraction coefficient – in the second step, divide by multiplying by the reciprocal. $-5+\frac{3}{4}x=-2$

Factoring. There are 6 groups; factor (divide) both sides to get one group. Then solve.

$6(6x - 2) = \quad - 24$

Combine like terms first. Then solve.

$$8x - 5 - 3x + 2 = 72$$

Write the sentence as an equation; then solve.

"Five more than the product of two and a number x is negative fifteen".

Suppose you buy 3 identical notebooks and a graphic novel. The novel costs $21 and you spend a total of $60. Write and solve an equation to find how much each notebook costs.

My variable is _____. It stands for _____