

MATH 134A Review: Sample Statistics

Facts to Know

A point estimate is the value of a statistic that estimates the value of a population parameter (e.g. proportion, mean, standard deviation).

- Let x be the number of individuals in a sample with a sought-after characteristic, and let n be the sample size. Then

$$\frac{x}{n} =: \hat{p}$$

is the point estimate for the population proportion.

- Let x_1, \dots, x_n be data collected from individuals within a sample; here n is the sample size. Then

$$\frac{x_1 + \dots + x_n}{n} =: \bar{x}$$

is the point estimate for the population mean. Also

$$\frac{(x_1 - \bar{x})^2 + \dots + (x_n - \bar{x})^2}{n - 1} =: s^2$$

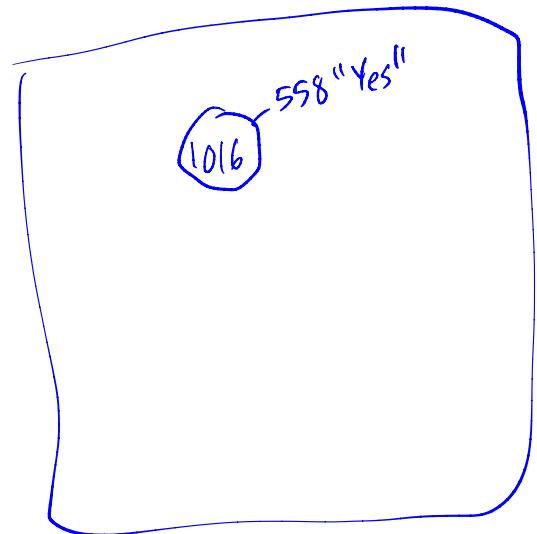
is the point estimate for the population variance.

Examples

- A poll was conducted which sampled 1016 adults with a yes-or-no question. Of the 1016 adults surveyed, 558 said "yes." Obtain a point estimate for the proportion of adults who will respond "no" to the surveyed question.

$$\frac{x}{n} = \hat{p} = \% \text{ "yes"}$$
$$\frac{558}{1016}$$

$$1 - \hat{p} = \frac{1016 - 558}{1016}$$



2. Some drivers report the miles per gallon of their vehicle to a particular government website. The following table shows data for 16 different owners of the 2011 Ford Focus automobile.

35.7	37.2	34.1	38.9
32.0	41.3	32.5	37.1
37.3	38.8	38.2	39.6
32.2	40.9	37.0	36.0

Source: www.fueleconomy.gov

Obtain a point estimate for the mean and variance miles per gallon of a 2011 Ford Focus. You are allowed to write an expression that simplifies to get the desired answer; that is to say, do not simplify.

$$\bar{X} = \frac{x_1 + \dots + x_n}{n} = \frac{35.7 + 37.2 + 34.1 + \dots + 36.0}{16}$$

$$= \frac{588.8}{16} = 36.8 \approx \mu$$

$$S^2 = \frac{(x_1 - \bar{x})^2 + \dots + (x_n - \bar{x})^2}{n - 1} = \frac{(35.7 - 36.8)^2 + \dots + (36.0 - 36.8)^2}{15}$$

$$= 8.5093 \approx \sigma^2$$