Dr. ZABDAWI

Practice problems for sections:
6.4, 6.5, 7.1,7.2

Name Solution Key

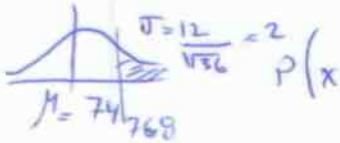
**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

**Solve the problem.**

1) The amount of snowfall falling in a certain mountain range is normally distributed with a mean of 74 inches, and a standard deviation of 12 inches. What is the probability that the mean annual snowfall during 36 randomly picked years will exceed 76.8 inches? 1) B

$n = 36$

A) 0.5808 B) 0.0808 C) 0.4192 D) 0.0026




$P(x > 76.8) = \text{normalcdf}(76.8, 1E99, 74, 2) = .0808$

2) A study of the amount of time it takes a mechanic to rebuild the transmission for a 1992 Chevrolet Cavalier shows that the mean is 8.4 hours and the standard deviation is 1.8 hours. If 40 mechanics are randomly selected, find the probability that their mean rebuild time exceeds 8.7 hours. 2) D

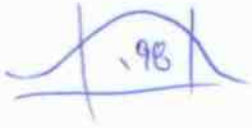
A) 0.1346 B) 0.1285 C) 0.1946 D) 0.1469



$P(x > 8.7) = P(x > 8.7) = \text{normalcdf}\left(8.7, 1E99, 8.4, \frac{1.8}{\sqrt{40}}\right)$
$= .1469$

3) Find the critical value $z_{\alpha/2}$ that corresponds to a degree of confidence of 98%. 3) C

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




$\Rightarrow \alpha = .02$
$\alpha/2 = .01$
$\Rightarrow -z_{\alpha/2} = \text{InverseNorm}(.01) = -2.33$

4) Find the critical value $z_{\alpha/2}$ that corresponds to a degree of confidence of 91%. 4) B

A) 1.645 B) 1.70 C) 1.34 D) 1.75


$\alpha = .09$
$\alpha/2 = .045$
$-z_{\alpha/2} = \text{InverseNorm}(.045) = -1.70$
$\Rightarrow z_{\alpha/2} = 1.7$

**Express the confidence interval in the form of $\hat{p} \pm E$.**

5) $0.02 < p < 0.48$ 5) D

A) $\hat{p} = 0.23 \pm 0.5$ B) $\hat{p} = 0.25 - 0.23$ C) $\hat{p} = 0.25 \pm 0.5$ D) $\hat{p} = 0.25 \pm 0.23$

$\hat{p} = \frac{(.48 + .02)}{2} = .25$

$E = \frac{.48 - .02}{2} = .23$

$\Rightarrow \hat{p} = .25 \pm 0.23$

**Solve the problem.**

6) The following confidence interval is obtained for a population proportion, p: (0.298, 0.338)
Use these confidence interval limits to find the point estimate, $\hat{p}$.

A) 0.321 B) 0.298 C) 0.338 D) 0.318

6) D

$\hat{P} = \frac{0.338 + 0.298}{2} = 0.318$

**Use the given degree of confidence and sample data to construct a confidence interval for the population proportion p.**

7) n = 133, x = 82; 90 percent

A) 0.548 < p < 0.686
B) 0.551 < p < 0.683
C) 0.550 < p < 0.684
D) 0.546 < p < 0.688

7) A

$P = \bar{P} \pm z_{\alpha/2}\sqrt{\frac{\bar{P}(1-\bar{P})}{n}}$

STAT A1-PropZTEST $P \in (.7472, .8059)$

8) n = 182, x = 135; 95 percent

A) 0.690 < p < 0.793
B) 0.691 < p < 0.792
C) 0.678 < p < 0.805
D) 0.677 < p < 0.806

8) C

STAT → TEST → A1-PropZtest → $P \in (.6782, .8053)$

**Find the minimum sample size you should use to assure that your estimate of p will be within the required margin of error around the population p.**

9) Margin of error: 0.002; confidence level: 93%; p and q unknown

A) 409 B) 204,757 C) 410 D) 204,756

95% CI → $-z_{\alpha/2} = \text{InvNorm}(.035) = -1.8119$

9) B

$n = \frac{z_{\alpha/2}^2 \bar{P}(1-\bar{P})}{E^2} = \frac{1.8119^2 \times .025}{(.002)^2} = 204,756.25$

take $n = 204,757$

10) Margin of error: 0.01; confidence level: 95%; from a prior study, p is estimated by the decimal equivalent of 69%.

A) 26,507 B) 8218 C) 7396 D) 14,184

10) B

$n = \frac{(z_{\alpha/2})^2 \bar{P}(1-\bar{P})}{E^2}$ ; 95% CI → $-z_{\alpha/2} = \text{InvNorm}(.025) = -1.96$

$n = \frac{(1.96)^2 .69(1-.69)}{(.01)^2}$

$= 8217.18$ → take $n = 8218$