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DEPARTMENT OF MATHEMATICS

UNIT- IV TESTING OF HYPOTHESIS

JEST OF SIGNIFICANCE OF SMALL BANPLES ! 1127 - 917 - 7 Student's t-test : JEST JOR SINGLE MEAN Null hypothesis . Ho: H = Ho. Test statistic, t = <u>n-µ</u> if spin given. E = x- H & SD & not given . For find s: $S^2 = \sum (n - \overline{n})^2$ Degrees & Freedom: V=n-1 Note: Confedence Limit: I + tor S 1) A random sample of 10 boys had The following Ig's. 70, 120, 110, 101, 88, 83, 95, 98, 107, 100. Do these data support the anumption of a population mean sig's of 100? . Find a reservable sange to which must of the mean Ig's value of sample to boys .. Soln: given : n=10, µ=100 n = 70+120+110+101 +88+88+95+98+107+100 10 . . = 97.2

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(An Autonomous Institution)

Coimbatore– 35

DEPARTMENT OF MATHEMATICS

UNIT- IV TESTING OF HYPOTHESIS

To find s : $g^2 = \leq (n - \pi)^2$ n-1 1 - - - -7L : 70 120 110 101 88 83 95 98 107 100 カーデ : ーマオ・2 スマ.8 12.8 3.8 -9.2 -14.2 -2.2 0.8 9.8 2.8 (n- 72) 2: 739.84 519.84 163.84 14.44 84.64 201.64 4.84 0.64 96.04 7.84 ≤(2-え)2= 1833.6. $(\cdot, S^2 = \sum (n - \pi)^2 \frac{1833.6}{10 - 1}$ = 203.73 => 3 = 14.24. steps: formulating Ho and HI! Ho: 4 = 100 HI: H 7 100 (Two failed test) stip 2: Los. at d = 5% = 0.05. steps: Test statistic, E = n-M a bar a que a S/Vn =97-2-100 14.27/50 = -0.62 111 = 0.62. 31

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DEPARTMENT OF MATHEMATICS

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step 4 : Etab for degrée à freedom, 21 = n-1 v = 10 - h = 9au t tab : 2.262 (ta) Step 5: conclusion: $E = 0.62 < 2.262 = t_{x}$: Ho is accepted at 5% Los. a: the population mean sig's is 100. Confidence limit: H= 2+ Ex 3 = 972 ± 2.262 × 14.27 VIO-1 = 97.2 1 10.759 = 107.95, 86.45: 3) the weight of 10 peoples of a locality are jound to be 70, 67, 62, 68, 61, 68, 70, 64, 64, 66 Jug it is renable to believe that The average weights of people locality equates than 64 kg. test at 5% Los. <u>soln:</u> Given: n=10, µ=64 死 - 70+67+62+68+61+68+70+64+64+66 DEDI LOG PHILLENCE OF DESK 5 = 66





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UNIT- IV TESTING OF HYPOTHESIS

To find S: $S^2 = \leq (n - \bar{n})^2$ n: 40 67 62 68 61 68 70 64 64 66 n.n: 4 1 -4 2 -5 2 4 -2 -2 0 (n.n): 16 1 16 4 25 4 16 4 4 0 $\leq (n-n)^2 = 90$ $(1 - 3)^2 = \sum (n - \overline{n})^2 = \frac{90}{1001} = 10$ 5 = 3.16 Step1: Formulating Ho and Hi: Ho: N = 64 H1: H > 64 (one tailed test - right) step 2: Los at x=5.1. slips: Test statistic, t= x-H = <u>66-64</u> 3.16/VIO = 2.02 step 4: Etab for degree of freedom, V=n-1 = 10-1 Address of the second second of the second s =9 (as trak: to = 1.833 (at two tailed at 10 %.)

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(An Autonomous Institution)

Coimbatore-35

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UNIT- IV TESTING OF HYPOTHESIS

Step 5 : Conclusion: E=2.02>0-9+65=tx : Ho & rejected at 5 1/ Los a) the avg, weight 2 people locality is greater than 64, kg.

23MAT206 - PROBABILITY AND STATISTICS





(An Autonomous Institution)

Coimbatore-35

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UEST FOR DIFFERENCE of MEAN? Null hypothesis; Ho: H, = H2 Test statistics, $E = \frac{\overline{x_1} - \overline{x_2}}{s\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$ where $s^2 = \frac{n_1 s_1^2 + n_2 s_2^2}{n_1 + n_2 - 2}$ (or) $s^2 = \frac{z}{(a_1 - \overline{x_1})^2 + z(m_2 - \overline{x_2})}$ Degree g Freedom; $v = n_1 + n_2 - R$.

1) In a test examination yiven to two youps q students the marks obtained were as zoliows: ignoup I: 18 20 36 50 49 36 34 49 41 Gnoup I: 29 28 26 35 30 44 46 Enamine whether The significance g difference between the average marks secured by the students g The above two executes.





