1- PROPORTION Z-TEST

This test is used to determine if a hypothesized population proportion (p) is reasonable based on a sample proportion ($\hat{p}$)

A potato-chip producer selects a random sample of 500 potatoes from a truck shipment and determines that 47 have blemishes. **At α = .05, is there evidence that more than 8% of the shipment's potatoes have blemishes?**

P) IDENTIFY POPULATION PARAMETER:

p = actual proportion of potatoes in this shipment with blemishes

H) STATE HYPOTHESES:

$H_0 : p = .08$ $Ha : p > .08$

A) VERIFY CONDITIONS REQUIRED FOR TEST:

a) Random

The problem says a random sample was taken

b) Normal Sampling Distribution

$n\, p_0 \geq 10$ $n(1 - p_0) \geq 10$

$(500)(.08) = 40 \geq 10$ ✓ $(500)(.92) = 460 \geq 10$ ✓

c) Independent

$N > 10n > (10)(500) > 500$ potatoes in shipment… probably

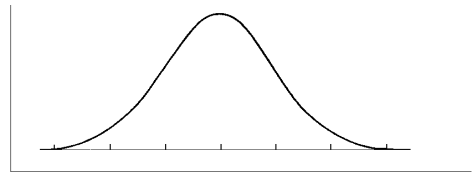
T) PERFORM TEST USING

a) TABLE A:

i) Calculate *z* test statistic

$$z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}} = \frac{.094 - .08}{\sqrt{\frac{(.08)(.92)}{500}}} = 1.15$$

ii) Determine area under curve (*P*-value)



Area under curve for $z > 1.15 = .1251$

b) CALCULATOR:

STAT → TESTS → 1-Prop Z Test → $p = .1243$

↓

X = # of successes

S) STATE CONCLUSION:

At $\alpha = .05$, we fail to reject H_0… there is insufficient evidence to conclude that the shipment contains more than 8% of blemished potatoes.

CONFIDENCE INTERVAL (Use PAIS):

After checking for normal distribution [$n\hat{p} \geq 10$ and $n(1 - \hat{p}) \geq 10$], a 90% confidence interval for the proportion of blemished potatoes in this truck is:

STAT → TEST → 1-Prop Z Int = (.073, .115)

We are 90% confident that between 7.3% and 11.5% of potatoes in this shipment are blemished (which reinforces are conclusion from the hypothesis test since as few as 7.3% may actually be blemished).