$$\bar{x} = \frac{x_1 + x_1 + x_2 + x_2 + x_2 + \ldots + x_k}{n}$$

$$= \frac{x_1 f_1 + x_2 f_2 + \ldots + x_k f_k}{n}$$

$$= \sum \frac{x_i f_i}{n}$$

$$y_i = a x_i + b$$

$$\bar{y} = \frac{\sum y_i}{n} = \frac{\sum (a x_i + b)}{n}$$

$$= \frac{\sum a x_i + \sum b}{n} = \frac{a \sum x_i}{n} + \frac{\not{n} b}{\not{n}}$$

$$= a \bar{x} + b$$

$$\underline{\underline{\text{SHOW}}} \quad S^2 = \frac{\sum x_i^2 - n\bar{x}^2}{n-1}$$

$$S^2 = \frac{\sum (x_i - \bar{x})^2}{n-1}$$

$$\sum (x_i - \bar{x})^2 = \sum (x_i^2 - 2x_i\bar{x} + \bar{x}^2) =$$

$$= \sum x_i^2 - 2\bar{x}\sum x_i + \sum \bar{x}^2 =$$

$$= \sum x_i^2 - 2\bar{x}(n\bar{x}) + n\bar{x}^2 =$$

$$= \sum x_i^2 - 2n\bar{x}^2 + n\bar{x}^2 = \sum x_i^2 - n\bar{x}^2$$