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1) Confidance Interval and Sample Size Calculation

a) 95 % Confidance Interval for the percentage of voters for Candidate A

1) Calculate Sample Size proportion $\hat{p}$

- No. of Voters For candidate A = 380
- Sample Size = 800

$$\hat{p} = \frac{380}{800} = 0.475$$

2) Z score for 95% Confidence level

For 95 % = 1.96

3) Standard error =

$$SE = \sqrt{\frac{\hat{p}(1-\hat{p}}{h}}$$

$$= \sqrt{\frac{0.475(1-0.475)}{800}}$$

$$= 0.0176$$

4) margine of error -

$$ME = Z \times SE$$

$$= 1.96 \times 0.0176$$

$$= 0.0345$$

$\therefore$ Confidance Interval = 0.475 ± 0.0345

$\therefore$ CI = $(0.4405, 0.5095)$

b) Sample Size Calculation for Desired margin error

Z-Score for 95% confidence level = 1.96

Margin of error (E) = 0.02

$$\therefore \text{Sample size } (n) = \left(\frac{(1.96)^2 \times 0.5(1-0.5)}{(0.02)^2} \right)$$

req' Sample size = 2401

② Hypothesis Testing for Average Arm Span

③ Hypothesis test.

$H_0 : \mu = 160$ cm

Alternate $H_a : \mu > 160$ cm

mean = 200 cm

$$z = \frac{\bar{x} - \mu_0}{\frac{\sigma}{\sqrt{n}}}$$

$$= \frac{200 - 160}{\frac{15}{\sqrt{30}}}$$

$$= 14.6$$

~~P-value = 14.6~~

for z value 14.6 p value extreamly small we reject null hypothesis

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e) 95% Confidance interval for average Arm Span

$$\text{Stander error} = \frac{15}{\sqrt{30}}$$

$$= 2.7386$$

$$\text{Margin of error} = 2.5E$$

$$= 1.96 \times 2.7386$$

$$= 5.37$$

Confidence interval :

$$CI = 200 \pm 5.37$$

Lower limit = 194.63

Upper limit = 205.37