Dr. ZABDAWI

Practice problems for section 7.3

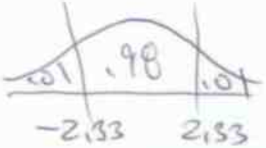
Name Solution Key

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

1) Find the critical value $z_{\alpha/2}$ that corresponds to a degree of confidence of 98%. 1) B

A) 2.05 B) 2.33 C) 2.575 D) 1.75



$-z_{\alpha/2} = \text{Inverse norm}(.01) = -2.33$

$z_{\alpha/2} = 2.33$

Determine whether the given conditions justify using the margin of error $E = z_{\alpha/2}\,\sigma/\sqrt{n}$ when finding a confidence interval estimate of the population mean μ.

2) The sample size is $n = 286$ and $\sigma = 15$. 2) B

A) No B) Yes

$n > 30 \longrightarrow$ YES

Use the confidence level and sample data to find a confidence interval for estimating the population μ.

3) Test scores: $n = 109$, $\bar{x} = 79.1$, $\sigma = 6.9$; 99 percent 3) A

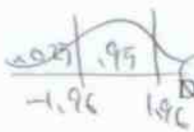
A) $77.4 < \mu < 80.8$ B) $77.6 < \mu < 80.6$ C) $78.0 < \mu < 80.2$ D) $77.8 < \mu < 80.4$

STAT — TESTS option 7 $\Rightarrow \mu \in (77.4, 80.8)$

Use the margin of error, confidence level, and standard deviation σ to find the minimum sample size required to estimate an unknown population mean μ.

4) Margin of error: \$121, confidence level: 95%, σ = \$528 4) D

A) 4 B) 64 C) 2 D) 74



$E = 121$, C.I $= 95\%$ $\Rightarrow z = \text{Inverse norm}(.025) = -1.96$

$\sigma = 528$

$E = z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$

$\Rightarrow n = \left(\frac{z_{\alpha/2}\,\sigma}{E}\right)^2 = \left(\frac{1.96 \times 528}{121}\right)^2 = 73.15$

$\Rightarrow$ take a sample $= 74$

Name Solution Key

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Do one of the following, as appropriate: (a) Find the critical value $z_{\alpha/2}$, (b) find the critical value $t_{\alpha/2}$, (c) state that neither the normal nor the t distribution applies.

1) 98%; $n = 7$; $\sigma = 27$; population appears to be normally distributed. 1) D

A) $t_{\alpha/2} = 2.575$ B) $z_{\alpha/2} = 2.05$ C) $t_{\alpha/2} = 1.96$ D) $z_{\alpha/2} = 2.33$

normal distribution applie

$-z_{\alpha/2} =$ InvNorm $(.01)$

$-z_{\alpha/2} = -2.33$

$z_{\alpha/2} = 2.33$

Find the margin of error.

2) 95% confidence interval; $n = 91$; $\bar{x} = 72$, $s = 11.4$ 2) B

A) 2.03 B) 2.37 C) 2.13 D) 4.57

$n > 30 \to t$ distribution applies

; $E = t_{\alpha/2} \frac{s}{\sqrt{n}}$

$d.f. = 91 - 1 = 90 \to t_{.025} = 1.987 \Rightarrow E = 1.987 \times \frac{11.4}{\sqrt{91}} = 2.37$

Use the given degree of confidence and sample data to construct a confidence interval for the population mean μ. Assume that the population has a normal distribution.

3) $n = 10$, $\bar{x} = 12.8$, $s = 4.9$, 95 percent 3) B

A) $9.96 < \mu < 15.64$ B) $9.29 < \mu < 16.31$ C) $9.31 < \mu < 16.29$ D) $9.35 < \mu < 16.25$

$\mu = \bar{x} \pm t_{\alpha/2} \frac{s}{\sqrt{n}}$

$d.f. = 10 - 1 = 9$, 95% CI $\to t_{2.5\%} = 2.262$

$\mu = 12.8 \pm 2.262 \times \frac{4.9}{\sqrt{10}} = 12.8 \pm 3.505 = 12.8 \pm 3.51$

$\mu \in (9.29, 16.31)$, Alternatively

STATS → TESTS → OPTION 8 T-Interval

$\mu \in (9.29, 16.31)$