08/01/2019

1. $n = 900$

$x = 81$

2. $\hat{p} = \frac{81}{900} \approx 0.09$

3. check $n\hat{p} \geq 5$

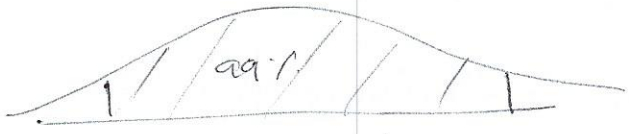
$n\hat{q} \geq 5$

$900 \times 0.09 = 81 > 5$

$900 \times 0.91 = 819 > 5$

The proportion is approx normal.

4. $c = 0.99$



$z_{\alpha/2} = 2.575$

$z_{\alpha/2} = 2.575$

5. Max Error of Max $E = z_{\alpha/2}\sqrt{\frac{\hat{p}\hat{q}}{n}}$

$E = 2.575\sqrt{\frac{0.09 * 0.91}{900}}$

6. $0.09 - 2.575\sqrt{\frac{0.09 \times 0.91}{900}} < p$

$< 0.09 + 2.575\sqrt{\frac{0.09 * 0.91}{900}}$

$0.0654 < p < 0.1146$

$(0.0654, 0.1146)$

7. ANSWER:

With 99% confidence we believe that ~~alcohol~~ US adults who feel that alcoholism is a reasonable conduct will fall between 6.54% and 11.46%.

As con level increase, confidence interval?

$$n = \hat{p}\hat{q}\left(\frac{z_{\alpha/2}}{E}\right)^2$$

$$E = z_{\alpha/2}\sqrt{\frac{\hat{p}\hat{q}}{n}}$$

$$\left(\frac{E}{z_{\alpha/2}}\right)^2 = \left(\sqrt{\frac{\hat{p}\hat{q}}{n}}\right)^2$$

$$n = \frac{\hat{p}\hat{q}}{E^2} \times (z_{\alpha/2})^2$$

Ex6.

$C = 0.9$

$\hat{p} = 0.04$

$\hat{q} = 0.96$

$z_{\alpha/2} = 1.645$

$E = 0.02$

$n = 0.04 \times 0.96 \left(\frac{1.645}{0.02}\right)^2$.

$n \approx 260$ adults.

The sample size needed for 2% accuracy is 260 adults between 18 & 29 years old.

$C = 0.9$

$\hat{p} = 0.5$

$\hat{q} = 0.5$

$z_{\alpha/2} = 1.645$

$E = 0.02$

$n = 0.5 \times 0.5 \left(\frac{1.645}{0.02}\right)^2$.

$n \approx 1692$

about 1692 adults between 18 & 29 yrs are needed in a sample to be within 2% accuracy.

Ex. 7

$c = 0.95$

$\hat{p} = 0.23$

$\hat{q} = 0.77$

$z_{\alpha/2} = 1.96$

$E = 0.05$

$$n = 0.23 \times 0.77 \left(\frac{1.96}{0.05}\right)^2$$

The sample size of 273 high school in NY wrestlers is needed to stay within 5% accuracy.

Ex 8

$n = 2000$

$x = 1320$

$\hat{p} = \frac{1320}{2000} = 0.66$

$\hat{q} = 0.34$

Check $n\hat{p} \geq 5 \quad = 1320$

$n\hat{q} \geq 5 \quad = 680$

The proportion is approx normal

$c = 0.9$

$z_{\alpha/2} = 1.645$

$$E = 1.645\sqrt{\frac{0.66 \times 0.34}{2000}}$$

$$0.66 - 1.645\sqrt{\frac{0.66 \times 0.34}{2000}} < p < 0.66 + 1.645\sqrt{\frac{0.66 \times 0.34}{2000}}$$

$$(0.6426, 6774)$$

With 90% confidence we believe that all US adults 65 yrs or older who receive a flue shot should be fall between 64.26% and 67.74%.

$$C = 0.99$$

$$z_{\alpha/2} = 2.575$$

$$E = 0.04$$

$$\hat{p} = 0.66$$

$$\hat{q} = 0.34$$

$$n = 0.66 \times 0.34 \left(\frac{2.575}{0.04}\right)^2$$

$$n \approx 930$$

The sample size of 930 US adults 65 yrs old or over is needed to within 4% accuracy and 99% confidence.