UNIVERSITY OF STRATHCLYDE
DEPARTMENT OF MATHEMATICS & STATISTICS

MM104: Statistics and Data Presentation Semester 2
MM107: Statistics and Data Presentation

Formula Sheet

One sample Z-test

$$z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$$

Two sample Z test

$$z = \frac{(\bar{x_1} - \bar{x_2}) - (\mu_1 - \mu_2)}{\sqrt{\sigma^2 \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

One sample t-test

$$t = \frac{\bar{x} - \mu}{s/\sqrt{n}}, \qquad s = \frac{1}{n-1} \sum_{i=1}^{n} (x_i - \bar{x})^2$$

Two sample t-test

$$t = \frac{(\bar{x_1} - \bar{x_2}) - (\mu_1 - \mu_2)}{\sqrt{s^2 \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}, \qquad s^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}$$

Effect size for a two sample t-test

$$ES = \frac{|\bar{x_1} - \bar{x_2}|}{\sqrt{\left(\frac{s_1^2 + s_2^2}{2}\right)}},$$

χ^2 test for association (independence) test statistic

$$\chi^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i}$$

$$S_{xx} = \sum x_i^2 - \frac{(\sum x_i)^2}{n}$$
$$S_{yy} = \sum y_i^2 - \frac{(\sum y_i)^2}{n}$$
$$S_{xy} = \sum x_i y_i \frac{\sum x_i y_i}{n}$$

$$R^2 = \frac{{S_{xy}}^2}{S_{xx} S_{yy}}$$