Name: _____ Class: _____

2020

For Incoming 7th Graders

The Mott Hall School

Hello Mathletes

I am looking forward to getting to know of you in the coming year. The year ahead seems exciting .. full of experiments and adventure as we engage in all forms of learning.

This summer packet is for you to get ready for 7th grade. Pace yourself when you do this packet. Don't leave it for the last day. If you don't have a printer at home, don't worry. You can do the work on loose leaf paper. Make sure you label all the problems. Show your work, so that when you check your work, you can understand what you have done. If you have any questions about the summer packet, or anything to do with 7th grade, or anything at all, don't hesitate to write to me at cjoshi@themotthall.org.

I hope you have a wonderful summer and do lots of fun stuff within the constraints of what social distancing allows. Learn something new during summer. Make sure to help the people around you.

Love,

Ms. Joshi

<u>CONVERSION OF FRACTIONS, DECIMALS, PERCENTS:</u> NO CALCULATORS

Make sure you know these conversions really well before you start 7th grade.

Fractions	Decimals	Percentages		Fractions	Decimals	Percentages
1	1	100%		$\frac{1}{10}$	0.1	10%
$\frac{1}{2}$	0.5	50%		$\frac{2}{10}$	0.2	20%
$\frac{1}{4}$	0.25	25%		$\frac{3}{10}$	0.3	30%
$\frac{3}{4}$	0.75	75%		$\frac{4}{10}$	0.4	40%
$\frac{1}{5}$	0.2	20%		$\frac{5}{10}$	0.5	50%
$\frac{2}{5}$	0.4	40%		$\frac{6}{10}$	0.6	60%
$\frac{3}{5}$	0.6	60%		$\frac{7}{10}$	0.7	70%
$\frac{4}{5}$	0.8	80%		$\frac{8}{10}$	0.8	80%
$\frac{1}{3}$	$0.\overline{3}$	$33.\overline{3}\%$		$\frac{9}{10}$	0.9	90%
$\frac{2}{3}$	$0.\overline{6}$	$66.\overline{6}\%$				

Now do these conversions. You do not have to memorize these, but you should know how to convert between fractions, decimals and percentages.

Convert DECIMALS to PERCENTAGES. (Move the decimal point to the RIGHT two places and write the % sign. For example 0.4 = 40% and 0.01 = 1% and 0.43 = 43%)

0.6 =	0.96 =	0.613 =
0.56 =	0.39 =	0.235 =
0.07 =	0.7 =	1.02 =
0.25 =	0.63 =	*Challenge*: 0.444… =

Convert PERCENTAGES to DECIMALS. (Move the decimal point to the LEFT two places and drop the % sign. For example 30% = 0.3 and 2% = 0.02 = 1% and 76.5% = 0.765)

80% =	43% =	42.5% =
34% =	90% =	24.6%=
3% =	9% =	105% =
75% =	7.5% =	120% =

Convert DECIMALS to FRACTIONS (Example $0.6 = \frac{6}{10} = \frac{3}{5}$, $0.56 = \frac{56}{100}$ and $1.23 = \frac{123}{100}$)

0.85 =	1.5 =	1.73 =
0.32 =	0.03 =	2.5 =

Convert PERCENT to FRACTIONS (Example $65\% = \frac{65}{100} = \frac{13}{20}$**)**

$46\% = \frac{}{50}$	$13\% = \frac{}{200}$	$96\% = \frac{}{25}$
$9\% = \frac{}{100}$	$90\% = \frac{}{40}$	$110\% = \frac{}{50}$

Convert FRACTIONS to PERCENTS (Example $\frac{17}{20} = \frac{85}{100} = 85\%$)

$\frac{7}{20} =$	$\frac{48}{50} =$	$\frac{6}{25} =$
$\frac{2}{5} =$	$\frac{52}{50} =$	$\frac{21}{20} =$
$\frac{19}{25} =$	$\frac{18}{20} =$	$\frac{32}{40} =$

<u>FRACTIONS AND RATES</u>: DO NOT USE A CALCULATOR

Try not to use calculators for these problems. You can use a calculator as a check.
If you are not sure how to solve these problems, make a ratio table. Write down the details of the problem. If you see the word 'per', that means 'for one'.

