ADD #6 and #7

Prime, multiples, solving ratios, > or <, adding time, perimeter and area of rectangles, quadrilaterals, multiplication tricks.

A prime number is a positive integer that has exactly two positive integer factors, 1 and itself. For example, if we list the factors of 28, we have 1, 2, 4, 7, 14, and 28. That's six factors. If we list the factors of 29, we only have 1 and 29. That's 2. So we say that 29 is a prime number, but 28 isn't.

Multiples: A number that may be divided by another number with no remainder: *4, 6, and 12 are multiples of 2.*

Solving a ratio with a missing number:

$$\frac{2}{3} = \frac{5}{?}$$

- There are many ways to solve for the ?. One way is to see how many times 2 goes into 5 (5 / 2 = 2.5). Then take that number and multiply by the 3 and you end with 7.5.
- Another way is to see how many times the 2 goes into the 3 (3 / 2 = 1.5). Then take that number and multiply by the 5 and you end with 7.5.
- A final way is to cross multiply and divide. You multiply the two numbers that are diagonal from each other, and then divide by the other number. 5 x 3 = 15, 15 / 2 = 7.5

< or >: Most students know how to use these, but don't know which sign is greater, and which sign is less. A quick reminder on how to use them is the mouth eats the bigger number. Some ways to remember what they are called is the less than sign looks kind of like an L. Another way people remember is when you read them from left to right, if you get to the small side first it is less than and if you get to the big side of the sign first, it is greater than.

Adding time: Adding time is often very difficult. For example if I have the time 8:15 am. and I add 7-1/2 hours it becomes difficult. To solve this I have to convert them to be the same format such as 8-1/4 or 7:30. Once I have done that I can add. I prefer to change them to the time format so I add 8:15 + 7:30 = 15:45 (this is not military time because military time has 100 minutes in an our so 3:45 pm would be 15:75). Since we don't go beyond 12 hours in standard time, you subtract 12 hours, switch to pm. and get 3:45 pm.

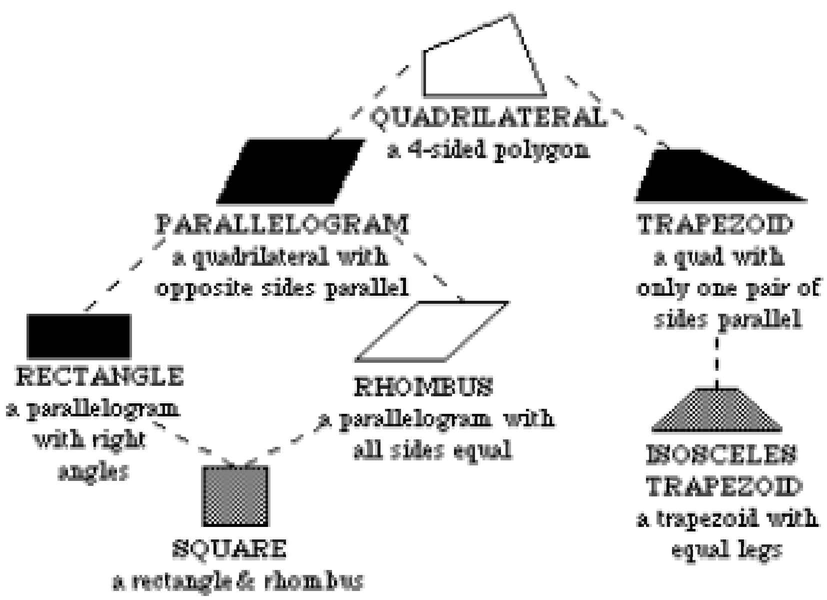
Angles: There are many different types of angles.

- ¶ Right Angle: An angle that measures exactly 90 degrees
- ¶ Acute Angle: An angle that measures less than 90 degrees
- ¶ Obtuse Angle: An angle that measures more than 90, but less than 180 degrees.
- ¶ Straight Angle: An angle that measures exactly 180 degrees
- ¶ Complimentary Angles: Two angles with a sum of 90 degrees
- ¶ Supplementary Angles: Two angles with a sum of 180 degrees

Perimeter: To find the perimeter of a rectangle, add all the sides. If two sides are given you can add them together and double it to get the other two sides.

Area: To find area you can multiply the two sides.

Below are different types of quadrilaterals and there definitions. Each shape would also be everything above it, but is not everything below it. For example a square is a rectangle, a rhombus, a parallelogram, and a quadrilateral, but a parallelogram is not always a rectangle, a rhombus, or a square.



Multiplication and factor tricks.

Multiples of 2: All even numbers are multiples of 2 meaning the number must end in a 0, 2, 4, 6, or 8

Multiples of 3: Add up the digits: if the sum is divisible by three, then the number is as well. Examples:

1. 111111: the digits add to 6 so the whole number is divisible by three.
2. 87687687. The digits add up to 57, and 5 plus seven is 12, so the original number is divisible by three.

