Mth102 Final Formula Sheet

Standard deviation: $s = \sqrt{\dfrac{\sum (x_i - \bar{x})^2}{n-1}} = \sqrt{\dfrac{\sum x^2 - (\sum x)^2/n}{n-1}}$

Mean of a random variable: $\mu = \sum xP(X = x)$

Standard deviation of a random variable: $\sigma = \sqrt{\sum (x-\mu)^2 P(X = x)} = \sqrt{\sum x^2 P(X = x) - \mu^2}$

Binomial probability

$$P(X = x) = \binom{n}{x} p^x (1-p)^{n-x} \qquad \mu = np \qquad \sigma = \sqrt{np(1-p)}$$

$(1-\alpha)100\%$ CI about μ, σ known: $\bar{x} \pm z_{\alpha/2} \cdot \dfrac{\sigma}{\sqrt{n}}$

$(1-\alpha)100\%$ CI about μ, σ unknown: $\bar{x} \pm t_{\alpha/2} \cdot \dfrac{s}{\sqrt{n}}$.

$(1-\alpha)100\%$ CI about p, $\hat{p} \pm z_{\alpha/2} \cdot \sqrt{\dfrac{\hat{p}(1-\hat{p})}{n}}$.

Margin of error about μ: $E = z_{\alpha/2} \cdot \dfrac{\sigma}{\sqrt{n}}$

Sample size necessary: $n = \left(\dfrac{z_{\alpha/2} \cdot \sigma}{E} \right)^2$

Margin of error about p: $E = z_{\alpha/2} \cdot \sqrt{\dfrac{\hat{p}(1-\hat{p})}{n}}$

$$z = \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}} \qquad t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}} \qquad z = \frac{\hat{p} - p_0}{\sqrt{\dfrac{p_0(1-p_0)}{n}}}$$