

## Show All Work!!!!

1. Find the critical value  $z_c$  that corresponds to an 90% confidence level.

$$\frac{1-0.90}{2} = \frac{.1}{2} = .0500$$

$$z_c = 1.645$$

2. Find the critical value,  $t_c$ , for  $c = 0.80$  and  $n = 35$ .

$$t_c = 1.307$$

3. A sample of 30 randomly selected Boston Marathon Women's Open Division champions have a mean of 2.6 hours with a standard deviation of 0.3 hour.

- a. Construct a 95% confidence interval for the population mean. Interpret the results (one decimal place)

$$n=30 \quad \bar{x}=2.6 \quad s=0.3 \quad C=.95$$

$$d.f.=29$$

$$t_c = 2.045$$

$$E = 2.045 \cdot \frac{0.3}{\sqrt{30}} \approx .11$$

$$2.6 - .1 < \mu < 2.6 + .1$$

$$2.5 < \mu < 2.7$$

With 95% confidence we can say the pop. mean for Women's Boston Marathon is between 2.5 and 2.7 hours.

- b. Does it seem possible that the population mean could be greater than 2.75 hours? Explain.

No, because it is outside the interval.

4. In a survey of 1018 U.S. adults, 753 say the energy situation in the United States is very or fairly serious. Construct a 90% confidence interval for the population proportion. Interpret the results. (3 dec. places)

$$\hat{p} = \frac{753}{1018} = .740 \quad z_c = 1.645$$

$$.740 - .023 < p < .740 + .023$$

$$.717 < p < .763$$

$$q_c = .260$$

$$E = 1.645 \sqrt{\frac{.740 \cdot .260}{1018}} = .023$$

With 90% confidence we can say that 71.7% to 76.3% of the adults in the U.S. say the energy situation is very or fairly serious.

5. From a random sample of 24 months from January 2006 through December 2016, the mean number of tornadoes per month in the United States was about 100. Assume the population standard deviation is 114. Construct a 95% confidence interval for the population mean. Interpret the results. (whole #)

$$n=24 \quad \bar{x}=100 \quad \sigma=114 \quad C=.95 \quad \frac{1-.95}{2} = \frac{.05}{2} = .0250 \quad z_c = 1.96$$

$$E = 1.96 \cdot \frac{114}{\sqrt{24}} \approx 46$$

$$100 - 46 < \mu < 100 + 46$$

$$54 < \mu < 146$$

With 95% confidence, we can say the pop. mean for tornadoes per month in the U.S. is between 54 and 146.