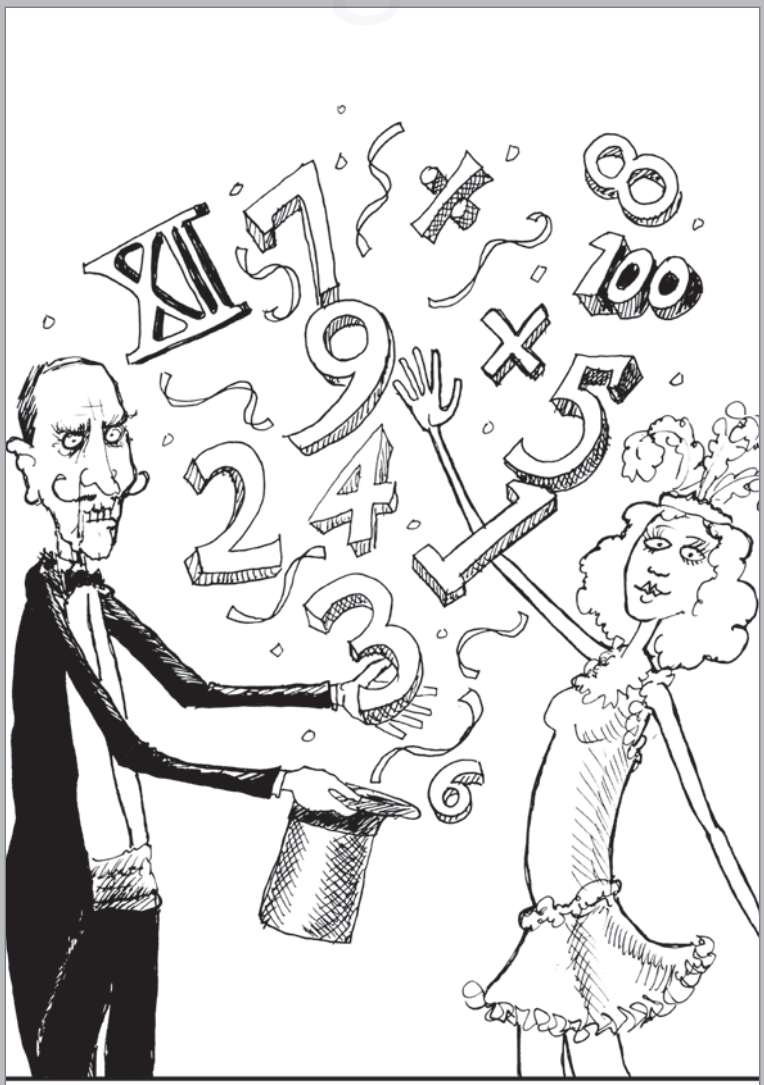


MAGICAL MATH

Numerator goes Up,
Denominator goes Down.

ALL ABOUT NUMBERS

Even if you're not in love with math class (and especially if you are!), you have to admit that numbers can be kind of cool. They let you count money, dial a phone, and measure the distance between your house and your friend's house. And sometimes they act like a secret code: What number is Super Bowl XLVI anyway? Unlock the code, and you'll unlock a whole new world!

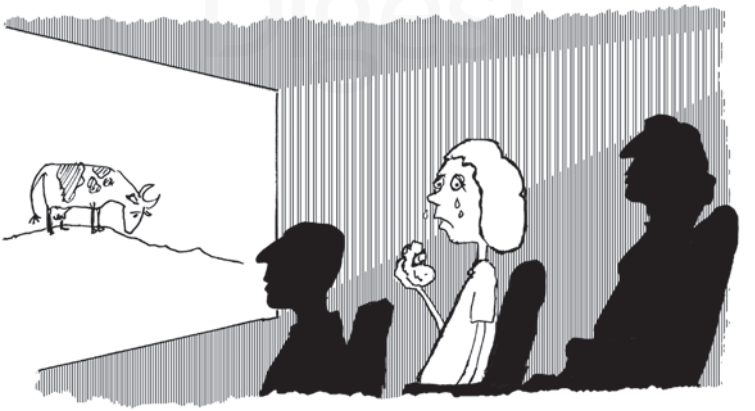
Roman Numerals

Way back in ancient Rome, people used letters in place of numbers. The Romans were nice enough to skip a Roman numeral for zero—giving you one less Roman numeral to remember—but they did have seven numbers that you'll see on occasion.

