

Math 153 - Quiz 10

April 25, 2019

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (5 points) In a recent (April 1-9) Gallup poll of 1012 U.S. adults, 23% of the respondents said that poor leadership in the government is the most important problem facing the United States.

23% of 1012 must be 233

- (a) Construct a 95% confidence interval estimate for the true proportion of U.S. adults who believe that poor leadership is the most important national problem.

1-Prop Z Int...

$$x = 233$$

$$n = 1012$$

$$C\text{-Level} = 0.95$$

95% C.I. ESTIMATE IS

$$(20.43\%, 25.62\%)$$

- (b) Give an interpretation of your interval in a complete sentence.

WE ARE 95% CONFIDENT THAT THE TRUE POPULATION PROPORTION OF U.S. ADULTS WHO BELIEVE THAT POOR GOVERNMENT LEADERSHIP IS THE MOST IMPORTANT NATIONAL PROBLEM IS BETWEEN 20.43% AND 25.62%

- (c) Find the margin of error in your interval estimate.

$$\frac{25.62\% - 20.43\%}{2} \approx 2.6\%$$

2. (5 points) A political consultant would like to determine a 90% confidence interval estimate for the proportion of U.S. voters who support a Medicare-for-all plan.

- (a) Assuming the consultant knows nothing about the opinions of voters, what size random sample should be used to obtain a margin of error of $\pm 4\%$?

$$\frac{(1.645)^2 (0.25)}{(0.04)^2} \approx 422.8 \Rightarrow \text{Use } n = 423$$

- (b) In a previous poll, it was found that 49% of Americans support Medicare-for-all. Using this new information, what sample size is required to obtain a ± 4 margin of error?

$$\frac{(1.645)^2 (0.49)(0.51)}{(0.04)^2} \approx 422.6 \Rightarrow \text{Use } n = 423 \text{ AGAIN}$$

$\alpha = 0.10$
 $\frac{\alpha}{2} = 0.05$
 $Z_{\alpha/2} \approx 1.645$