Multiples of 4: Look at the last two digits. If the number formed by its last two digits is divisible by 4, the original number is as well. This works because 4 goes into 100 evenly so as long as it can fit into the last two digits, it can fit into the number. If the last two digits are large and difficult for you to remember, you can subtract multiples of 20 first (20, 40, 60, 80), or if you can divide the two digit number in half twice and end with a whole number, it is divisible by 4. Examples:

1. 2048 is divisible by 4 because 48 is divisible by 4. You could subtract 20 twice and got the number down to 8, or you could divide it in half twice (48 / 2 = 24 / 2 = 12).
2. 1732782989264864826421834612 is divisible by four also, because 12 is divisible by four.

Multiples of 5: If the last digit is a five or a zero, then the number is divisible by 5.

Multiples of 6: Check the rules for 3 and 2. If the number is divisible by both 3 and 2, it is divisible by 6 as well. So in other words if it is even and the sum of the digits is a multiple of 3, it will be divisible by 6.

Multiples of7: To find out if a number is divisible by seven, take the last digit, double it, and subtract it from the rest of the number.
Example: If you had 203, you would double the last digit to get six, and subtract that from 20 to get 14. If you get an answer divisible by 7 (including zero), then the original number is divisible by seven. If you don't know the new number's divisibility, you can apply the rule again. It even works if after you subtract you get a negative number. Ex. 14 (double 4 = 8, 1 – 8 = -7 which is divisible by 7.

Multiples of 8: Check the last three digits. Since 1000 is divisible by 8, if the last three digits of a number are divisible by 8, then so is the whole number. Example: 33333888 is divisible by 8; 33333886 isn't.

How can you tell whether the last three digits are divisible by 8
If the first digit is even, the number is divisible by 8 if the last two digits are. If the first digit is odd, subtract 4 from the last two digits; the number will be divisible by 8 if the resulting last two digits are. So, to continue the last example, 33333888 is divisible by 8 because the digit in the hundreds place is an even number, and the last two digits are 88, which is divisible by 8. 33333886 is not divisible by 8 because the digit in the hundreds place is an even number, but the last two digits are 86, which is not divisible by 8.

Multiples of 9: Add the digits. If that sum is divisible by nine, then the original number is as well. This holds for any power of three. ($3^2 = 9$, $3^3 = 27$...)

Multiples of 9 up to 9 x 10: Hold your two hands together so that all of your ten fingers are out in front of you. Give your fingers numbers from 1 to 10 from left to right, so the pinky on your left hand is 1, and the ring finger is 2. Keep going like that. (Your left hand thumb is 5, your right hand thumb is 6 ... all the way up to your right hand pinky, which is 10.)

Now think of what number you want to multiply by 9. Let's choose 4 as an example. The number you are multiplying by 9 is 4, so fold down your fourth finger (The index finger on your left hand.) Now look at your two hands. See how there are 3 fingers up, then 1 down, then 6 more up? We read this as 4 times 9 is 36.

Try it again, this time with 6. Fold down your 6th finger (Your right hand thumb.) See how there are 5 fingers up, then one down, then 4 more up: 9 times 6 is 54.

Do you see the pattern? You look at the number of fingers to the left side of the folded down finger to find out what number is in the 10s column of the answer, and you look to the right of the folded down finger to find the number in the ones column.

Multiples of 10: If the number ends in 0, it is divisible by 10.

Multiples of 11

To find out what 11 times a number is:

- If it is one digit times 11, you just double the digit.
  - Ex. 8 x 11 = 88
- If it is 2 digit times 11, rewrite the number with a space in the middle and in the space put the sum of the two numbers. If the sum is greater than 9, add the 1 to the hundreds place.
  - Ex. 23 x 11 = 253 (5 is the sum of 2 and 3)
  - Ex. 57 x 11 = 627 (It was a 5 and a 7 with a 12 in the middle so the 10 value in 12 made the 5 become a 6)

A way to find if a number is a multiple of 11.

Take any number, such as 365167484.

Add the first, third, fifth, seventh,.., digits.....3 + 5 + 6 + 4 + 4 = 22

Add the second, fourth, sixth, eighth,.., digits.....6 + 1 + 7 + 8 = 22

If the difference, including 0, is divisible by 11, then so is the number.

22 - 22 = 0 so 365167484 is evenly divisible by 11.

To find more explanation of why these work see Divisibility by 3, 5, & 11 in the Dr. Math archives.

Multiples of 12: Check for divisibility by 3 and 4.

Multiples of 13: Delete the last digit from the given number. Then subtract nine times the deleted digit from the remaining number. If what is left is divisible by 13, then so is the original number.

Another method

Instead of deleting the last digit and subtracting it nine fold from the remaining number (which works), you could also add the deleted digit fourfold. Both methods work because 91 and 39 are each multiples of 13.

Multiples of 14: Check for divisibility by 2 and 7.

Multiples of 15: Check for divisibility by 3 and 5.