



① Define Hypothesis

- Null, H_0 ; $\mu = \mu_0$ / $\mu \leq \mu_0$ / $\mu \geq \mu_0$
- Alternative H_1 ; $\mu \neq \mu_0$ / $\mu > \mu_0$ / $\mu < \mu_0$

level of significance

Prob of Type I error when null hypothesis is true as an equality

② level of significance = α

- Prob of rejecting True null Hypothesis = α : Type I Error
- Prob of accepting False null Hypothesis = β : Type II Error

- Take care according to one-tailed or two-tailed test

- Take 5% level of significance if not given

③ Test Statistics

$$z = \frac{\bar{x} - \mu_0}{\frac{\sigma}{\sqrt{n}}} \text{ (FPC)}, \quad t = \frac{\bar{x} - \mu_0}{\frac{s}{\sqrt{n}}} \text{ (FPC)}$$

σ known

σ unknown

FPC if N/ pop given

④ calculate p-value using test statistic

if H_1 : $\mu > \mu_0$ $t \geq t_{\alpha}(v)$
 : $\mu < \mu_0$ $t \leq -t_{\alpha}(v)$
 : $\mu \neq \mu_0$ $t \leq -t_{\alpha/2, v}$ or $t \geq t_{\alpha/2, v}$

TABLE 9.2 SUMMARY OF HYPOTHESIS TESTS ABOUT A POPULATION MEAN: σ KNOWN CASE

	Lower Tail Test	Upper Tail Test	Two-Tailed Test
Hypotheses	$H_0: \mu \geq \mu_0$ $H_a: \mu < \mu_0$	$H_0: \mu \leq \mu_0$ $H_a: \mu > \mu_0$	$H_0: \mu = \mu_0$ $H_a: \mu \neq \mu_0$
Test Statistic	$z = \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}}$	$z = \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}}$	$z = \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}}$
Rejection Rule: p-Value Approach	Reject H_0 if $p\text{-value} \leq \alpha$	Reject H_0 if $p\text{-value} \leq \alpha$	Reject H_0 if $p\text{-value} \leq \alpha$
Rejection Rule: Critical Value Approach	Reject H_0 if $z \leq -z_{\alpha}$	Reject H_0 if $z \geq z_{\alpha}$	Reject H_0 if $z \leq -z_{\alpha/2}$ or if $z \geq z_{\alpha/2}$

TABLE 9.3 SUMMARY OF HYPOTHESIS TESTS ABOUT A POPULATION MEAN: σ UNKNOWN CASE

	Lower Tail Test	Upper Tail Test	Two-Tailed Test
Hypotheses	$H_0: \mu \geq \mu_0$ $H_a: \mu < \mu_0$	$H_0: \mu \leq \mu_0$ $H_a: \mu > \mu_0$	$H_0: \mu = \mu_0$ $H_a: \mu \neq \mu_0$
Test Statistic	$t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$	$t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$	$t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$
Rejection Rule: p-Value Approach	Reject H_0 if $p\text{-value} \leq \alpha$	Reject H_0 if $p\text{-value} \leq \alpha$	Reject H_0 if $p\text{-value} \leq \alpha$
Rejection Rule: Critical Value Approach	Reject H_0 if $t \leq -t_{\alpha}$	Reject H_0 if $t \geq t_{\alpha}$	Reject H_0 if $t \leq -t_{\alpha/2}$ or if $t \geq t_{\alpha/2}$