	Parameter	Sample	Type of Data	Examples	Statistical Question	Analysis	In Minitab	Most accurate when...
1	one population mean μ (Unit C6)	sample mean $\bar{x}$	numerical	! symptom scores, e.g. 0, 1,... 16 ! cholesterol levels ! weight ! GPAs	What is μ?	1-sample t-interval $\bar{x} \pm t\left(\frac{s}{\sqrt{n}}\right)$	1. Select Stat. 2. Select Basic statistics. 3. Select 1-sample t.	! data are not too skewed **or** ! have a large sample ($n \geq 30$)
2	one population mean μ (Unit C6)	sample mean $\bar{x}$	numerical	! Likert scale e.g. 0, 1,... 4 ! blood pressure ! height ! number of white blood cells ! nose length	Is $\mu = \mu_0$?	H_0: $\mu = \mu_0$ H_A: $\mu > \mu_0$, $\mu < \mu_0$, or $\mu \neq \mu_0$ The 1-sample t-test: $t \quad \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$ gives the P-value.	1. Select Stat. 2. Select Basic statistics. 3. Select 1-sample t.	! data are not too skewed **or** ! have a large sample ($n \geq 30$)
3	one population proportion p (Ch. 10)	sample proportion $\hat{p}$	categorical (binary)	! class in school ! gender (m, f) ! age (y, m, o) ! smoking status (y, n)	What is p?	1-proportion Z-interval $\hat{p} \pm Z\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$	1. Select Stat. 2. Select Basic statistics. 3. Select 1 Proportion.	! have at least 5 in each category
4	one population proportion p (Ch. 11)	sample proportion $\hat{p}$	categorical (binary)	! disease status (y, n) ! opinion about gun control (support, reject) ! degree of burn (first, second, third) ! drinking status (binger, moderate, abstainer)	Is $p = p_0$?	H_0: $p = p_0$ H_A: $p > p_0$, $p < p_0$, or $p \neq p_0$ The 1-proportion Z-test: $Z \quad \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$ gives the P-value.	1. Select Stat. 2. Select Basic statistics. 3. Select 1 Proportion.	! have at least 5 in each category

	Parameter	Sample	Type of Data	Examples	Statistical Question	Analysis	In Minitab	Most accurate when...
5	difference in two population means $\mu_1 - \mu_2$ (Unit C8)	difference in two sample means $\bar{x}_1 - \bar{x}_2$	numerical	! How different are the mean GPAs of males and females? ! How many fewer colds do vitamin C takers get, on average, than non vitamin C takers?	What is $\mu_1 - \mu_2$?	Two-sample t-interval $(\bar{x}_1 - \bar{x}_2) \pm t \times s.e.(\bar{x}_1 - \bar{x}_2)$	1. Select Stat. 2. Select Basic statistics. 3. Select 2-sample t.	! data in each sample are about normal ! samples not too different in size
6	difference in two population means $\mu_1 - \mu_2$ (Unit C8)	difference in two sample means $\bar{x}_1 - \bar{x}_2$	numerical	! Do the mean pulse rates of exercisers and non-exercisers differ? ! Is the mean EDS score for dropouts greater than the mean EDS score for graduates?	Is $\mu_1 = \mu_2$?	H_0: $\mu_1 = \mu_2$ (or $\mu_1 - \mu_2 = 0$) H_A:$\mu_1 > \mu_2$, $\mu_1 < \mu_2$, or $\mu_1 \neq \mu_2$ The 2-sample t-test: $t = \frac{(\bar{x}_1 - \bar{x}_2) - 0}{s.e.(\bar{x}_1 - \bar{x}_2)}$ gives the P-value.	1. Select Stat. 2. Select Basic statistics. 3. Select 2-sample t.	! data in each sample are about normal ! samples not too different in size
7	mean of paired difference μ_D (Unit C9)	sample mean of differences $\bar{d}$	numerical	! What is the difference in pulse rates, on average, before and after exercise?	What is μ_D?	Paired t-interval $\bar{d} \pm t\left(\frac{s_d}{\sqrt{n}}\right)$	1. Select Stat. 2. Select Basic statistics. 3. Select Paired t.	! differences are not too skewed **or** ! have a large number of pairs ($n \geq 30$)
8	mean of paired difference μ_D (Unit C9)	sample mean $\bar{d}$	numerical	! IQs of pairs of twins ! difference in paired cholesterol levels of a old, smoking exerciser and an old, smoking non-exerciser nonsmoker	Is $\mu_D = 0$?	H_0: $\mu_D = 0$ H_A:$\mu_D > 0$, $\mu_D < 0$, or $\mu_D \neq 0$ The paired t-test: $t = \frac{\bar{d} - 0}{s_d/\sqrt{n}}$ gives the P-value.	1. Select Stat. 2. Select Basic statistics. 3. Select Paired t.	! differences are not too skewed **or** ! have a large number of pairs ($n \geq 30$)

	Parameter	Sample	Type of Data	Examples	Statistical Question	Analysis	In Minitab	Most accurate when...
9	difference in two population proportions $p_1 - p_2$ (No RAT)	difference in two sample proportions $\hat{p}_1 - \hat{p}_2$	categorical (binary)	! How different are the percentage of male and female smokers? ! How different are the percentage of upper- and lower-class binger drinkers?	What is $p_1 - p_2$?	2-proportions Z-interval $(\hat{p}_1 - \hat{p}_2) \pm Z \times s.e.(\hat{p}_1 - \hat{p}_2)$	1. Select Stat. 2. Select Basic statistics. 3. Select 2 proportions.	! have at least 5 in each category
10	difference in two population proportions $p_1 - p_2$ (No RAT)	difference in two sample proportions $\hat{p}_1 - \hat{p}_2$	categorical (binary)	! How different are the percentage of male and female smokers? ! How different are the percentage of upper- and lower-class binger drinkers?	Does $p_1 = p_2$?	H_0: $p_1 = p_2$ (or $p_1 - p_2 = 0$) H_A: $p_1 > p_2$, $p_1 < p_2$, or $p_1 \neq p_2$ 2-proportions Z-test $Z = \frac{(\hat{p}_1 - \hat{p}_2) - 0}{s.e.(\hat{p}_1 - \hat{p}_2)}$ gives the P-value.	1. Select Stat. 2. Select Basic statistics. 3. Select 2 proportions.	! have at least 5 in each category
11	relationship between two categorical variables OR difference in two or more population proportions (Ch. 6)	the observed counts in a two-way table	categorical (binary)	! Is there a relationship between smoking and lung cancer? ! Do the proportion of students in each class who smoke differ?	Is there a relationship between the categorical variables?	H_0: There is no relationship. H_A: There is a relationship. The chi-square statistic, which is the sum of $\frac{(observed - expected)^2}{expected}$ over the cells in the table, gives the P-value.	1. Select Stat. 2. Select Tables. 3. Select Chi square Test.	! the expected count in each cell of the table is at least 5