- **Calculation formulae**:

	For a sample $x_1, \dots, x_n$	For grouped data with k classes, frequencies $f_1, \dots, f_k$ and interval centers $u_1, \dots, u_k$
Sample mean $\bar{x}$	$\frac{1}{n}\sum_{i=1}^{n} x_i$	$\frac{1}{n}\sum_{i=1}^{k} f_i u_i$
Sample variance s^2	$\frac{1}{n-1}\left[\sum_{i=1}^{n} x_i^2 - \frac{1}{n}\left(\sum_{i=1}^{n} x_i\right)^2\right]$	$\frac{1}{n-1}\left(\sum_{i=1}^{k} f_i u_i^2 - n\bar{x}^2\right)$

- **For simple linear regression** with paired obserations $(x_1, y_1), (x_2, y_2), \cdots, (x_n, y_n)$:

L_{xy}	$\sum_{i=1}^{n} x_i y_i - \frac{1}{n}\sum_{i=1}^{n} x_i \sum_{i=1}^{n} y_i$
L_{xx}	$\sum_{i=1}^{n} x_i^2 - \frac{1}{n}\left(\sum_{i=1}^{n} x_i\right)^2$
L_{yy}	$\sum_{i=1}^{n} y_i^2 - \frac{1}{n}\left(\sum_{i=1}^{n} y_i\right)^2$
r	$\frac{L_{xy}}{\sqrt{L_{xx}L_{yy}}}$

For the regression line $y = a + bx$:	
b	$\frac{L_{xy}}{L_{xx}}$
a	$\bar{y} - b\bar{x}$

Test statistic for the slope b:	
TS	$\frac{b}{s/\sqrt{L_{xx}}}$
s^2	$\frac{L_{yy} - bL_{xy}}{n-2}$

- **Some probability results:**

For any two events A and B	$P(A \cup B) = P(A) + P(B) - P(A \cap B)$
If A and B are mutually exclusive (m.e.)	$P(A \cap B) = 0$ and $P(A \cup B) = P(A) + P(B)$
If A and B are independent	$P(A \cap B) = P(A)P(B)$ and $P(A \cup B) = P(A) + P(B) - P(A)P(B)$

- If X is a discrete random variable, then $E(X^k) = \sum r^k P(X = r)$ and $Var(X) = E(X^2) - [E(X)]^2$.
- If $X \sim \mathcal{B}(n, p)$, then $P(X = r) = \binom{n}{r} p^r (1-p)^{n-r}, r = 0, \cdots, n$, $E(X) = np$, $Var(X) = np(1-p)$.
- **Some test statistics and their sampling distributions** (under appropriate assumptions):

$$\overline{X} \sim \mathrm{N}\left(\mu, \frac{\sigma^2}{n}\right)$$

$$\frac{(\overline{X} - \mu)}{\sigma/\sqrt{n}} \sim \mathrm{N}(0, 1)$$

$$\frac{(\overline{X} - \mu)}{S/\sqrt{n}} \sim t_{n-1}$$

$$\frac{\hat{p} - p}{\sqrt{\frac{p(1-p)}{n}}} \sim \mathrm{N}(0, 1)$$

$$\frac{\overline{X} - \overline{Y}}{S_p\sqrt{\frac{1}{n_x} + \frac{1}{n_y}}} \sim t_{n_x+n_y-2}, \text{ where}$$

$$S_p^2 = [(n_x - 1)S_x^2 + (n_y - 1)S_y^2]/(n_x + n_y - 2)$$

$$\frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \sim \mathrm{N}(0, 1)$$

$$\sum_i \frac{(O_i - E_i)^2}{E_i} \sim \chi^2_\nu, \text{ for appropriate } \nu$$

- **General formula for any CI:** estimator $\pm$ (table value)$\times$ SE