Hypothesis Test about a population mean

If the population σ is known and the population has normal distribution or sample size $n \geq 30$.

Test Statistic (t.s.) = $\frac{\bar{x}-\mu_0}{\frac{\sigma}{\sqrt{n}}}$

Left-tailed test $H_0: \mu \geq \mu_0$ $H_a: \mu < \mu_0$	P-value =P(Z<t.s.)	Reject H_0 , if p-value ≤ α or t.s.<-Z_α; otherwise fail to reject H_0
Right-tailed test $H_0: \mu \leq \mu_0$ $H_a: \mu > \mu_0$	P-value =P(Z>t.s.)	Reject H_0 , if p-value ≤ α or t.s.>Z_α; otherwise fail to reject H_0
Two-tailed test $H_0: \mu = \mu_0$ $H_a: \mu \neq \mu_0$	P-value =2P(Z>t.s.), if t.s.>0 P-value =2P(Z<t.s.), if t.s.<0	Reject H_0 , if p-value ≤ α or t.s.>$Z_{\alpha/2}$ or t.s.<-$Z_{\alpha/2}$; otherwise fail to reject H_0

If the population σ is unknown and the sample has bell-shaped distribution

Test Statistic (t.s.) = $\frac{\bar{x}-\mu_0}{\frac{s}{\sqrt{n}}}$

Left-tailed test $H_0: \mu \geq \mu_0$ $H_a: \mu < \mu_0$	P-value =P(t<t.s.)	Reject H_0 , if p-value ≤ α or t.s.<-t_α; otherwise fail to reject H_0
Right-tailed test $H_0: \mu \leq \mu_0$ $H_a: \mu > \mu_0$	P-value =P(t>t.s.)	Reject H_0 , if p-value ≤ α or t.s.>t_α; otherwise fail to reject H_0
Two-tailed test $H_0: \mu = \mu_0$ $H_a: \mu \neq \mu_0$	P-value =2P(t>t.s.), if t.s.>0 P-value =2P(Z<t.s.), if t.s.<0	Reject H_0 , if p-value ≤ α or t.s.>$t_{\alpha/2}$ or t.s.<-$t_{\alpha/2}$; otherwise fail to reject H_0