Math 220—Calculus for Business and Management, Summary of Sections 1 to 5

1. Rough sketches of essential graphs including intercepts. (See pdf on website.)

   Domain of a function, especially of polynomial, rational and root functions, as well as log and exponential functions.

2. Cost, revenue and profit functions (linear only) and how they relate:

   $P(x) = R(x) - C(x)$, that is, profit from the sale of x items is the difference between the revenue realized from selling x items and the cost to produce them.

   $R(x) = px$ where p = price per unit, x = number of units sold;

   $C(x) = mx + b$ where mx = variable cost, b = fixed cost of production.

   Variable costs include labor and materials. Fixed costs include rent and utilities. These are not rigidly defined, as what is fixed and what is variable is not always clear-cut. Your knowledge of economics and business informs a finer understanding of this.

3. Marginal cost—cost of producing each additional unit, that is, $C(x + 1) - C(x)$. For linear cost functions, slope m is identical to marginal cost, since:

$$\text{slope} = \frac{\Delta y}{\Delta x} = \frac{C(x+1) - C(x)}{x + 1 - x} = \frac{C(x+1) - C(x)}{1} = C(x+1) - C(x) = \text{marginal cost}$$

4. Breakeven point—number of units x one must sell so revenue covers cost of production. To find this amount, set $R(x) - C(x) = 0$ and solve for x. Sometimes, x is given as q or even as n. In $C(x)$, it is units produced. In $R(x)$ and $P(x)$ it is units sold.

5. Log and exponential properties are helpful for solving certain finance and economics problems. The important ideas are on the handout (the one with my writing).

6. 'Interest paid on interest' is compound interest. For n compounding periods per year at annual interest rate r, the final value F of a principal (deposit or loan) P over t years is calculated by:

$$F = P\left(1 + \frac{r}{n}\right)^{nt}$$

   Continuous compound interest is calculated

$$F = Pe^{rt}$$

   Effective interest rate is a bit higher than stated interest rate, due to the compounding effect.

   For the two scenarios: eff rate of interest = $\left(1 + \frac{r}{n}\right)^{n} - 1$ and $e^{r} - 1$.