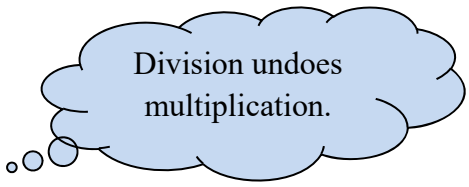
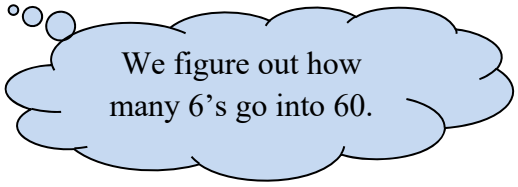
Technology-Integrated Mathematics
Class Notes
Arithmetic: Division of Whole Numbers (Section 1.4)




The product of 6 and 10 can be thought of as the total number of things in 6 groups of 10. What if we know the total (60) and the number of groups (6), but need to know how much is in each group? We will use division.

We may write this as $60 \div 6$, $60/6$, $\frac{60}{6}$, or even $6\overline{)60}$. Again, seeing this as the inverse of multiplication is helpful. We can figure the division $60 \div 6$ by finding the number that we would multiply 6 by to get 60. Since we know $6 \times 10 = 60$, we have our answer $60 \div 6 = 10$.

**Definitions:** In our example above, the 60, or the number being divided, is the **dividend**. The 6, or the number used to divide, is the **divisor**. The answer to our division problem, the 10, is the **quotient**.




To do basic division problems, it might be a matter of just recalling a multiplication fact, like $6 \times 10 = 60$. However, with more complex or unusual quotients to find, we'll use the calculator. Again, it's a good idea to use estimation to protect yourself from an entry error.

expl 1: Find the quotients.

a.) $750 \div 25$

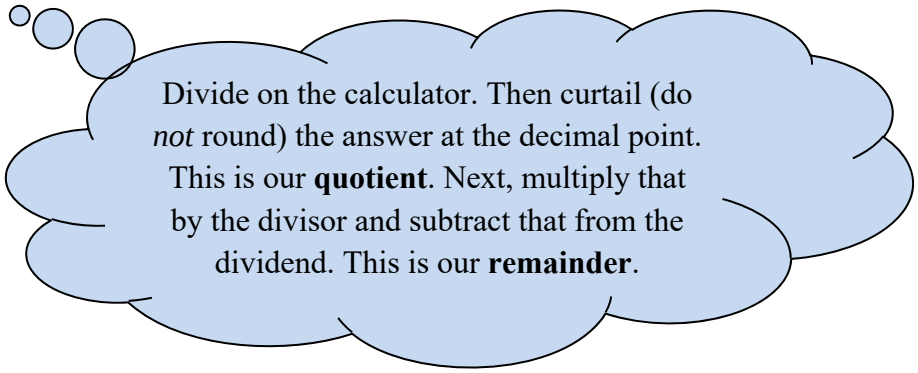
b.) $53\overline{)2385}$

**Definition: Divisible:** A whole number is **divisible** by another if their quotient is a whole number. If you do the division and get a number with digits to the right of the decimal point, the quotient is *not* a whole number.

We will write these answers, at least for now, as quotients and **remainders**. We define this **remainder** as the part of the dividend that is "left over". Let's investigate that.

expl 2: Divide. You will see that the answers are *not* whole numbers.

a.) 750/12 b.) $8,452 \div 35$




expl 3: Check our answers by undoing the process. You should see that "quotient x divisor + remainder = dividend".

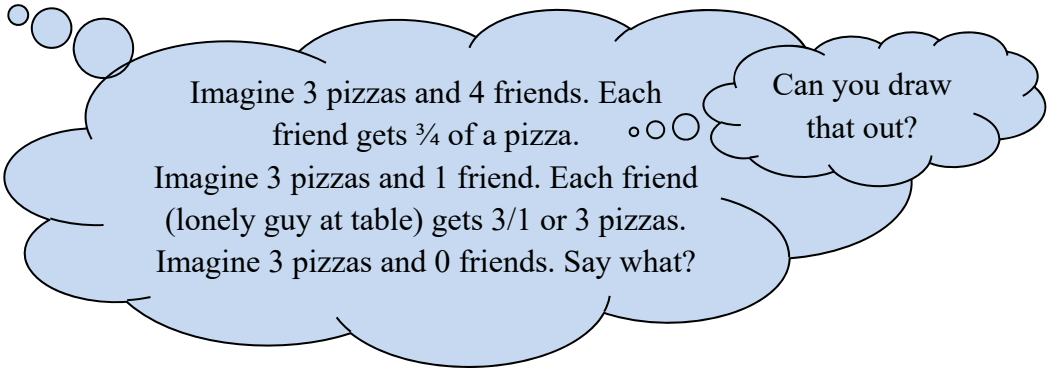
a.) Is it true that 62 x 12 + 6 = 750?

b.) Make up and check the equation needed to verify your answer for $8,452 \div 35$.

