Formula Sheet

$$\bar{x} = \frac{\sum x}{n} = \frac{\sum xf}{n} \approx \frac{\sum(\text{class mark})f}{n}$$

$$SS(x) = \sum(x-\bar{x})^2 = \sum x^2 - n(\bar{x})^2 = \sum x^2 - \frac{(\sum x)^2}{n}$$

$$= \sum x^2 f - \frac{(\sum xf)^2}{n} \approx \sum(\text{class mark})^2 f - \frac{(\sum(\text{class mark})f)^2}{n}$$

$$s^2 = \frac{SS(x)}{n-1} \qquad s = \sqrt{s^2} \qquad z = \frac{x-\bar{x}}{s}$$

Chebyshev's Theorem: $1 - \frac{1}{y^2}$

$$SS(xy) = \sum(x-\bar{x})(y-\bar{y}) = \sum xy - \frac{(\sum x)(\sum y)}{n}$$

$$SSE = \sum(y-\hat{y})^2$$

$$b_1 = \frac{SS(xy)}{SS(x)} = \frac{\sum(x-\bar{x})(y-\bar{y})}{\sum(x-\bar{x})^2} \qquad b_0 = \frac{\sum y - (b_1 \cdot \sum x)}{n} = \bar{y} - (b_1 \cdot \bar{x})$$

$$r = \frac{SS(xy)}{\sqrt{SS(x)SS(y)}}$$

$${}_nP_k = \frac{n!}{(n-k)!} \qquad {}_nC_k = \frac{{}_nP_k}{k!} = \frac{n!}{(n-k)!\,k!}$$

$$P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A\cap B) - P(B \cap C) - P(A \cap C) + P(A \cap B \cap C)$$

Law of Total Probability: $P(B) = P(B|A_1)P(A_1) + P(B|A_2)P(A_2) + \ldots + P(B|A_k)P(A_k)$

Baye's Theorem: $P(A_j|B) = \frac{P(B|A_j)P(A_j)}{\sum_{i=1}^{k} P(B|A_i)P(A_i)}$