MTH245 Day 1 Percents, Excel Basics

In algebra classes we often talk about there being 3 ways to approach a problem: symbolically, graphically and numerically. And we rarely, if ever, use the numeric (quantitative) approach. This class is about solving problems that do not lend themselves to algebraic solutions. There still will be some algebra used, but what we want to develop in this class is the ability to problem solve—how to analyze a problem and come up with a logical approach to find a solution. Problems are all applied, and each is unique. (Not a situation where I show you a problem in class and you go home and do 10 copies of the same problem for homework. I'll show you a problem in the class but then you have to come up with logical variations to solve the homework problems.) We will use Excel a lot in this class (Office 14). I am not an expert and you do not need to be either, we will learn as we go. Help each other (and me!) out.

We will have a Moodle site, it contains files you will need, assignments, announcements, etc. Much of the work you turn in will be by uploading files to Moodle.

There will be group work and work that must be done in class. Attendance is mandatory; you do not get to make up missed assignments. (You will be able to drop a couple.) We will use the computers during class but you may only use them for class work. Don't distract yourself…that means no e-mail, surfing, games, etc. Turn the screen off if it is too tempting.

Percents

Percent = divide by 100 5% = 5/100 = 1/20 = .05 Just a type of notation

When working with percents "of" means "multiply"

20% of $80 is 20% * 80 = .2 * 80 = 16 or $16

If a pair of shoes is usually $80 but is marked down 20% you will save $16. (80 – 16 = $64 for sale price)

Wholesale cost of a book is $84 but is marked up 25% for the retail price. What is the retail price?

25% of 84 = ¼ * 84 = 21, mark up is $21 so the retail price is $84 + $21 = $105

It seems to be the words that cause the most trouble. Store purchases a book for $100 and sells it for $120. How much is the markup? $20. The mark up is what percent of the original price? 20 = what % of 100. 20 = x * 100, solve for x and convert to a percentage: 20%

Sometimes fractions are more convenient than decimals. Personal favorites:

1% = 1/100 5% = 1/20 10% = 1/10 50% = ½ 100% = 1 200% = 2

35 is 5% of what number? 35 = 1/20 * p, so p = 20 * 35 = 700
Sometimes fractions are easier than decimals to work with.

Carefully compare these two problems:
4 students are in a room and two more walk in, what was the percent increase?
2 students are in a room and 4 more walk in, what was the percent increase?

During tough economic times your company asks you to take a wage cut of 20% for 6 months and then it will give you a 20% raise. Will you be back to your original wage?
Salary of $50,000: 20% of 50,000 = .2 * 50,000 = 10,000 you have a $10,000 wage cut, so temporary salary is $40,000.
Raise: 20% 0f 40,000 = .2 * 40,000 = $8000 your raise in 6 months is only $8000 so your new wage is $48,000. Your new salary is a permanent decrease of $2000.

A little bit of algebra can make this process more streamlined. This is important as we will be doing this a lot. Back to the shoes, if the shoes were discounted 20% that would mean we must be paying the remaining 80%, right? 80% of $80 = .8 * 80 = $64 for the sale price. Same answer, but faster.

New value = old value (1 + % change), or, new value = old value (1 - % change)

Look at the salary problem again: original salary was $50,000 then we had an increase of 20% followed by a decrease of 20%
50,000(1 - .2)(1 + .2) = 50,000(.8)(1.2) = 50,000(.96) we ended up at 96% of our original salary

Another one: Store marks up wholesale prices by 25%, in addition consumers are charged 5% sales tax. How much above retail is the consumer paying? Let's say an item costs $100 wholesale:
100(1+.25)(1+.05)= 100(1.25)(1.05) = 100(1.3125)The consumer pays 31.25% more than wholesale.

A variation: Joe gets a 10% raise every year, his starting wage is $8 an hour, what is his wage after 3 years? $8(1 + 0.1)(1+0.1)(1+0.1) = 8(1.1)^3$ = (calculator) = $10.648. Does that sound reasonable? What was his raise the first year? The next year should be a little bit bigger, right? etc.

Jim started at a wage of $9 an hour and 2 years later is earning $11, If his wage rose by the same percent each year, what was the percentage rate? $9(1 + p)^2 = 11$, p = 10.55%