

Mrs. Melia's Math Class

**Dear Students**,

Name:

This packet is part one of your summer assignment. It is designed to help you retain the information you learned in 7th grade. For this practice to be effective, work on these exercises for 15 minutes per day. On the top of each page or work or your packet please write the date to remind yourself to space out the packet during the summer. Do not try to complete this packet in one day. All work should be completed on loose leaf paper and will be collected on the first full day of school. It is not necessary to print out this packet, however, feel free to do so if it is easier for you. Any loose leaf should be stapled to the packet. Also some topics may be new to you. Allow yourself to be challenged. Try it out and do your best. Remember to always be resourceful. If you forgot a topic, look it up online or in an old notebook. The packet will be graded as your first homework grade.

Part two (for those in accelerated math) will be to create a mini-lesson on any of the following topics and complete each of the four parts to be handed in and graded as your first project grade.

Topics:	Parts of the Lesson:
1. Pythagorean theorem	1. Introduction
2. Slope and Rate of Change	2. Steps, procedure and notes
3. Scientific Notation	needed to teach the topic.
	3. Examples with work shown to
	be taught to the class.
	4. Activity such as a worksheet,
	game (can be from online) etc.

Have a safe, healthy and fun filled summer!

### **Topic:** Integers

#### 

### **Examples:**

Addition	Subtraction	Multiplication	Division
Same signs:	Keep–Change-Opposite	Same signs:	Same signs:
Add & keep sign		Positive product	Positive quotient
+6 + +5 = +11	$^{+}10 - ^{-}8 = ^{+}10 + ^{+}8 = 18$	(+7)(+8) = +56	$+42 \div +6 = +7$
-8 + -2 = -10		(-2)(-6) = +12	$-24 \div -8 = -3$
	-5 - +12 = -5 + -12		
Different signs:		Different signs:	Different signs:
Subtract & take sign of	-208 = -20 + -8 = -12	Negative product	Negative quotient
larger value		(+3)(-9) = -27	$+56 \div -7 = -8$
+9 + -5 = +4		(-5)(+4) = -20	$-50 \div +2 = -25$
-6 + +1 = -5			
	•	•	

### Recall the **order of operations**:

- $1 \underline{\mathbf{P}}$ arentheses (or grouping symbols)
- $2 \underline{\mathbf{E}}$ xponents
- 3  $\underline{\mathbf{M}}$ ultiplication /  $\underline{\mathbf{D}}$ ivision (left to right)
- $4 \underline{A}$ ddition/ $\underline{S}$ ubtraction (left to right)

Find each answer.

### Answers:

1. 12 + 7 =	2. 25 + 18 =	1
		2
3. 2 + 25 =	4. 28 - 8 =	3
		4
5. 11 - 5 =	6. 21 - 4 =	5
		6
7. (-9)(-8) =	8. (2) ( 12) =	7
		8
9. <sup>-</sup> 35 ÷ <sup>-</sup> 7 =	$10. \ ^{-}48 \div \ ^{+}8 = $	9
		10
11. $(-2)(+6)(-5) =$	1230 + 24 ÷ 6 • -2 =	11
		12
		13
13. $16 \div 4 + 2 \cdot -8 = $	14. $-3(1-8) + 2^3 = $	14

Scientific Notation	
A number written as a number that is at least 1, but less than 10 multiplied by a power of 10.	
Ex. $7.16 \times 10^4 = 71600$ in standard form	
$9.2 \times 10^{-3}$ = .0092 in standard form	

Write each of the following in standard form.

Answers:

15. $8.2 \times 10^5$	15
16. $2.45 \times 10^{-4}$	
	16
Write each of the following in scientific notation.	
17. 25,900	17
18039	
	18



Solve the following questions. Show your work and check your answer. Write your answers on the answer blanks on the next page.

1. 
$$\frac{x}{3} - 9 = -12$$
  
2.  $8(2w - 6) + 4(-1 - 5w) = 0$   
3.  $3(12 + n) = 5(n - 4)$ 

Check:

Check:

Check:

- 4. One-half of a number is -12. Find the number.
- 5. The sum of 2 times a number and 28 is 42. Find the number.
- 6. Solve the inequality  $2n + 3 \ge 7$  and graph the solution on the number line.



