Rules for means.

If X is a random variable and a and b are fixed numbers, then $\mu_{a+bX} = a + b\mu_X$

If X and Y are random variables, then $\mu_{X+Y} = \mu_X + \mu_Y$

Rules for variances and standard deviations:

If X is a random variable and a and b are fixed numbers, then $\sigma^2_{a+bX} = b^2\sigma^2_X$

If X and Y are independent random variables, then $\sigma^2_{X+Y} = \sigma^2_X + \sigma^2_Y$ and $\sigma^2_{X-Y} = \sigma^2_X + \sigma^2_Y$

If X and Y have correlation ρ, then $\sigma^2_{X+Y} = \sigma^2_X + \sigma^2_Y + 2\rho\sigma_X\sigma_Y$ and $\sigma^2_{X-Y} = \sigma^2_X + \sigma^2_Y - 2\rho\sigma_X\sigma_Y$

Definition of conditional probability: $P(B/A) = \frac{P(A\ and\ B)}{P(A)}$

Normal approximation to the binomial distribution:

If X is a count having the $B(n, p)$ distribution, then when n is large,

X is approximately $N\left(np, \sqrt{np(1-p)}\right)$

The sample proportion $\hat{p} = \frac{X}{n}$ is approximately $N\left(p, \sqrt{\frac{p(1-p)}{n}}\right)$

We will use these approximations when $np \geq 10$ and $n(1 - p) \geq 10$.