I = 1
V = 5
X = 10
L = 50
C = 100
D = 500
M = 1,000

Try remembering them this way:

I Viewed **X**-rays; **L**acrosse **C**aused **D**amaged **M**uscles.



If you can remember **IVX** (the first three Roman numerals) without a sentence, you can remember the rest with these phrases:

Lucy **C**ries **D**uring **M**ovies.

Lonely **C**ows **D**on't **M**oo.

The Metric System

You're probably not too familiar with the metric system, and your parents may not be either. Still, you need to remember the names of metric measurements for school (because you'll run into them in science). The metric measurements for distance use a meter as a starting point.

Kilometer = 1,000 meters

Hectometer = 100 meters

Decameter = 10 meters

Meter = 1 meter

Decimeter = 1/10 of a meter

Centimeter = 1/100 of a meter

Millimeter = 1/1,000 of a meter

The easiest way to remember these seven numbers is to use their first letters in a silly sentence:

King **H**enry **D**ied **M**errily **D**rinking **C**hocolate **M**ilk.

Now that you can remember the order of distance in the metric system, you can conquer the order of weight in the metric system. Just use the same prefixes (kilo-, hecto-, deca-, deci-, centi-, and milli-), but substitute *gram* for *meter*. Your new, sadder sentence will look like this:

King **H**enry **D**ied **G**rimly **D**rinking **C**hocolate **M**ilk.

EXTRA CREDIT

Can you come up with a sentence for the order of metric weights that starts with ***kangaroo?***

Prime Numbers

A prime number is a number that can be divided by itself and by 1—that's all. So 2, 3, 5, 7, 11, 13, and 17 are all prime numbers. How can you remember what makes a prime number a prime number?

If I'm a prime number, I only think of the **me** in pri**me**. Turn the **i** in pr**i**me to a 1, and you'll never forget that a prime number can only be divided by me (itself) and 1.

Fractions

A fraction—a number that is not a whole number, like 2/5—is divided into two parts: a numerator and a denominator. The numerator is the top number (in this case, the number 2) and the denominator is the bottom number (in this case, the number 5). How to keep them straight?

N**U**merator goes **U**p, **D**enominator goes **D**own.

Or you can use two words that go together to let you know that the **N** comes before the **D** in a fraction:

Nice **D**og
North **D**akota

MULTIPLYING AND DIVIDING

Even if adding and subtracting are easy for you, multiplying and dividing can be a little more challenging. But you can learn tricks—including an amazing trick with your hands—that will help you become a multiplying and dividing whiz.

Tricks for Times Tables

The best way to learn your times tables is to memorize them. You can make up rhymes to help you remember times tables—or parts of them—that give you trouble, but learning mnemonics for all the times tables would be harder than learning the times tables alone!

However, there are tricks that can help you remember two complete times tables. The first is for the ten times table: Want to multiply a number by ten? Just add a zero to the original number and you have your answer.

$4 \times 10 = 40$

$16 \times 10 = 160$

Be sure to move the comma to the right by one place when you start multiplying larger numbers by 10:

$2{,}789 \times 10 = 27{,}890$

The nine times table has an even better trick. Look carefully at the product (the answer) of the nine times tables up to 10:

$9 \times 1 = 9$

$9 \times 2 = 18$

$9 \times 3 = 27$

$9 \times 4 = 36$

$9 \times 5 = 45$
$9 \times 6 = 54$
$9 \times 7 = 63$
$9 \times 8 = 72$
$9 \times 9 = 81$
$9 \times 10 = 90$

Do you see a pattern? Here's the secret. Add the digits in the product together, and they will always equal 9.

$9 \times 4 = 36$ (3 + 6 = 9)
$9 \times 8 = 72$ (7 + 2 = 9)

Seems obvious now, right?

Here's an even easier way to learn your nine times tables—just look at your hands. What's the trick?

Hold your hands up, with your palms facing you. Starting with the thumb on your left hand, give each thumb and finger a number. Your left thumb is one, your next finger in line is two, then three, and so on, until you reach your right thumb, which will be the number ten.

