

Name	Parameter	Statistic	Quantity Measured
Mean	μ	\bar{Y} or \bar{y}	Center or Location
Proportion	ρ	\hat{p} or $\hat{\pi}$	Location or Frequency
Standard Deviation	σ	S or s	Variation or Spread
Variance	σ^2	S^2 or s^2	Variation or Spread

$$\mu$$

$$\bar{Y} = \frac{1}{n} \sum_{i=1}^n Y_i$$

M = Middle Value

$$y_1 = 25, y_2 = 28, y_3 = 41, y_4 = 34, y_5 = 21, y_6 = 24, y_7 = 25$$

$$\bar{y} = \frac{1}{7}(25 + 28 + 41 + 34 + 21 + 24 + 25) = 28.29 \text{ years}$$

$$21, 24, 25, 25, 28, 34, 41$$

$$21, 24, 25, 25, 27, 28, 34, 41$$

$$\sigma^2 \quad \sigma \quad S^2 = \frac{\sum_{i=1}^n (Y_i - \bar{Y})^2}{n - 1} \quad S = \sqrt{S^2}$$

$$\bar{y} = 28.29 \text{ years}$$

$$S^2 = \frac{(25 - 28.29)^2 + (28 - 28.29)^2 + \dots + (25 - 28.29)^2}{7 - 1} = 47.90 \text{ years}^2$$

$$S = \sqrt{S^2} = 6.92 \text{ years}$$

$$\bar{y} = 28.29$$

$$\hat{p} = \frac{\# \text{ in Category}}{\text{Total \#}} = \frac{Y_1 + Y_2 + \dots + Y_{500}}{500}$$

$$\hat{p} = \frac{\# \text{ in Category}}{\text{Total \#}} = \frac{y_1 + y_2 + \dots + y_{500}}{500} = 0.860$$

$$\hat{p} = 0.860$$

$$\frac{\hat{p}(1 - \hat{p})}{n} \quad \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}}$$

p or π

$$\frac{p(1 - p)}{n} \quad \sqrt{\frac{p(1 - p)}{n}}$$

$$y_1 = 0, y_2 = 1, y_3 = 1, y_4 = 1, y_5 = 1, y_6 = 0, y_7 = 1$$

$$\hat{p} = \frac{0 + 1 + 1 + 1 + 1 + 0 + 1}{7} = \frac{5}{7}$$

$$SD(\hat{p}) = \sqrt{\frac{5/7(1 - 5/7)}{7}} = 0.171$$

$$0 \leq P(A) \leq 1$$

$$\Omega \quad P(\Omega) = 1 \quad P(A) = 0.5$$

$$P(A \text{ or } B) = P(A \cup B) = P(A) + P(B)$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B) \quad P(A \cap B) = P(A \text{ and } B) = 0$$

$$A^c \quad \bar{A}$$

$$1 = P(\Omega) = P(A \cup A^c) = P(A) + P(A^c) \implies P(A^c) = 1 - P(A)$$

$$\hat{p} = \frac{Y}{20}$$

$$MOE = 2 * s / \sqrt{n}$$

$$\text{Estimate of mean is 28.29 years } (\pm 5.23 \text{ years})$$

$$n\hat{p} \geq 10, n(1 - \hat{p}) \geq 10$$

$$\hat{p} \pm z^* \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}}$$

$$p(y) = P(Y = y) = \begin{cases} \frac{12^y e^{-12}}{y!} & y = 0, 1, 2, \dots \\ 0 & \text{otherwise} \end{cases}$$

$$Y \sim Poi(12)$$

$$P(Y < 8) = P(Y \leq 7) = \sum_{y=0}^7 \frac{12^y e^{-12}}{y!} = 0.0895$$

$$P(a < Y < b) = \int_a^b f(y) dy$$

$$f(y) = \begin{cases} 12e^{-12y} & y > 0 \\ 0 & \text{otherwise} \end{cases}$$

$$Y \sim Exp(12)$$

$$P(Y > 0.25) = \int_{0.25}^{\infty} 12e^{-12y} dy = 0.0497$$

$$F(y) = P(Y \leq y)$$

$$P(Y > 0.25) = 1 - P(Y \leq 0.25) = 1 - F(0.25)$$

$$Mean : \mu = \int_{14}^{\infty} y f(y) dy = 26.5$$

$$Median : 0.5 = \int_{14}^{median} f(y) dy \implies Median = 26.08$$

$$P(\hat{p} \leq 0.5) \approx 0.01$$

$$P(Y = 0.25) = \int_{0.25}^{0.25} 12e^{-12y} dy = 0$$

$$MOE = 2 * \sqrt{\hat{p}(1 - \hat{p})/n}$$

Estimate of proportion is 0.860 (± 0.031)