Show your work.

1. Juan bought $\frac{3}{5}$ pound of strawberries at the rate of $4 per pound. How much money did Juan spend? (Answer should be in decimals, not fractions)

2. Rami goes running in Central Park every Sunday. He runs at a constant speed. He can run $6\frac{3}{5}$ miles in $1\frac{2}{3}$ hours. What is his speed in miles per hour?

3. A recipe says it takes $2\frac{1}{2}$ cups of flour to make a batch of cookies. How many cups of flour are needed to make $3\frac{3}{4}$ batches of cookies?

4. Anyeny bought $\frac{3}{4}$ pound of organic raspberries for $6. What is the cost of $1\frac{1}{5}$ pounds of raspberries?

5. Olivia has $4\frac{2}{3}$ yards of fabric to make scarves. She needs $\frac{3}{4}$ yards for one scarf. How many scarves can she make?

6. The recipe for mint chocolate ice cream requires $2\frac{1}{4}$ cups of heavy cream for 6 people. You need ice cream for 8 people. How much heavy cream will you need?

<u>FRACTIONS MULTIPLY AND DIVIDE</u>: DO NOT USE A CALCULATOR

Multiply these numbers. Here is one example given to help you.

1) Multiply the numerators together
2) Multiply the denominators together
3) Simplify your answer (if possible)

Example: $\frac{3}{5} \times \frac{10}{9} = \frac{30}{45} = \frac{2}{3}$

(or you can cross cancel the common factors and get the same answer)

$\frac{1}{6} \times \frac{3}{4} =$	$\frac{3}{2} \times \frac{4}{5} =$
$\frac{3}{8} \times \frac{2}{3}$	$6 \times \frac{2}{7} =$

Divide these numbers. Here is one example given to help you.

1. Keep the first fraction as it is
2. Change the division to multiplication
3. Flip the second fraction (find its reciprocal)
4. Multiply fractions and simplify answer

Example: $\frac{3}{5} \div \frac{10}{9} = \frac{3}{5} \times \frac{9}{10} = \frac{27}{50}$

$\frac{2}{3} \div \frac{1}{5} =$	$\frac{3}{5} \div \frac{9}{10} =$
$\frac{4}{3} \div \frac{2}{9} =$	$\frac{5}{8} \div \frac{3}{7} =$

Multiply or divide these numbers.

$\frac{1}{6} \div \frac{4}{15} =$	$8 \times \frac{7}{16}$
$\frac{6}{7} \div 2$	$\frac{5}{9} \times \frac{3}{5} =$
$\frac{3}{8} \times \frac{4}{5} =$	$\frac{7}{9} \div \frac{8}{5} =$

Convert to mixed number to improper fraction first

$1\frac{2}{3} \times 2\frac{3}{4}$	$6\frac{3}{5} \div 2\frac{3}{4}$

<u>NEGATIVE NUMBERS AND INEQUALITY</u>: DO NOT USE A CALCULATOR

1. **Compare each pair of numbers using these signs <, >, =. For each problem, EXPLAIN in one sentence how you decided.**

Any positive number is bigger than any negative number. On a number line, a number to the right is bigger than a number to the left. Example of two negative fractions. $-\frac{3}{4}\ and\ -\frac{2}{3}$. Find common denominators and equivalent fractions. $-\frac{3}{4} = -\frac{9}{12}\ and\ -\frac{2}{3} = -\frac{8}{12}$. -8 is bigger than -9, so $-\frac{8}{12}$ is bigger than $-\frac{9}{12}$

