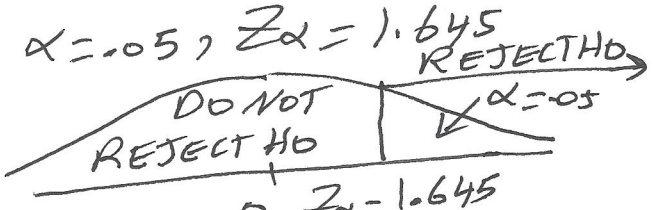
① HYPOTHESIS TEST FOR TWO POPULATIONS' MEANS
σ_1 AND σ_2 OR σ_1^2 AND σ_2^2 ARE GIVEN

EXAMPLE 5-1 PAGES 233-234 $\bar{X}_1 = 121$, $\bar{X}_2 = 112$, $\sigma_1 = \sigma_2 = 8$, $\sigma_1^2 = \sigma_2^2 = 64$
$n_1 = 10$, $n_2 = 10$

IF WE ARE ASKED IF THE MEAN OF DRYING TIME OF SPECIMAN PAINT1 IS GREATER THAN THE MEAN OF DRYING TIME OF SPECIMAN PAINT2. OR $\mu_1 > \mu_2$
THIS IS A ONE SIDED (RHS) TEST AND $\mu_1 - \mu_2 > 0$ IS IN H_1

① $H_0: \mu_1 \leq \mu_2$ or $\mu_1 - \mu_2 \leq 0$
$H_1: \mu_1 > \mu_2$ or $\mu_1 - \mu_2 > 0$

$\alpha = .05$, $Z_\alpha = 1.645$



② IF $Z_{OBT} > Z_\alpha$ REJECT Ho
or $Z_{OBT} > 1.645$ REJECT Ho

③ $$Z_{OBT} = \frac{\bar{X}_1 - \bar{X}_2 - 0}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} = \frac{121 - 112}{\sqrt{\frac{64}{10} + \frac{64}{10}}} = 2.52$$

④ AS $Z_{OBT} > Z_\alpha$, AS $2.52 > 1.645$ REJECT Ho AND H_1 IS TRUE

⑤ WE ARE 95% CONFIDENT THAT THE MEAN DRYING TIME OF ~~A~~ PAINT WITH FORMULATION 1 IS GREATER THAN THE MEAN DRYING TIME OF ALL PAINT WITH FORMULATION 2. OUR AIM IS TO SELECT THE PAINT WITH FORMULATION 2, AS IT DRIES FASTER.

USING THE CONFIDENCE INTERVAL P183

2A IF ~~0~~ LOWER LIMIT, REJECT Ho

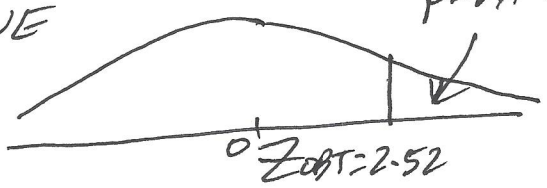
3A CI: $\bar{X}_1 - \bar{X}_2 - Z_\alpha \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$ = LOWER LIMIT, $\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}} = 3.577708$

LOWER $= 121 - 112 - 1.645(3.577708) = 3.11467$

4A AS $0 <$ LOWER LIMIT OR $0 < 3.11467$, REJECT Ho

USING THE P-VALUE

2B IF P-VALUE $< \alpha$ REJECT Ho



3B $$Z_{OB} = \frac{\bar{X}_1 - \bar{X}_2 - 0}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} = 2.52$$

P-VALUE $= 1 - \Phi(2.52) = 1 - 0.994132 = 0.005868$

4B AS P-VALUE $< \alpha$ OR P-VALUE $= 0.005868 < 0.05$ REJECT Ho