# Math 373 Hw 11 Recommended problems, don't turn this in.

Hw 252: 7.16, 7.18, 7.20, 7.24, 7.26, 7.28. Rec 252: 7.19abcd, 7.25a, 7.27ab.

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7.19abcd

Suppose a random sample of $n = 5$ observations is selected from a population that is normally distributed, with mean equal to 1 and std. dev. equal to .36.

(a) Give the mean and std. dev. of the sampling distribution of $\bar{x}$.

(b) Find the probability that $\bar{x}$ exceeds 1.3.

(c) Find the probability that the sample mean $\bar{x}$ is less than .5.

(d) Find the probability that the sample mean deviates from the population mean $\mu = 1$ by more than .4.

7.25a An important expectation of a federal income tax reduction is that consumers will reap a substantial portion of the tax saving. Suppose estimates of the portion of total tax saved, based on a random sampling of 35 economists, have a mean of 26% and a std. dev. of 12%.

(a) What is the approximate probability that a sample mean, based on a random sample of $n = 35$ economists, will lie within 1% of the mean of the population of the estimates of all economists?

## Answers

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7.19abcd

Suppose a random sample of $n = 5$ observations is selected from a population that is normally distributed, with mean equal to 1 and std. dev. equal to .36.

(a) Give the mean and std. dev. of the sampling distribution of $\bar{x}$.

$\mu = 1$

$SE = \sigma/\sqrt{n} = .36/\sqrt{5} = .160$

(b) Find the probability that $\bar{x}$ exceeds 1.3.

$P(x>1.3) = P(z>\frac{1.3-1}{.160}) = P(z>.1875) = .5 - P(<z<.1875)$

$= .5 - .4699 = .030$

(c) Find the probability that the sample mean $\bar{x}$ is less than .5.

$P(x<.5) = P(z<\frac{.5-1}{.160}) = P(z<-3.11) = .5 - P(0<z<3.11) \approx 0$

(d) Find the probability that the sample mean deviates from the population mean $\mu = 1$ by more than .4.

7.25a An important expectation of a federal income tax reduction is that consumers will reap a substantial portion of the tax saving. Suppose estimates of the portion of total tax saved, based on a random sampling of 35 economists, have a mean of 26% and a std. dev. of 12%. Stated in %:

$\mu = 26$

$\sigma = 12$

(a) What is the approximate probability that a sample mean, based on a random sample of $n = 35$ economists, will lie within 1% of the mean of the population of the estimates of all economists?

$SE = \sigma/\sqrt{n} = 12/\sqrt{35} = 2.028$

$P(25<x<27) = 2P(26<x<27) =$

$2P(\frac{26-26}{SE} < \frac{x-26}{SE} < \frac{27-26}{SE})$

$2P(0<z<\frac{1}{SE}) = 2P(0<z<\frac{1}{2.028}) = 2P(0<z<.4931)$

$= 2(.1879) = .3758$