Table 9.1 Hypothesis Tests Concerning the Mean μ of a Normal Population with Known Variance σ^2.

$X_1, \ldots, X_n$ are sample data, and $\overline{X} = \frac{\sum_{i=1}^n X_i}{n}$

H_0	H_1	Test statistic TS	Significance-level-α test	p Value if TS $= \nu$
$\mu = \mu_0$	$\mu \neq \mu_0$	$\sqrt{n}\,\frac{\overline{X}-\mu_0}{\sigma}$	Reject H_0 if $\lvert TS\rvert \geq z_{\alpha/2}$ Do not reject H_0 otherwise	$2P\{Z \geq \lvert\nu\rvert\}$
$\mu \leq \mu_0$	$\mu > \mu_0$	$\sqrt{n}\,\frac{\overline{X}-\mu_0}{\sigma}$	Reject H_0 if $TS \geq z_\alpha$ Do not reject H_0 otherwise	$P\{Z \geq \nu\}$
$\mu \geq \mu_0$	$\mu < \mu_0$	$\sqrt{n}\,\frac{\overline{X}-\mu_0}{\sigma}$	Reject H_0 if $TS \leq -z_\alpha$ Do not reject H_0 otherwise	$P\{Z \leq \nu\}$

Table 9.2 Hypothesis Tests Concerning the Mean μ of a Normal Population with Unknown Variance σ^2.

$X_1, \ldots, X_n$ are sample data; $\overline{X} = \frac{\sum_{i=1}^n X_i}{n}$ $S^2 = \frac{\sum_{i=1}^n (X_i-\overline{X})^2}{n-1}$

H_0	H_1	Test statistic TS	Significance-level-α test	p Value if TS $= \nu$
$\mu = \mu_0$	$\mu \neq \mu_0$	$\sqrt{n}\,\frac{\overline{X}-\mu_0}{S}$	Reject H_0 if $\lvert TS\rvert \geq t_{n-1,\alpha/2}$ Do not reject otherwise	$2P\{T_{n-1} \geq \lvert\nu\rvert\}$
$\mu \leq \mu_0$	$\mu > \mu_0$	$\sqrt{n}\,\frac{\overline{X}-\mu_0}{S}$	Reject H_0 if $TS \geq t_{n-1,\alpha}$ Do not reject otherwise	$P\{T_{n-1} \geq \nu\}$
$\mu \geq \mu_0$	$\mu < \mu_0$	$\sqrt{n}\,\frac{\overline{X}-\mu_0}{S}$	Reject H_0 if $TS \leq -t_{n-1,\alpha}$ Do not reject H_0 otherwise	$P\{T_{n-1} \leq \nu\}$

T_{n-1} is a t random variable with $n-1$ degrees of freedom, and $t_{n-1,\alpha}$ and $t_{n-1,\alpha/2}$ are such that $P\{T_{n-1} \geq t_{n-1,\alpha}\} = \alpha$ and $P\{T_{n-1} \geq t_{n-1,\alpha/2}\} = \alpha/2$.