**Division by Zero and One:**

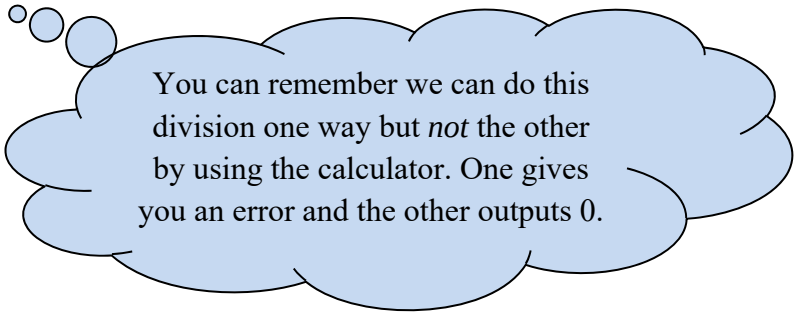
What do you get when you divide a number by 0? What happens when you divide by 1?

I like to think of division as pizzas and friends. The top number is how many pizzas are on a table. The bottom number is how many friends are sitting at the table. The quotient is how much pizza each friend gets.



Since dividing by 0 makes *no* sense, we say that this quotient is *not* possible. We call it **undefined**. We can also see this if we consider division as finding how many of a total is in each group. When we divided $60 \div 6$ and got 10, we were saying that a total of 60 cookies (yeah, I've moved on to cookies) divided into 6 groups means each group has 10 cookies. How many cookies would we have in each group if we had 0 groups? The question makes *no* sense and *cannot* be answered.

So, $60 \div 0 = \textit{undefined}$, but what is $0 \div 60$? If we had 0 cookies and 60 groups, how many cookies are in each group?




**Factors:**

**Definition**: The **factors** of a number are numbers that multiply to make the first number. Many numbers have more than two factors.

Another way to think of factors, is that they are the numbers that are **evenly divisible** into the first number. (When we divide a whole number by one of its factors, we get a whole number.)

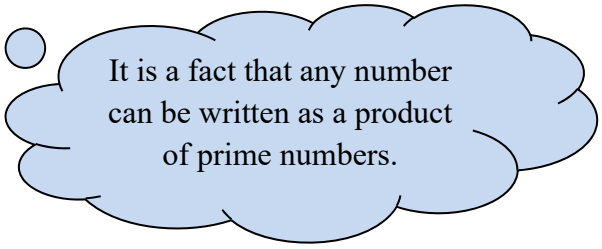
expl 4: Write all of the factors of the numbers below.

a.) 45 b.) 13

**Definition:** A **prime number** is a number (greater than 1) whose only factors are 1 and itself. The first several prime numbers are 2, 3, 5, 7, 11, 13, 17, 19, 23, and 29.

**Definition: Prime factors** of a number are those factors that are themselves prime numbers.

Can you write 45 as the product of prime numbers? This is called its **prime factorization**.



**Definition:** A **composite number** is one that is *not* prime.

**Handout: Rules for Divisibility:**
This is a handout that has some helpful (and some definitely *not* helpful) rules for knowing if a number is divisible by the numbers 2 through 13. Of course, we can always divide the two numbers and just see if we get a whole number.

expl 5: How many joists are spaced 16 in. o.c. (on center) are required for a floor that is 432 inches long? Add 1 joist for a starter.

expl 6: Mr. Murcher hired a plumber who worked 18 hours. The total bill was $4696. If the cost for materials was $3400, how much was the plumber paid per hour?

expl 7: A high-speed stamping machine can produce small flat parts at the rate of 96 per minute. If an order calls for 297,600 parts to be stamped, how many hours will it take to complete the job? Round *up* to the nearest hour. (Remember that 60 minutes = 1 hour.)