

# LABORATORY : Hypothesis Testing Simulator

1. In the *hypothesisTesting.xlsx*, write excel formulas to calculate values for hypothesis testing (cells highlighted in blue).

Formulas that you might want to consider using include NORMSINV, NORMSDIST, ABS, SQRT.

A	B	C	D	E	F
	<b>z-statistic for population mean (<math>\mu</math>)</b>				
	<b>One Sample (<math>n \geq 30</math>), Population variance (<math>\sigma</math>) is known</b>				
	<b>Input</b>				
	Hypothesized $\mu$		H0		0
	Sample Mean $\bar{x}$				
	Std Dev ( $\sigma$ or $s$ )				
	Sample Size $n$				
	Significance Level ( $\alpha$ )				
	<b>Results</b>				
	Test Statistic <b>z stat</b>				
	Critical <b>z left-tail</b>				
	Critical <b>z right-tail</b>				
	p-value <b>left-tail</b>				
	p-value <b>right-tail</b>				
	Critical <b>z two-tails</b>				
	p-value <b>two-tails</b>				
	<b>Conclusion</b>				

Excel Formulas

NORMSINV

NORMSDIST

ABS

SQRT

When parameters are entered to the input area (yellow cells). Your simulator will then show values and conclusion in blue cells, automatically.

Example :

A factory manufactures cars with a warranty of 5 years on the engine and transmission. An engineer believes that the engine or transmission will malfunction in less than 5 years. He tests a sample of 40 cars and finds the average time to be 4.8 years with a standard deviation of 0.50. At 2% significant level, is there enough evidence to support the idea that the warranty should be revised ?

A	B	C	D	E	F
<b>One Sample (n &gt;= 30), Population variance (<math>\sigma</math>) is known</b>					
<b>Input</b>					
Hypothesized $\mu$	5	H0	>	5	
Sample Mean $\bar{x}$	4.8				
Std Dev ( $\sigma$ or $s$ )	0.5				
Sample Size $n$	40				
Significance Level ( $\alpha$ )	0.02				
<b>Results</b>					
Test Statistic <b>z stat</b>	-2.530				
Critical <b>z left-tail</b>	-2.054				
Critical <b>z right-tail</b>	2.054				
p-value <b>left-tail</b>	0.0057				
p-value <b>right-tail</b>	0.9943				
Critical <b>z two-tails</b>	2.326				
p-value <b>two-tails</b>	0.0114				
<b>Conclusion</b>					
left-tailed					
reject H0 at $\alpha = 0.02$					

- Test your simulator on various problems until you are certain that it works perfectly and you truly understand how to use z-statistic for hypothesis testing.

What to submit : the hypothesis testing simulator excel file