(An Autonomous Institution)

Coimbatore– 35

DEPARTMENT OF MATHEMATICS

UNIT- IV TESTING OF HYPOTHESIS

Now $\overline{\lambda_{1}} = 18 + 20 + 36 + 50 + 49 + 36 + 34 + 49 + 41 = 34$ $\overline{\lambda_{2}} = 29 + 28 + 26 + 35 + 30 + 444 + 46} = 34$ $\overline{\lambda_{1}} = \overline{\lambda_{1}} - \overline{\lambda_{1}} - (\overline{\lambda_{1}} - \overline{\lambda_{1}})^{2} - \overline{\lambda_{2}} - (\overline{\lambda_{2}} - \overline{\lambda_{2}}) - (\overline{\lambda_{2}} + \overline{\lambda_{2}})^{2}$ 18 - 19 - 361 - 29 - 5 - 25 20 - 14 - 289 - 8 - 6 - 36 36 - 1 - 1 - 26 - 8 - 64 50 - 13 - 169 - 35 - 1 - 1 - 16 36 - 1 - 1 - 26 - 8 - 64 50 - 13 - 169 - 35 - 1 - 1 - 16 36 - 1 - 1 - 144 - 10 - 100 34 - 3 - 9 - 46 - 12 - 1449 49 - 12 - 1449 - 16 - 100 34 - 3 - 9 - 46 - 12 - 1449 41 - 4 - 16 - 1641 $\leq (\overline{\lambda_{1}} - \overline{\lambda_{1}})^{2} - 1134 - 2(\overline{\lambda_{2}} - \overline{\lambda_{2}})^{2} - 386$	3011 l	given: e	noupi: 1 Znoupi: 1	D, = 9.			
$\begin{array}{rcl} & & & & & & & \\ \hline & & & & & \\ \hline & & & &$	Nou		1.1		19+ 36+31	+49+41 24	
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$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$		£2 =	29 + 28+	26+35+	-30+44+1	46 24	
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$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$. 49	. 12	144	30	1-4 1 0	1605 2	2
49 12 144 41 4 16 $\leq (x_1 - \overline{x_1})^2 = 1134$ $\leq (x_2 - \overline{x_2})^2 = 386$	36	···-1··	1.1	44	10 '	100	
41 4 16 $\leq (n_2 - \overline{n_2})^2 - 386$ $\leq (n_2 - \overline{n_2})^2 - 386$	34	-3	9	46 -	12	144	
$\leq (n_2 - \bar{n}_2)^2 = 1134$ $\leq (n_2 - \bar{n}_2)^2 = 386$	49	12	1440.0		n n		
$\Sigma(x_1-x_1) - 1134$	41	4	16	11	61		
		5 (2	1-a.)=1134			Z (n2-22)2	386.
					1.00.00		
Now 82 5 (n,-n,)2+ 5 (n2- 22)2	Now	3°= 2(and the second se	- \$2,)2	1 James	
11+12-2							
$= \frac{1134 + 386}{9 + 7 - 2} = 108.57$		= !!	34+386	= 10	8.54		
= 10.42	7						

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UNIT- IV TESTING OF HYPOTHESIS

step 1: Formulating Ho and Hi Ho: H1= H2 H1: H, 7 H2 (two fulled test) stips: Los at a = 5%. gtip 3: Test statestic, E = X1 - X2 $S\sqrt{\frac{1}{n}} + \frac{1}{n}$ = 37-34 10.42 1 + 1 = 0.5 413 step4: trai for degrees & freedom, v= n,+n2-2 =9+4-2 (ii) that = (tx) = 2.145 step 5: Conclusion: E= 0.5413 < 2.145= tox. ... Ho & accepted at 5% Los. : there is no significant difference in the ang. marking the two groups of students.

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UNIT- IV TESTING OF HYPOTHESIS

2) A samples of two types of electric bulbs were tisted for length of life and the following data were obtained. Samples size mean SD. I 8 1134 35 I 7 1054 40 Test at 51. <u>Soln:</u> -epiven: sample 1: n1 = 8, x1 = 1134, S1 = 35 Sample 1 : no = 4 , To = 1024 , So = 40. step 1: Journulating Ho and HI. Ho: H1 = H2 H1: H1 # H2 (two failed test) step 2: Los at a = 5%. step 3: Test statistic, t= x1-x2 $S\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}$ Now S= n, s, 2+ n2 32 n1+02-2 = 8 (35)2+ 7 (40)2 8+4-2 = 1615.38 8 = 40.19 mille at mail

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Coimbatore-35

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UNIT- IV TESTING OF HYPOTHESIS

:. E = 1134 - 1024 40.19/1 = 110 = 5.288 step 4: Etab for degrees & freedom, V= n,+n2-2 = 8+7-2 =12 (ù) Etab: Ez = 2.160. slips: conclusion: E=5.288>2.160 = tx. . No & rejected at 5.1.

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