Stat and Data Analysis **9.1 worksheet #2** **NAME:** Key

1) What sample size is needed if I want to have a 6% margin of error and 99% confidence? Assume the sample proportion is 0.37.

$m = 0.06$

$C = 99\%$

$\hat{p} = 0.37$

$0.06 = 2.576\sqrt{\frac{(0.37)(0.63)}{n}}$

$n = 430$ units

2) What sample size is needed if I want to have a 2% margin of error and 90% confidence?

$m = 0.02$

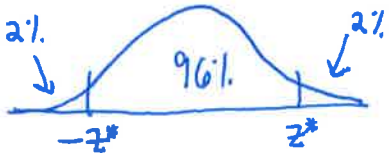
$C = 90\%$

$\hat{p} = 0.50$

$0.02 = 1.645\sqrt{\frac{(0.5)(0.5)}{n}}$

$n = 1692$ units

BONUS 3) What is the Z* for 96% confidence? Show work



$z^* = \text{invnorm}(0.02, 0, 1)$

$z^* = 2.054$

4) I have a confidence interval that is (0.562, 0.704)

a. What is the sample proportion? $\hat{p} = 0.633$

b. What is the margin of error? $m = 0.071$

c. If my confidence level is 90%, what is the sample size?

$0.071 = 1.645\sqrt{\frac{(0.633)(0.367)}{n}}$

$n = 125$ units

5) I have a confidence interval that is (0.22, 0.34)

a. What is the sample proportion? $\hat{p} = 0.28$

b. What is the margin of error? $m = 0.06$

c. If my confidence level is 95%, what is the sample size?

$0.06 = 1.96\sqrt{\frac{(0.28)(0.72)}{n}}$

$n = 216$ units

6) A political pollster takes a survey of 1000 local residents and finds that only 360 are planning on voting for his candidate.

a. Create a 99% confidence interval for the true percent of residents who will vote for his candidate

$n = 1000$

$\hat{p} = \frac{360}{1000} = 0.36$

$C = 99\%$

$$0.36 \pm 2.576\sqrt{\frac{(0.36)(0.64)}{1000}}$$

$$= 0.36 \pm 0.0391$$

$$= (0.3209, 0.3991)$$

We are 99% confident that the true % of people/residents who will vote for this candidate is btw. 32.09% and 39.91%.

b. Based on your confidence interval, do you think the candidate will win the election (receive at least 50% of the vote)? Why?

No, I do not think he will win the election. The entire confidence interval is below 50%, therefore I am 99% sure he will receive less than 50% of the vote, and will lose.

c. If he changes his confidence to 95%, what will happen to the following? (state increase, decrease, or stay the same)

i. Critical value ↓

ii. Margin of error ↓

iii. Confidence interval narrower

d. If he changes his sample size to only 500, what will happen to the following? (state increase, decrease, or stay the same)

i. Critical value same

ii. Margin of error ↑

iii. Confidence interval wider