This first worksheet is all review from Basic Math/6th grade. Review each of these concepts going as in-depth as needed.

Multiplication

Words that mean multiplication:

- Multiply, times, product, of

Ways to write multiplication:

- $5 \cdot 6$ and $5(6)$ **NEVER** use an "x" this is not acceptable 5×6 !!!

It is so important that students know the times tables. Do a little mini verbal or write quiz to gage where they are at. Stress the importance that students know their times tables. Maybe even make flash cards as a class project. These problems are nearly impossible if students don't know the times tables.

How to multiply

1. Put the longest number on top. You don't need to use commas and maybe even shouldn't as a part of your work because they sometimes end up looking like a one. Be sure the work is neat and lined up carefully.
2. Start on the bottom right and multiply up and put the answer underneath of the number you multiplied by.
3. Carry as needed showing all work.
4. Continue multiplying until there are no more numbers on the bottom.
5. Add for final answer.

Practice multiplication problems:

- $987(678)$
- $8{,}759(986)$
- $6{,}987(798)$
- $659{,}738(60{,}007)$
- $8{,}900{,}000(740{,}000)$ * zeros are our friend and they make multiplication really easy. All you have to do is ignore the zeros and just multiply the numbers, in this case 89 and 74. Then just add <u>all</u> the zeros from both numbers onto the end of the answer.

How to multiply signed numbers:

Same signs result in a positive answer. $(+)(+) = +$ $(-)(-) = +$

Different signs result in a negative answer $(+)(-) = -$ $(-)(+) = -$

Exponents (aka powers)

Exponents tell you how many of same thing are there. For example, 5^2 just means that there are two 5's sitting there being multiplied together. $5^2 \Leftrightarrow 5 \bullet 5$

Say "five squared" or "five to the second power." $5 \bullet 5 = 25 \qquad 5^2 = 25$

Students must show **all** their work. When doing an exponent problem they need to write out the numbers all being multiplied together and then get an answer.

Practice exponent problems:

- 3^2
  - the work students need to show: $3 \bullet 3$
- 2^3
  - the work students need to show: $2 \bullet 2 \bullet 2$
- 1^8
  - the work students need to show: $1 \bullet 1 \bullet 1 \bullet 1 \bullet 1 \bullet 1 \bullet 1 \bullet 1$
- 0^4
  - the work students need to show: $0 \bullet 0 \bullet 0 \bullet 0$
- 5^0
  - **ANYTHING TO THE ZERO POWER IS ONE!**

Practice multiplying signed number problems:

- $5(6)$
- $-7(8)$
- $8(-9)$
- $-6(-7)$

Division

Ways to write division:

- $8 \div 2$ and $\frac{8}{2}$ and $2\overline{)8}$ and $8:2$ **NEVER** use the slash $8 / 2$!!!

How to know who goes inside for long division

Imagine the fraction getting dizzy and falling flat on its face. Put a line on top and your long division is set up!

$\frac{12}{3} \rightarrow 3|12 \rightarrow 3\overline{)12}$

Teaching Notes For Homework #1

What does division actually mean?

Imagine the inside number as a bucket. And you will up that bucket with the outside number.

$\frac{8}{2}=4$ $\frac{3}{4}=\frac{3}{4}$ $\frac{0}{5}=0$ $\frac{6}{0}=\text{undefined}$ Zero on the bottom is the worst thing that can happen in math. The world blows up and the answer is undefined.

Long Division

1. What times the outside number equals the inside number?
2. Write down that number over the number it went into.
3. Multiply that number by the outside and write it underneath.
4. **Change the sign** and do the number line.
5. Bring down the next number.
6. Repeat until you run out of numbers.
7. Write down anything left over as a remainder with an R *answers should not be in decimal form at this point.

Practice Long Division Problems:

- $82{,}097 \div 9$
- $837{,}625 \div 389$ Round to help figure out what number should go on top. Round both the inside and outside number to the same number of places, in this problem two. And then figure out how many times the rounded numbers go into each other. You will know your right because the new number after subtracting with be less than the outside. If you are too high or too low just go up or down one number. This tip saves a ton of time!
- $709{,}386{,}512 \div 10{,}000$ Trick: *only works when dividing with a 1 and a bunch of zeros. Start where the outside goes in. Then write the number on top exactly until you run out of numbers underneath. What didn't get used is the R.

Divisibility Rules

Use these rules when you have a big number that you have to break up

Try these numbers **in order** and if a number "works," try it again to see if it will work again in the new number. You only try to divide by prime numbers. Students are responsible for trying numbers up to 31.

- 2 – will only work if the number is even (ends in 0, 2, 4, 6, or 8)
- 3 – take each digit and add up. If 3 goes into that number evenly than 3 will work in the original number

- You never try 4 because it's just a bunch of 2's and if 2 on its own didn't work then there is no way more 2's will.
- 5 – will work if a number ends in 5 or 0
- Don't try 6. If both 2 and 3 work, then 6 will also work. Otherwise, it won't work.
- 7 – sucky number! No trick (or at least not one worth memorizing). Try long division to see if 7 will work.
- 11 – sucky number! No trick. Try long division to see if it will work.
- 13 – sucky number! No trick. Try long division to see if it will work.
- 17 – sucky number! No trick. Try long division to see if it will work.
- 19 – sucky number! No trick. Try long division to see if it will work.
- 23 – sucky number! No trick. Try long division to see if it will work.
- 29 – sucky number! No trick. Try long division to see if it will work.
- 31 – sucky number! No trick. Try long division to see if it will work.

Practice divisibility rules problems:

- 336
- 3,465
- 969
- 551

Practice monster problems:

- $\sqrt{686}$
- $\sqrt[3]{0}$
- $\sqrt[5]{1}$
- $\sqrt[3]{81x^2y^5a^4}$
- $\sqrt{72x^4y^3a^9}$