

Fill in the red bubbles below:

name: _____

Situation 1. A population has a Normally distributed variable x . From this population we draw a Simple Random Sample of size . The mean, μ , of the population is unknown. The standard deviation of the population, σ , is known. The mean of the sample, \bar{x} , is computed. The population variable x has the distribution $N(\mu, \sigma)$ and the sample mean \bar{x} has the distribution . Here is the picture:

Population

x distribution $\rightarrow N(\mu, \sigma)$
 $\mu = ?$
 σ is known

Simple Random Sample

\bar{x} distribution \rightarrow
mean = \bar{x}
size =

Confidence Intervals

We can estimate μ with

$\mu =$

Where is determined by the confidence level C . The table below gives for some common values of C :

C	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Hypothesis Testing.

The Null Hypothesis:

$$H_0: \mu = \mu_0$$

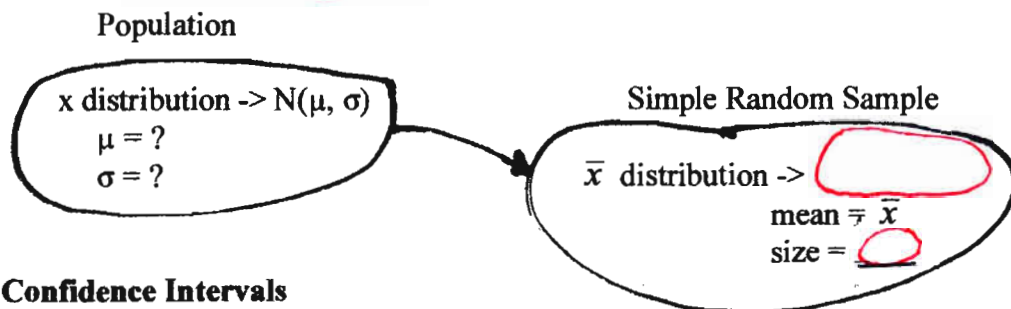
The Alternative Hypothesis:

$$H_a: \mu > \mu_0$$

First compute the statistic using the formula:

Then for significance level determine . Then if we reject the
and say that we have for the

Situation 2. A population has a Normally distributed variable x . From this population we draw a Simple Random Sample of size n . The mean, μ , of the population is unknown. The standard deviation of the population, σ , is also unknown. From the sample we compute both the mean \bar{x} and the standard deviation s . The population variable x has the distribution $N(\mu, \sigma)$ and the sample mean \bar{x} has the distribution t_{n-1} with mean μ and $n-1$ degrees of freedom. Here is the picture:



Confidence Intervals

We can estimate μ with

$$\mu =$$

Where $t_{\alpha/2, n-1}$ is determined by the confidence level C and the degrees of freedom of the t distribution ($n-1$). The table below is similar to the table for the z procedures:

C	90%	95%	99%
$t_{\alpha/2, n-1}$			

Hypothesis Testing.

The Null Hypothesis:

$$H_0: \mu = \mu_0$$

The Alternative Hypothesis:

$$H_a: \mu > \mu_0$$

First compute the test statistic using the formula:

Then for significance level α determine $t_{\alpha, n-1}$. Then if $t_{\text{stat}} > t_{\alpha, n-1}$ we reject the null hypothesis and say that we have evidence for the alternative hypothesis.

Situation 3. A proportion p of a population has some particular outcome of interest. From this population we draw a Simple Random Sample of size n . The proportion, p , of the population is unknown. The proportion of the sample with the outcome of interest is computed as $\hat{p} = \frac{\text{number of successes in the sample}}{n}$. For a sufficiently large sample size the \hat{p} statistic has the distribution

Here is the picture:

Population

Simple Random Sample

proportion p "have it"

$p = ?$

proportion \hat{p} "have it"

\hat{p} distribution \rightarrow

size =

Confidence Intervals

We can estimate p with

$p =$

Where n is determined by the confidence level C . The table below gives n for some common values of C :

C			

Hypothesis Testing.

The Null Hypothesis:

$H_0: p = p_0$

The Alternative Hypothesis:

$H_a: p > p_0$

First compute the z statistic using the formula:

Then for significance level α determine z_{α} . Then if $z > z_{\alpha}$ we reject the null hypothesis and say that we have evidence for the alternative hypothesis.