Check:

Check:

Check:

Answers:

1.\_\_\_\_\_

2.\_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

# TRY THE CHALLENGE

### **Topic:** Polynomials

#### Multiplying & Dividing Monomials (powers with the same base)

Recall that exponents are used to show repeated multiplication. You can use the definition of exponent to help you understand how to multiply or divide powers with the same base.

Examples:

Multiplication:

1.  $2^3 \cdot 2^4 = (2 \cdot 2 \cdot 2) \cdot (2 \cdot 2 \cdot 2 \cdot 2) = 2^7$ 

(*Note:* the values are:  $8 \cdot 16$ , which is equal to 128, which is  $2^7$ )

2.  $x^3 \cdot x^2 = (x \cdot x \cdot x) \cdot (x \cdot x) = x^5$ 

-6

Product of Powers rule: You can multiply powers with the same base by adding their exponents.

**Division**:

1. 
$$\frac{2^{6}}{2^{2}} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}{\cancel{2} \cdot \cancel{2}} = 2 \cdot 2 \cdot 2 \cdot 2 = 2^{4}$$
  
2. 
$$\frac{x^{10}}{x^{7}} = \frac{x \cdot x \cdot x \cdot \cancel{k} \cdot \cancel{k} \cdot \cancel{k} \cdot \cancel{k} \cdot \cancel{k} \cdot \cancel{k} \cdot \cancel{k}}{\cancel{k} \cdot \cancel{k} \cdot \cancel{k} \cdot \cancel{k} \cdot \cancel{k} \cdot \cancel{k}} = x \cdot x \cdot x = x^{3}$$

Quotient of Powers rule: You can divide powers with the same base by subtracting their exponents.

Using the power rules above, simplify each expression. Write your answer using exponents. 1.  $7^2 \cdot 7^5 =$ 2.  $3^8 \cdot 3^6 =$ Answers: 1.\_\_\_\_\_ 4.  $x^2 \cdot x^6 =$ 3.  $6^4 \cdot 6 =$ 2. 3. 5.  $n^6 \cdot n^4 =$ 6.  $y^3 \cdot y^6 =$ 4.\_\_\_\_\_ 5.\_\_\_\_\_ 6. 7.  $m^8 \cdot m^7 =$ 8.  $a^m \bullet a^n =$ 7.\_\_\_\_\_ 8. 10.  $\frac{10^{10}}{10^6} =$ 9.  $\frac{3^8}{3^3} =$ 9. 10.\_\_\_\_\_ 11. 11.  $\frac{x^{11}}{r^7} =$ 12.  $\frac{4^7}{4} =$ 12.\_\_\_\_\_ 13. \_\_\_\_\_ Find the missing exponent for problems 13 & 14. 14.\_\_\_\_\_ 14.  $\frac{12^7}{12-} = 12^5$ 13.  $5^4 \cdot 5^- = 5^{12}$ 

# **TRY THE CHALLENGE!**

Combining like terms and applying the Distributive Property			
In algebraic of Only the coef	In algebraic expressions, <u>like terms</u> are terms that contain the same variables raised to the same power. Only the <u>coefficients</u> of like terms may be different.		
	In order to <b>combine like terms</b> , we add or subtract the numerical coefficient of the like terms using the Distributive Property: $ax + bx = (a + bx)$	ficients )x .	
Examples:	1. $2x + 9x = (2 + 9)x = 11x$ 2. $12y - 7y = (12 - 7)y = 5y$ 3. $5x + 8 - 2x + 7 = 3x + 15$ Here, the like terms are and:	5x  and  -2x = 3x 8 + 7 = 15	
The <b>Distrib</b>	<b>putive Property</b> of multiplication over addition/subtraction is frequent	ly used in Algebra:	
Examples:	1. $7(2x + 9) = 7 \cdot 2x + 7 \cdot 9 = 14x + 63$ 2. $4(6-5x) = 4(6) - 4(5x) = 24 - 20x$		
Simplify each	h expression by combining like terms.	Answers:	
15. $8y + 2y$		15	

16. $10 - 6y + 4y + 9 =$	16
	17
17. $3x + 7 - 2x =$	17
18  8n = 7v = 12n + 5 = 3v = 12n	18
10.0117912117559 =	

Apply the distributive property and write your answer in simplest form.

