Continuing on last weeks example about computers if we needed to find a conditional probability the technical (often confusing) formula is:

$$P(A \mid B) = \frac{P(A \& B)}{P(B)}$$

	Mac computer	PC computer	Total
iPad	5	2	7
iPod	6	4	10
iPhone	3	10	13
Total	14	16	30

When given a table like the one to the left the formula becomes much simpler. To find P(A|B) also known as "the probability of A given B" (the symbol that looks like a lowercase l stands for the word "given") we need to find the number that falls in BOTH A & B and divide that value by the total of all possibilities for B.

Note:

In the formula : $P(A \mid B) = \frac{P(A \& B)}{P(B)}$

The denominator *(bottom of the fraction)* changes to match the total of the values in the single category following the given sign!

Examples:

What is the probability of being a Mac user given you own an iPad?

$$P(Mac \mid iPad) = \frac{P(Mac \& iPad)}{P(iPad)} = \frac{5/30}{7/30} = \frac{5}{7}$$

There is a "cheat" to this formula. *If you do NOT simplify any values you can use the table without getting the extra fractions involved by looking at the table we can see that the students with BOTH a Mac & iPad* is 5 *and there are a total of* 7 *iPads* So we can skip the complicated looking fraction and go right to the answer: 5 / 7

What is the probability of being an iPad user given you own a Mac?

$$P(iPad \mid Mac) = \frac{P(iPad \& Mac)}{P(Mac)} = \frac{5/30}{14/30} = \frac{5}{14}$$

Note there is a cheat to this formula. If you do NOT simplify any values you can use the table without getting the extra fractions involved by looking at the table we can see that the students with BOTH an iPad and a mac is still 5 *and there are a total of* 14 *Mac owners* So we can skip the complicated looking fraction and go right to the answer: 5 / 14