Formula Sheet

$$\text{mean} = \frac{1}{n}\left(x_1 + \cdots + x_n\right)$$

$$\text{SD} = \sqrt{\frac{1}{n}\left((x_1 - \text{mean})^2 + \cdots + (x_n - \text{mean})^2\right)}$$

$$\text{sd} = \sqrt{\frac{1}{n-1}\left((x_1 - \text{mean})^2 + \cdots + (x_n - \text{mean})^2\right)}$$

$$\text{EV}_{\text{sum}} = n\,\text{AV}_{\text{box}}$$
$$\text{SE}_{\text{sum}} = \sqrt{n}\ \text{SD}_{\text{box}}$$

$$\text{EV}_{\text{av}} = \text{AV}_{\text{box}}$$
$$\text{SE}_{\text{av}} = \text{SD}_{\text{box}} \big/ \sqrt{n}$$

Shortcut formula (if there are only two different kinds of numbers in the box):

$$\text{SD}_{\text{box}} = (\text{big } \# - \text{small } \#)\sqrt{\left(\begin{array}{c}\text{fraction of}\\ \text{tickets with the}\\ \text{big number}\end{array}\right)\left(\begin{array}{c}\text{fraction of}\\ \text{tickets with the}\\ \text{small number}\end{array}\right)}$$

$$95\%\text{ confidence interval} = \text{observed } \pm\ 2\,\text{SE}$$

$$z = \frac{\text{observed} - \text{expected}}{\text{standard error}}$$

Regression line:

$$y - y_{\text{av}} = r\,\frac{\text{sd}_y}{\text{sd}_x}\,(x - x_{\text{av}})$$

RMS error for the regression line:

$$\text{RMS}_{\text{reg}} = \text{sd}_y\sqrt{1 - r^2}$$

Binomial Formula:

$$\frac{n!}{k!\,(n-k)!}, p^k\,(1-p)^{n-k}$$