Table for Context and Construction of the Null and Alternative Hypotheses for the Testing of a Mean

Note₁: We will use H_0 for the Null Hypothesis and H_1 for the Alternative Hypothesis. Some textbooks use H_a for the Alternative Hypothesis.

Note₂: I am using 100 as an arbitrary value for μ_0 , please replace this with the correct value.

$H_0: \mu = 100$ Strong evidence $H_0: \mu = 100$ $H_0: \mu = 100$ **Reject Null Hypothesis** $H_1: \mu \neq 100$ $H_1: \mu > 100$ $H_1: \mu < 100$ Supports the claim Claim: $\mu \neq 100$ Claim: $\mu > 100$ Claim: $\mu < 100$ Weak evidence not equal Do not reject Null Hypothesis less than greater than differs Does not support the claim $H_0: \mu = 100$ Strong evidence $H_1: \mu \neq 100$ $H_0: \mu = 100$ $H_0: \mu = 100$ **Reject Null Hypothesis** $H_1: \mu < 100$ $H_1: \mu > 100$ Claim: $\mu = 100$ Refutes the claim $\text{Claim}: \mu > 100$ Claim: $\mu < 100$ equal Weak evidence at least at most Do not reject Null Hypothesis greater than or equal to less than or equal to same as Does not refute the claim does not differ **Right-tailed** Test Left-tailed Test Two-tailed Test

For textbooks which always use equality statements for the Null Hypothesis

Continued on Page 2

For textbooks which always use the complement of the Alternative Hypothesis for the Null Hypothesis

$H_0: \mu \ge 100$ $H_1: \mu < 100$ Claim: $\mu < 100$	$H_0: \mu = 100$ $H_1: \mu \neq 100$ $Claim: \mu \neq 100$	$H_0: \mu \le 100$ $H_1: \mu > 100$ Claim: $\mu > 100$	Strong evidence Reject Null Hypothesis Supports the claim
less than	not equal differs	greater than	Weak evidence Do not reject Null Hypothesis Does not support the claim
$H_0: \mu \ge 100 \\ H_1: \mu < 100 \\ Claim: \mu \ge 100$	$H_0: \mu = 100$ $H_1: \mu \neq 100$ Claim: $\mu = 100$	$H_0: \mu \le 100 \\ H_1: \mu > 100 \\ Claim: \mu \le 100$	Strong evidence Reject Null Hypothesis Refutes the claim
at least greater than or equal to	equal same as does not differ	at most less than or equal to	Weak evidence Do not reject Null Hypothesis Does not refute the claim
Left-tailed Test	Two-tailed Test	Right-tailed Test	