$-\frac{7}{8}$ _____ $-\frac{2}{5}$

$-\frac{3}{4}$ _____ $-\frac{5}{6}$

$-\frac{3}{5}$ _____ $\frac{2}{3}$

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

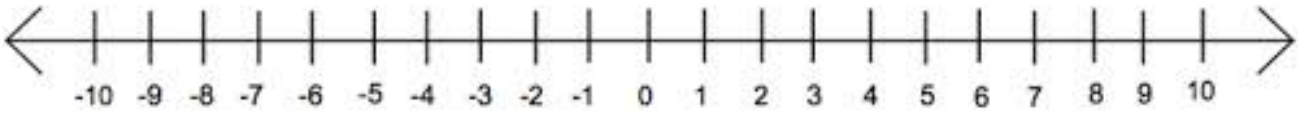
2. **First separate out the positives and negative. Draw your own number line. Then place the numbers below on the number line.**

A) $-1,\ -\frac{3}{4},\ \frac{8}{5},\ -2,\ 2,\ -\frac{9}{4},\ 0,$

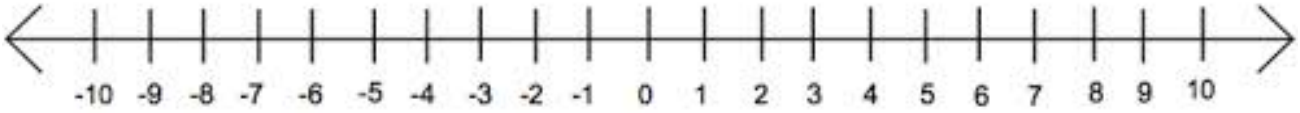
B) $-3,\ -\frac{4}{5},\ -\frac{8}{5},\ -1,\ 1,\ -\frac{11}{5},\ 0,$

3. **First decide whether x is less than or greater than the number. Then decide which direction you should go. If x can also be equal, fill in the circle.**

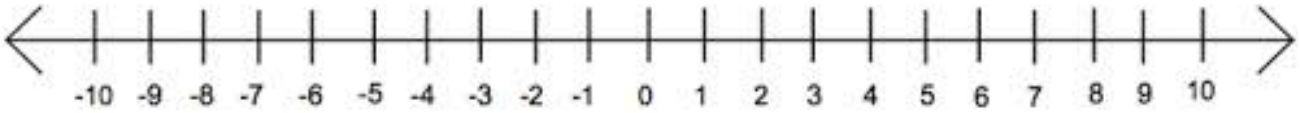
   Show $x \leq -3$ on the number line.



   Show $x > -6$ on the number line.



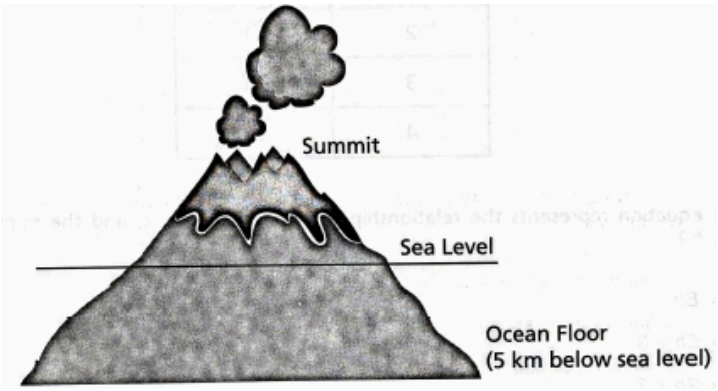
   Show $x < 2$ on the number line.



4. Find the absolute value. Absolute value means distance from zero.
   Example: $|-45|$ means absolute value of -45 which is 45.

   $|-83|$ = _____ $|61|$ = _____ $\left|\frac{4}{5}\right|$ = _____

5. **The summit of a volcano is 9 kilometers (km) above the ocean floor, as shown below. The ocean floor has an elevation of -5 km.**



   What is the elevation of sea level?

   _____

   What is the elevation of the summit?

   _____

PERCENTS:

Some tips for percentage problem:
To find 10% of a number, divide the number by 10.
To find 25% of a number, divide the number by 4.
To find 75% of a number, find 25% and then multiply by 3.

