Tost of signebicance for Debberence ab Means:

Let I, be the mean of a sample at size on, brown a population with mean il, and variance of and & be the mean of an independent random complete size no born another population with mean 42 and variance 62. Then since sample sizes are large,

I, ~ N/U, 5,2) and In ~ N/U2, 52

Also X, -x, being the debberence ab two independent normal variates is also a normal variate. Then I (standard normal variate) corresponding to x, -x,

is given by $Z = (\overline{X}_1 - \overline{H}_2) - F(\overline{X}_1 - \overline{H}_2)$ S. F (X1 - H2)

S. E stands for standard error

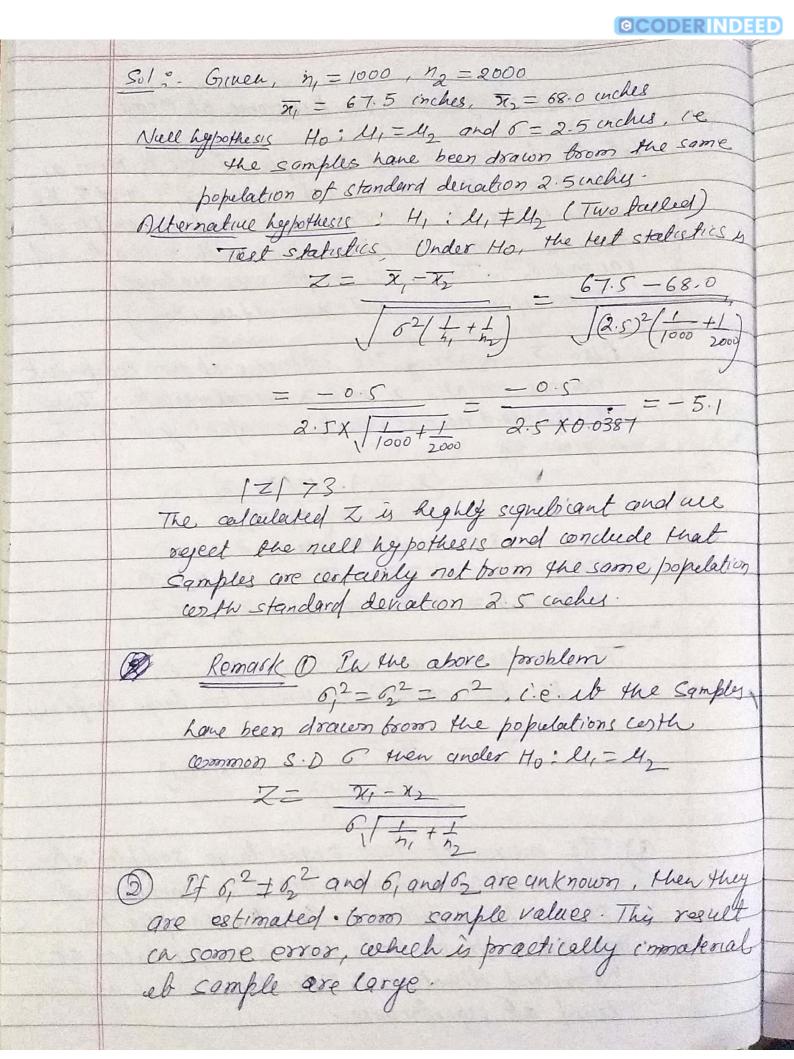
(=(X1-N2)=E(X1)-E(X2)=U1-42=0 $V(\overline{x}_1 - \overline{x}_2) = V(\overline{x}_1) + V(\overline{x}_2) = \frac{\sigma_1^2}{h} + \frac{\sigma_2^2}{h}$

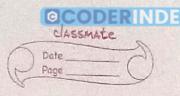
Thus under the null hypothesis. Ho: 11, = 42 the test statistics becomes [bor large samples)

$$Z = \overline{x_1} - \overline{x_2}$$

$$\sqrt{\frac{6_1^2}{7} + \frac{6_2^2}{7}} \sim N(0,1)$$

(3) the means of two single large samples ab 1000, and 2000 members are 67.5 inches and 68.0 inches respectively. Can the samples be regorded as drawn brown the same population of standard denation 2. 5 forchis? Toyl at 5% level of significance.





These estimates by large samples are given by $\hat{G}_1 = S_1^2 \approx 8_1^2$ and $\hat{G}_2^2 = S_2^2 = 8_2^2$ (for sample are large)

 $Z = \overline{\chi_1 - \overline{\chi_2}}$ $\sqrt{\frac{8^2}{n_1} + \frac{8^2}{n_2}}$

Ex(2) In a survey of buying habits, 400 women shoppers are chosen at random in super market A located in a certain section at the uty. Their average weekly tood expendeture is Rs 250 worth a standard deviation at Rs 40. For 400 women shoppers chosen at random in sufer market B' in another section at the uty; the average weekly tood expenditure is Rs 220 worth a standard denation of Rs 55. Test at 1% level cet significance whether the average weekly bood expenditure is Rs 200 worth.

 S_{1} $n_{1} = 400$, $\overline{x}_{1} = 250$, $S_{1} = 40$ $n_{2} = 400$, $\overline{x}_{2} = 220$, $S_{3} = 55$

Null hypothesis Ho: U1=U2 ce, the grerage weekly bood eapendetures at the two populations of shoppers are equal.

Alternative by pothesis H; 4 742 (Two feeled)

 $\frac{\overline{\chi_1 - \chi_2}}{\sqrt{\frac{67^2}{h} + 67^2}}$

Since 6^2 and 6^2 are not known, we can take $6^2 = 8^2$ and $6^2 = 8^2$

$$Z = \frac{7i - 7i}{\sqrt{\frac{8^2 + 8^2}{n_i + n_2}}} = \frac{250 - 220}{\sqrt{\frac{(40)^2}{n_i + n_2}}} = \frac{250 - 220}{\sqrt{\frac{400}{400} + \frac{(55)^2}{400}}}$$

$$= 30 \times 20 = 8.82$$

$$\sqrt{40^2 + 55^2} = 8.82$$

Calculated 1217 2.58

Null hypothesis is rejected

So average & expendeture at two populations
at shoppers in market A and market B debber

signebicantly.

(3) The average hously wages at a sample at 150 workers on plant A' was Rs 2.56 with a standard deviation at Rs 1.08. The average hously wage at a sample at 200 workers in plant B: was Rs 2.87 central a standard deviation at Rs 1.28 can an applicant sately assume that hously wages paid by plant B' one hegher than those paed by plant A'?

Solin 1, = 150, $\overline{X}_1 = 2.56$, $S_1 = 1.08$ $1_2 = 200$, $\overline{X}_2 = 2.87$, $S_2 = 1.28$ Null hypothesis: Ho: $1_1 = 1_2$, there is no signetion debberence between the mean wages at workers in plant A and plant B.

Alternative hypothesis H_1 ; $H_1 < H_2$

 $Z = \overline{\chi_1 - \chi_2} = 2.56 - 2.87$ $= \frac{2.56 - 2.87}{(1.08)^2} + \frac{(1.28)^2}{2.00}$ $= \frac{\sqrt{8_1^2 + 8_2^2}}{\gamma_1 + \gamma_2} = \frac{\sqrt{(1.08)^2 + (1.28)^2}}{\sqrt{150} + 2.00}$

	classmate
	O Date
$\frac{-0.31}{\sqrt{0.016}} = -2.46$	
Non alai	1.645
So nell hypothesis rejected	(contical value about 2 box libt tailed at 5 y. level ob sig)
ale conclude that average. housely wage at plant a	3 is corfainly Ligher