19. 7 $(x - 4) =$	19
20. $5(4n-3) =$	20
21. $-6(3y+5) =$	21
22. $-4(8-9x) =$	22
23. 8 $(3n + 7) - 10n =$	23
24. $-4(5+7y) + 6(2y-9) =$	24

Topic: Ratio, Proportion
Example: 1. In a circle graph, what is the measure of the central angle of a section that represents 40% of the graph?
Solution: $\frac{40}{100} = \frac{x}{360}$ Cross multiply
100 x = 14400  Divide by 100 x = 144  144° represents 40 % on the circle graph.
Example: 2. On a map, Max found that the straight line distance between Buffalo and Auburn was 2.3 in.
Find the actual distance between the two cities, if 1 in represents 65 mi.
Solution: $\frac{1 in}{65mi} = \frac{2.3 in}{x mi}$ Cross multiply
x = 149.5 The distance is 149.5 miles between the two cities.
<b>Hint:</b> When writing a proportion, always put the corresponding quantities in the same part of the fraction.
A <u>unit rate</u> is a rate that has been simplified so it has a denominator of 1. For example, if a 3 lb. box of pasta costs \$3.21, the unit rate (or unit price) is $3.21/3 = 1.07$ , \$1.07 per lb.

Solve the following exercises. Show work. Write your answer on the line provided. Round answers to the nearest whole number.

1. In a circle graph, what is the measure of the central angle that represents 21%?

1.\_\_\_\_\_

2. In a circle graph, if the central angle measures 54°, what percent of the whole does this represent?

2.\_\_\_\_\_

3. A recipe calls for 1.5 cups of raisins for 18 cookies. How many cups of raisins must be used for making 30 cookies?

3.\_\_\_\_\_

4. Express each ratio as fractio Hint: convert to the sam	n in simplest form. 1e unit before simplifying.	
a) 14 girls to 35 boys	b) 18 in to 6 feet	c) 15 dollars to 120 cents
5. Express each ratio as a unit a) \$ 3.00 for 6 cans of tuna	rate: (round to the nearest hund b) 25 feet in 3.2 hours	lredths if necessary) c) \$0. 99 for 10 pencils
5. A package of 22 green pens Which package has the low	cost \$ 8.59, and a package of 5 ger cost per pen?	green pens cost \$1.85.
		6
Round answers to the nearest t	enth.	
7. Jim went to a concert and sp \$20 for gas. a) What percent of all his spe	eent \$60 for his ticket, \$25 for fo nding was the cost of parking?	ood, \$15 for parking and
b) What is the measure of the graph for his spending?	he central angle that would repr	7.a resent the price of the food on a circle
		7.b
8. The distance on a map bet If 1 cm = 8 km on the ma	ween two cities is 6.5 cm. p, how many <u>miles</u> apart the two (11	o cities are from each other? km = 0.621 mi)

8.\_\_\_\_\_

# **TRY THE CHALLENGE!**

## **Topic:** Coordinate Geometry

Recall that we can graph coordinates (x, y) on the coordinate plane. The x-axis is the horizontal axis, and the y-axis is the vertical axis.

### To graph a line:

- 1) make a table of values for the equation
- 2) choose approx. 5 values for x and solve each for y
- 3) plot the coordinates on the coordinate plane
- 4) draw a line through the points (use arrows) and l '

**Example**. Graph the line y = 2x + 1

X	2x +1	У	(x, y)
-1	2(-1) + 1	-1	(-1, -1)
0	2(0) + 1	1	(0, 1)
1	2(1) + 1	3	(1, 3)
2	2(2) + 1	5	(2, 5)



Complete the tables then graph the equations. 1. y = 3x - 1

X	3x - 1	У	(x, y)
- 2			
- 1			
0			
1			
3			

#### 2. y = -2x + 3

х	-2x + 3	У	(x, y)
- 2			
- 1			
0			
1			
3			



### **Topic:** Probability

$$P(\text{Event}) = \frac{\# of \ favorable \ outcomes}{total \ \# of \ outcomes}$$

P(A or B) = P(A) + P(B) $P(A \text{ and } B) = P(A) \bullet P(B)$ 

Sample Space: List of total # of possible outcomes

**Counting Principle**: To find the total number of possible outcomes for a multiple events. **Using the Counting Principle**: The counting principle states that 'if an event has **m** possible outcomes and another independent event has **n** possible outcomes, then there are  $\mathbf{m} \bullet \mathbf{n}$  possible outcomes for the two events together.

