

Confidence Interval Flowchart

Parameter	Variance known?	Variances same?	Size?	Point estimator	Standard error	Distribution type	D.O.F.	Confidence interval
Mean, $\mu$	Known	—	Irrelevant	$\bar{x}$	$\sigma_x/\sqrt{n}$	z-distrib.	—	$\bar{x} \pm z_{\alpha/2}\sigma_{\bar{x}}$
<b>Mean, <math>\mu</math></b>	Unknown	—	Small	$\bar{x}$	$s_x/\sqrt{n}$	t-distribution	$n-1$	$\bar{x} \pm t_{\alpha/2}s_{\bar{x}}$
<b>Mean, <math>\mu</math></b>	Unknown	—	Large	$\bar{x}$	$s_x/\sqrt{n}$	Approx. z	—	$\bar{x} \pm z_{\alpha/2}s_{\bar{x}}$
Proportion, $p$	Known	—	Irrelevant	Crazy	Crazy	Crazy	Crazy	Crazy
Proportion, $p$	Unknown	—	Small	$\hat{p}$	$\sqrt{\hat{p}(1-\hat{p})/n}$	???	???	???
<b>Proportion, <math>p</math></b>	Unknown	—	Large	$\hat{p}$	$\sqrt{\hat{p}(1-\hat{p})/n}$	approx. z	—	$\hat{p} \pm z_{\alpha/2}s_{\hat{p}}$
Diff. in means, $\Delta\mu$	Known	—	Irrelevant	$\Delta\bar{x}$	$\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$	z-distrib.	—	$\Delta\bar{x} \pm z_{\alpha/2}\sigma_{\Delta\bar{x}}$
Diff. in means, $\Delta\mu$	Unknown	Yes	Small	$\Delta\bar{x}$	$\sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2}} \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$	t-distrib.	$n_1+n_2-2$	$\Delta\bar{x} \pm t_{\alpha/2}s_{\Delta\bar{x}}$
Diff. in means, $\Delta\mu$	Unknown	Yes	Large	$\Delta\bar{x}$	$\sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2}} \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$	approx. z	—	$\Delta\bar{x} \pm z_{\alpha/2}s_{\Delta\bar{x}}$
<b>Diff. in means, <math>\Delta\mu</math></b>	Unknown	No	Small	$\Delta\bar{x}$	$\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$	t-distrib.	$n_1+n_2-2$ (approx.)	$\Delta\bar{x} \pm t_{\alpha/2}s_{\Delta\bar{x}}$
<b>Diff. in means, <math>\Delta\mu</math></b>	Unknown	No	Large	$\Delta\bar{x}$	$\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$	approx. z	—	$\Delta\bar{x} \pm z_{\alpha/2}s_{\Delta\bar{x}}$
Diff. in proportions, $\Delta p$	Known	—	Irrelevant	Crazy	Crazy	Crazy	Crazy	Crazy
Diff. in proportions, $\Delta p$	Unknown	Yes	Irrelevant	Crazy	Crazy	Crazy	Crazy	Crazy
Diff. in proportions, $\Delta p$	Unknown	No	Small	$\Delta\hat{p}$	$\sqrt{\frac{p_1(1-p_1)}{n_1} + \frac{p_2(1-p_2)}{n_2}}$	???	???	???
<b>Diff. in proportions, <math>\Delta p</math></b>	Unknown	No	Large	$\Delta\hat{p}$	$\sqrt{\frac{p_1(1-p_1)}{n_1} + \frac{p_2(1-p_2)}{n_2}}$	approx. z	—	$\Delta\hat{p} \pm z_{\alpha/2}s_{\Delta\hat{p}}$