Answer to Question #85245 – Math – Statistics and Probability

Suppose the annual savings (in millions of euros) of a specific household is a random variable, which follows the normal distribution with mean $\mu = 5$ and standard deviation $\sigma = 1$. If we take a random sample of 16 households from the population, what is the probability the sampling mean to be:

Question

more than 5.5 million euros?

Solution

$$z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{5.5 - 5}{1/\sqrt{16}} = 2.0$$

$$P(\bar{x} > 5.5) = P(z > 2.0) = 1 - P(z < 2.00) = 1 - 0.9772 = 0.0228$$

Answer: $0.0228.$

Question

between $4.9\ and\ 5.1$ million euros?

Solution

$$z_1 = \frac{4.9 - 5}{1/\sqrt{16}} = -0.4$$

$$z_2 = \frac{5.1 - 5}{1/\sqrt{16}} = 0.4$$

$$P(4.9 < \bar{x} < 5.1) = P(z_2) - P(z_1) = 0.6554 - 0.3446 = 0.3108$$

Answer: 0.3108**.**