**Ex 1:** If a fair 6-sided die is rolled once:

A) 
$$P(2) = \left(\frac{1}{6}\right)$$
  
B)  $P(even) = \frac{3}{6} = \left(\frac{1}{2}\right)$   
C)  $P(4 \text{ or } 5) = \frac{1}{6} + \frac{1}{6} = \frac{2}{6} = \left(\frac{1}{3}\right)$ 

**Ex 3:** Jake packed 5 shirts, 3 pairs of pants and 2 pairs of shoes to go on a trip. How many different outfits consisting of 1 shirt, 1 pair of pants, and 1 pair of shoes can Jake make?

$$5 \bullet 3 \bullet 2 = (30)$$

**Ex 2:** If a fair 6-sided die is rolled twice:

A) The total # of outcomes = 
$$6 \cdot 6 = 36$$
  
B) P(even and then a 6) =  $\frac{3}{6} \cdot \frac{1}{6} = \frac{3}{36} = \frac{1}{12}$ 

**Ex 4:** Show the sample space for tossing a coin and rolling a 6-sided die using a tree diagram.



Use the following information to answer questions 1 & 2.

A spinner contains eight regions, numbered 1 through 8. The arrow has an equally likely chance of landing on any of the eight regions.

1) If the spinner is spun <u>once</u> find:

a) P(6) b) P(even) c) P	P(not 5)
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d) P(1 or 8) \_\_\_\_\_ e) P(2 or 3 or 4) \_\_\_\_\_

2) If the spinner is spun **<u>twice</u>** find:

- a) The total # of outcomes \_\_\_\_\_\_ b) P(two 3's) \_\_\_\_\_\_ c) P(7 and then 4) \_\_\_\_\_
- 3) What is the theoretical probability of choosing a vowel from the word MATHEMATICS?

4) Burger Queen offers 4 types of burgers, 5 types of beverages, and 3 types of desserts. If a meal consists of 1 burger, one beverage and one dessert, how many possible meals can be chosen?

5) The following information is given on girls ice skates:
Colors: white, beige, pink, yellow, blue
Sizes: 4, 5, 6, 7, 8
Extras: tassels, striped laces, bells
Assuming that all skates are sold with ONE extra, how many possible arrangements exist?

6) Your state issues license plates consisting of letters and numbers. There are 26 letters and the letters may be repeated. There are 10 digits and the digits may be repeated. How many possible license plates can be issued with two letters followed by three numbers?

\_\_\_\_\_

7) There are 3 trails leading to Camp A from your starting position. There are 3 trails from Camp A to Camp B. How many different routes are there from the starting position to Camp B? Draw a tree diagram to illustrate your answer.



Answer each of the following.

- A travel agent has 10-day vacation packages to Italy for the following prices per person: \$899, \$980, \$1,020, \$1,350 and \$1,600. (Show work for parts a & b)
  - a) Find the range of the prices. \_\_\_\_\_ b) Find the range of the prices. \_\_\_\_\_ b)

b) Find the mean of the prices.

2) Given the following set of data: 1, 5, 6, 4, 5, 9, 2, 3, 5, 7. Find the mean, median and mode. Round your answer to the nearest tenth when necessary and show work.

Mean = \_\_\_\_\_

Median = \_\_\_\_\_

Mode = \_\_\_\_\_

3) If 18 is added to the data set to the right, which statement is true? 16, 14, 22, 16, 16, 18, 15, 25

- A) The mode increases B) The mean decreases
- C) The mean increases D) The median increases

4) The monthly family budget is \$1200. According to the circle graph below, how much of the monthly budget, to the nearest dollar, is spent on pet supplies? Show work.



5) Use the data table below to construct a frequency histogram on the grid provided.

Temperature (°F)	Tally	Frequency
100-104	III	3
105-109	.HHT III	8
110-114	11 1111 1111 1111	17
115-119	11111111	12
120-124	JHT 11	7
125-129	II Completes	2
130-134	I Constant	1

 Frequency

### Intervals

6) Jeff's test scores so far this year are 75%, 83%, 96%, 92%, and 81%. What must Jeff get on his 6<sup>th</sup> test in order to have an overall average of exactly a 85%? Show work.