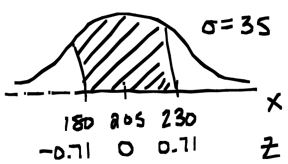
Statistics

Practice Test 3 Solutions

a.1. Let X = the weight of a deer



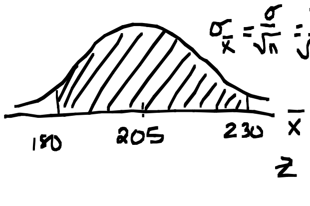
$P(180 < x < 230) = P(-0.71 < z < 0.71) = \text{normalcdf}(-0.71, 0.71, 0, 1)$

$= 0.5223$

$z = \dfrac{180-205}{35} = -0.71$

$z = \dfrac{230-205}{35} = 0.71$

b. $\sigma_{\bar{x}} = \dfrac{\sigma}{\sqrt{n}} = \dfrac{35}{\sqrt{9}} = \dfrac{35}{3}$



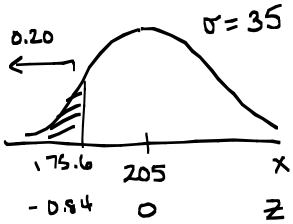
$P(180 < \bar{x} < 230) = P(-2.14 < z < 2.14) = \text{normalcdf}(-2.14, 2.14, 0, 1)$

$= 0.9676$

$z = \dfrac{180-205}{11.6666667} = -2.14$

$z = \dfrac{230-205}{11.6666667} = 2.14$

c.

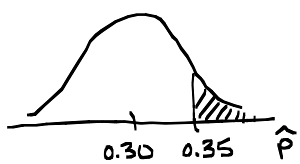


$z = \text{invNorm}(0.20, 0, 1) = {}^{-}0.84$

$x = \mu + z\sigma = 205 + (-0.84)(35) = 175.6$ pounds

2. a. The sample proportion has a normal distribution with a mean $\mu_{\hat{p}} = 0.30$ and a standard deviation $\sigma_{\hat{p}} = \sqrt{\dfrac{pq}{n}} = \sqrt{\dfrac{(0.30)(0.70)}{230}} = 0.0302166093.$

b.



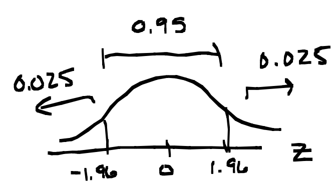
$P(\hat{p} > 0.35) = P(z > 1.65) = \text{normalcdf}(1.65, 9999, 0, 1)$

$= 0.0495$

$z = \dfrac{0.35-0.30}{0.0302166093} = 1.65$

3. a. $\hat{p} = \dfrac{293}{1011} = 0.290$

b. $\hat{p} \pm z_{\alpha/2}\sqrt{\dfrac{\hat{p}\hat{q}}{n}}$



$0.290 \pm 1.96\sqrt{\dfrac{(0.290)(0.710)}{1011}}$

0.290 ± 0.028

c. We are 95% confident that the population proportion of U.S. adults who like to watch football is between 0.262 and 0.318

d. It would be wider because you want to be more confident that the interval contains the true population proportion.

4. a. $\bar{x} = 673.8$

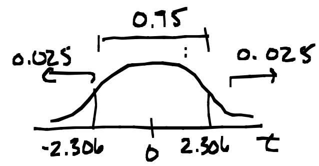
$s = 86.3$

$n = 9$

confidence level $= 0.95$

$\alpha = 1 -$ confidence level $= 0.05$

$t_{\alpha/2} = t_{0.025} = 2.306$

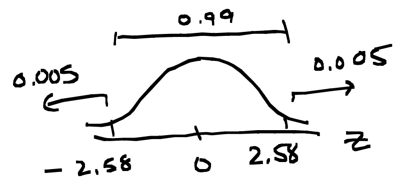


d.f. = 8

$\bar{x} \pm t_{\alpha/2} \frac{s}{\sqrt{n}} \rightarrow 673.8 \pm 2.306 \frac{86.3}{\sqrt{9}} \rightarrow 673.8 \pm 66.3$

b. We are 99% confident that the population mean credit rating of applicants for car loans is between 607.5 and 740.1

5. a. $\bar{x} \pm z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$



$61.2 \pm 2.58 \frac{7.9}{\sqrt{84}}$

61.2 ± 2.2

b. We are 99% confident that the population mean noise level is between 59.0 and 63.4 decibels.

6. $n = \left(\frac{z_{\alpha/2}\,\sigma}{E}\right)^2 = \left(\frac{2.58 \cdot 1.86}{0.10}\right)^2 = 2302.8$ round up to 2303 salmon

7. $n = \frac{z_{\alpha/2}^2\, p q}{E^2} = \frac{1.645(0.25)(0.75)}{(0.02)^2} = 1268.4$ round up to 1269 women