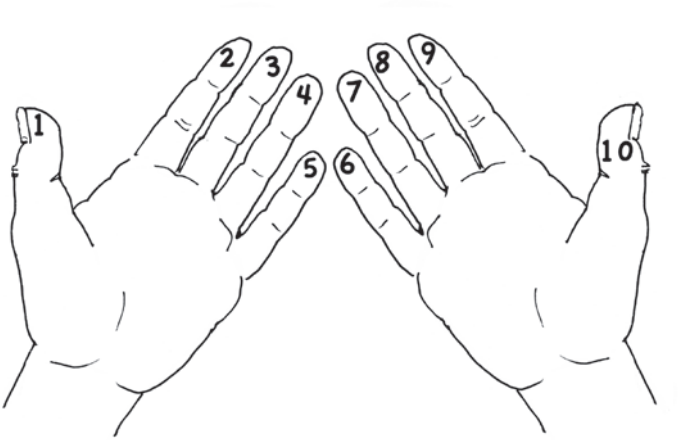
Now try 9 x 2. Bend your left index finger (the one you labeled number two) down to your palm (or as close as you can get) to represent the two in 9 x 2. Now count the number of fingers (and thumbs) standing to the left of your index finger, and you have one (thumb). Count the number of fingers (and thumbs) standing to the right of your index finger—eight. Put them next to each other and you have 18—the product of 9 x 2!

Try it with 9 x 4. Bend your left ring finger (the one you

labeled number four) down to your palm. How many fingers and thumbs do you have to the left of your ring finger? Three. How many fingers and thumbs do you have to the right of your ring finger? Six. Put them next to each other for 36—the product of 9 x 4.

You can use this trick all the way to 9 x 10. If you bend your right thumb down, you have nine fingers and thumbs to the left, and zero fingers and thumbs to the right. Together they make 90!

Remember that the number to the left side of the bent finger belongs in the tens column of the answer, and the number to the right side of the bent finger belongs in the ones column.



Long Division

Long division requires certain steps, just as a dance requires certain steps. In long division, though, the steps are not nearly as fancy as dance steps.

Divide
Multiply
Subtract
Bring down

The easiest way to remember the order of the steps is the mnemonic they probably teach you in school:

Dad, **M**om, **S**ister, **B**rother.

If you need to see a picture in your head to remember the steps, try:

Dumb **M**onkeys **S**teal **B**ananas.

If you want to add the word *down* in the final step (*bring down*), try remembering the steps this way:

Dracula's **M**other **S**ucks **B**lood **D**aily

CALCULATE THIS!

Here's where you take what you've learned about numbers to a whole new level. You can figure out the toughest problems if you know the correct order of operations, and you'll easily figure out the mode, median, and mean of a set of numbers with the mnemonic devices below.

Order of Operations

Math problems start getting complicated once you've mastered the basics of adding, subtracting, multiplying, and dividing. Now you need to add, subtract, multiply, and divide all in one problem! Throw in an exponent, and you have your work cut out for you. Sometimes you'll see a problem like this:

$(8\text{-}3) \times 2^2 + 6 \div 3 = X$

. . . and you have to figure out what **X** is. You must do each operation in a particular order or you'll get the wrong answer. What's the correct order?

Parentheses
Exponents
Multiplication
Division
Addition
Subtraction

Pretty much everybody remembers the order of operations with this sentence:

Please **E**xcuse **M**y **D**ear **A**unt **S**ally.

If you need to see an image to help you remember the right order, try this:

Pandas **E**at **M**y **D**oughnuts **A**fter **S**chool.

And by the way, the answer is 22. Did you get it right?

EXTRA CREDIT

Can you come up with a silly sentence that will help you remember the order of operations?

Averages

Finding an average isn't as easy as just finding an average. There are three main ways to do it, and you need to remember which way is the right way when solving a math problem. You have to remember mode, median, and mean.

Here's how:

Mode This is the number that appears most often in a set of numbers. For example, if you have this set of numbers—1, 2, 2, 8, 9, 11, 16—the mode number is 2.

The **MO**de number appears **MO**st often.

Median This is the number that you'll find exactly in the middle of a set of numbers that are listed in order. In that same set of numbers—1, 2, 2, 8, 9, 11, 16—the median number is 8.

The me**D**ian number is the mi**D**dle number.

(If you have a set of numbers that doesn't have only one middle number—say 1, 2, 2, 8, 9, 11—you'll add the two middle numbers together and then divide the total by two: 2 + 8 = 10 ÷ 2 = 5.)

Mean This is what you get when you add all the numbers in the set together, then divide that sum by how many numbers are in the set. Let's use the same set again: add 1, 2, 2, 8, 9, 11, and 16 for a total of 49. Divide 49 by 7 (how many numbers appear in the set), and you have a mean of 7. You can also call this the average.

Remember: Someone **mean** might call you **average.**