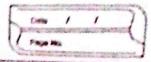


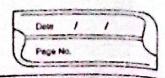
Use a two-tailed test when: we want to de tect any significant difference Chigles or low A oretailed test connet detect on effect in the apposite direction Deciding wholes to use a one-tailed of two-tailed test must be done before orally zir the data. Summary: Understanding the Observed Significance (P-value) in Hypothesis Tasting I What is the obsessed significance (P-value). The observed significance (p-value) reasones how suse our Sumple result would be it the null hypothesis (Ho) was to It is the probability of obtaining a test statistic as extreme as los noso extreme than the observed value assuming Ho is tou A small prale sciggests strong evidence against Ho, supporting the alternative Lypo Tresis(Ha) A large p-value means the sample sesselt is not unusual so these is not enough avidonce to reject Ho. 2 How to interpret the P-value? If P = a (eg 0.05), we seject the > The tosult is significant Id p= a, he fail to reject the > 12 ocsult is not

significant (but we do not "agoppt" Ho)

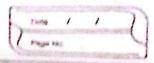


3 sxample: lest Tailed lest (ope-Tailed Test) Pain Pelicies study (lost - Tailed test) Just statistic, Z = -1.89 P-vale P(Z < -1.89) = 0.0294 Interpretation: If Ho west true, only 2.94% of sample at produce results this extreme as now extreme Id 9 = 0.05, then p=0.0294 < 0.05. So we exect the Conducte to that 5 t a = 0.01, tun p= 0.0794 > 0.01, so a Jailto sgelt Ho (not enough evidence) 4) Example: Two-tuiled test Example large sample test Test statistic . Z = 7:490 Right - Tail Aza: 0.0064 since it is a two-tailed test, we double the tail awa-P = 2x 0.0064 = 0.0128 Interpolation: It to wer true, only J. 28%. Of samples would give results this oxtrene Surrory: The P-value Approach to Hypothesis Testing The produce approach provides a systematic may to detormine whater to reject the null Hypothesis (Ho) Instead of compling rejection regions used extical values, no directly compare to puale to the significance bool (a) Stex for Hypothesis testing vising the prolo Approach I set the Hypotheses (Ho and Ha) I Lentify the test statistic and its distribution.

3 compute the test statistic using sample data



,	4)	Find the prople from the fest statistic.
	5	compare z-value to a and hate, a decision:
		i'é pe a , reject the (significantly exult)
		it p= a, do not seject the (not significant)
l.o.	G	Interpet the conclusion in context
	341	and the second s
11.11		Total the Nall Hypotheris
		The mull Hypothesis states that the population mean (it is equi
		tu be a hypothesized value. A significance test assessed
		Law likely it is to obtain a sample near that different
		from this hypothesized value.
		Example 1: Subliminal Message Expresiment
		Hypothesis: Door sublining messaging influence piduse choice
	5 in 5	Sund, a subjects, each making zoo choices.
		Null Hypothesis (Ho) = 21 = 50 (10 possue).
	, N	Sample Mean (M).57
		The probability of obtaining a mean of 57 or greater is
		The probability of obtaining a mean of 57 or greater is
		$\sigma = 5$
-		N=9, 10 Standard Error (SE) = 0/ VN = 5/Jg=1.60
ب		
		Using a Norval distribution calculator:
		One topied propability (M > 51): 0.274 > Hois not rejected
		(ret Statistically significant)
-		Two-tailed probability (M < 49 or M > 5]): 0:548
	-	
-	-	



Z Slow Approach Bedie moden calculate, prehabilities were completed using the z-gove formula z= M-2 Sur this example 2 - 51-50 = 0.60 The poolshillity remains 0.274, conditioning provious - culculation Surmony: Lange Sumple Tosts dos a Population Mean Large sample hypothesis test dos a population nean are based

on the Contral lived Reosem (LLT), which states that the surply distribution of the sumple mean x is appropriately would when the sample size n =30, with rean 21 = 21 and slandord deviation of In

Just gatistic down lation:

It o is unknown (typically the case), replace it sample standard doviations Z = 71-210 S/V n

Since the comple is large, I follows the sturction royal distriction

Example Testing a New Pain Policies Objective: Test is a new pain solverex recters pain faster than a standard one, which has a near solid time of 35 minuter. · Sample Data

n=50, = 3.1,5=1.5 Hypothes;s: Ho:21=3.5, Ha=24<3.5



	Ceto / / Pegu No.
1	compute Test Statistic = 3.7-35 = -1.886
-	$\xi = 3.7 - 35 = -1.886$
	1.5/150
	Pocision: Sinco Z = - Z.886 falls in the sejection geon
1	Pocision: Sinco Z = - 7.886 falls in the sejection spean
	seject to
	conclusion: Reven Pain Proclaies is significantly tester at seducing pain than the standard are at at the 5% last.
	reducing pain than the standard one at at the 5% last.
	Summary of small sample Tests for a Population han
	Key Concepts
•	unidity
•	For small samples, me assure the population follows a
~	The distributions to encuse validity
	It population standard deviation cos is known, the
7 - 1 - 17 - 17 - 17	Jest statistic follows the standard round distribution
~	Cz-distribution).
	If a is unknown, the test statistic follow students
1	t-distribution with (n-1) degre as of seadom.