DO NOT USE CALCULATORS FOR THESE PROBLEMS

Find percent of a number.

$10\%\ of\ 40 =$	$30\%\ of\ 60 =$
$25\%\ of\ 80 =$	$75\%\ of\ 20 =$

Word problems: Try and use double number line. Show your work!!!

1. 25% of a total of 36 beads are red. How many red beads are there?

2. 30% of the total beads are black. There are 12 black beads. What is the total number of beads?

3. There are 32 blue beads out of a total of 80 beads. What % of the beads is blue?

4. 45% of the pizzas in the freezer in the store are cheese pizzas. There are 120 pizzas in the freezer. How many of them are cheese pizzas? (Hint: find 10%. Using 10% find 40% and 5%)

5. 75% of the M&Ms in a bag are red. There are 36 red in the class. How many M&Ms are in the bag? (Hint: Find 25% from75%)

YOU CAN USE CALCULATORS FOR THESE PROBLEMS

6. A big movie theater had 1,200 seats. 864 of the total number of seats were sold. What percentage of the seats was sold?

7. At Little Rock School, 476 students ride their bike to school. This is 85% of the total students in the school. How many total students are in the school? (Hint: if you know how much is 85%, you can find 5%, and then find 100%)

<u>SOLVING EQUATIONS:</u> YOU MAY USE A CALCULATOR

For each equation, find the value of *x* and do a check. **Show all the work for the check.**

	SOLVE EQUATION	**DO A CHECK**
1.	$x - 37 = 161$	
2.	$\frac{x}{6} = 24$	
3.	$9x = 153$	
4.	$x + 7.86 = 12.034$	

5.	$5x + 115 = 290$	
6.	$3x - 267 = 390$	
7.	$\frac{x}{3} - 24 = 32$	
8.	$x \div 5 + 48 = 62$	

<u>WRITING EQUIVALENT EXPRESSIONS</u>: YOU MAY USE A CALCULATOR

1. Which expression is equivalent to $9k + 16$? **Explain why**.

   A $4 + 5k + 10 + 6$

   B $4 + 3k + 2k + 10 + 6$

   C $2k + 7 + 10 + 6$

   D $3\text{k} + 4k + 2k + 10 + 6$

2. The dimensions of four rectangles are represented in the table below when $m > 0$.

Rectangle	Length	Width
A	$0.5(4 + 3m)$	$4.5 + 3.5m$
B	$4(5 + 6m)$	$20 + 6m$
C	$6m + 18$	$6(m + 3)$
D	$8m + 12$	$16m$

Which rectangle must be a square? **Explain your thinking**.

3. Which statement is true about the expressions $5k + 3$ and $4k + 3 + k$? **Explain why**.
   A. They are equivalent only when $k = 0$

   B. They are equivalent only when $k = 1$

   C. They are equivalent only when $k = 8$

   D. They are equivalent any value of k

4. Which expression is equivalent to $4n + 28$? **Explain why**.

   A $28n + 4$

   B $4(n + 28)$

   C $4(n + 7)$

   D $32n$

5. Sam wrote the expression below.

   $10 + 15k$

   Rami said that this expression is equivalent to $5(3k + 2)$.
   Kenneth said this expression is equivalent to $7k + 6 + 8k + 4$.

   Who is correct and why? Explain your thinking clearly.

6. Circle all the expressions that are equivalent to this expression: $6p + 7$.
   You will lose a point for every wrong expression that you circle.

$p + 2 + 5p + 5$ $\quad$ $42p$ $\quad$ $7p + 6$

$3p + 2p + p + 7$ $\quad$ $13p$ $\quad$ $p + p + p + p + p + p + 5 + 1 + 1$

7. Which expression is equivalent to $4(7k) + k$? **Explain why**.

   E. $32k$

   F. $8k + 4$

   G. $28k^2$

   H. $29k$

8. SIMPLIFY THIS EXPRESSION. Show your work.

$7(3n + 2) + 6n + 4 =$ _____