

### Formulas for Exam 1

$$\bar{x} = \frac{\sum x}{n} \quad s_x = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}} \quad z_x = \frac{x - \bar{x}}{s_x}$$

$$\bar{y} = \frac{\sum y}{n} \quad s_y = \sqrt{\frac{\sum (y - \bar{y})^2}{n-1}} \quad z_y = \frac{y - \bar{y}}{s_y}$$

$$r = \frac{\sum z_x z_y}{n-1} = \frac{\sum (x - \bar{x})(y - \bar{y})}{(n-1)s_x s_y}$$

$$b_1 = \frac{SS(xy)}{SS(x)} = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2} \quad \text{or} \quad b_1 = r \frac{s_y}{s_x}$$

$$b_0 = \bar{y} - b_1 \bar{x}$$

$$\hat{y} = b_0 + b_1 x \quad \text{residual} = y - \hat{y}$$