

## Stat Support Activity

### Inequality signs and Population Parameters

**Population Parameter Notes:** Recall the following population parameter symbols.

#### Common Parameters

$\mu$  : (“mu”) Population mean average

$\sigma$  : (“sigma”) Population standard deviation (typical distance from the population mean)

$\sigma^2$ : Population variance (population standard deviation squared)

$\pi$ : (“pi”) Population proportion (population percentage) (*Some people use “p” for population proportion.*)

$N$  : Population size or frequency (number of people or objects in the population)

$\rho$  : (“rho”) Population correlation coefficient (measures quantitative relationships between populations.  
Note this is not a “p”. It is the Greek letter “rho”.)

$\beta_1$  : Population slope (The slope of the population regression line. Used when studying quantitative relationships between populations.)

$\beta_0$  : Population Y-intercept (The Y-intercept of the population regression line. Used when studying quantitative relationships between populations.)

**Inequality Symbol Notes:** We need to be able to translate words into symbolic notation. Let’s review the following inequality symbols.

“=” : Equal to or same as.

“≠” : Not equal to or different than.

“>” : Greater than, more than, or increased by. Notice the symbol looks like an arrow pointing to the right.

“<” : Less than, smaller than, or decreased by. Notice the symbol looks like an arrow pointing to the left.

“≥” : Greater than or equal to, more than or equal to, or “at least”. Notice the symbol looks like an arrow pointing to the right, but also has the equal to line underneath.

“≤” : Less than or equal to, smaller than or equal to, or “at most”. Notice the symbol looks like an arrow pointing to the left, but also has the equal to line underneath.

Let’s see if we can put population parameters and inequality symbols together. This is key to being able to translate claims about population parameters. Here are a couple of key things to remember.

- For one population, always put the parameter symbol on the left and the number on the right.
- For two populations, always put the parameter symbol for population 1 on the left and the parameter symbol for population 2 on the right.

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**Problems:**

(#1-6) Directions: Fill out the following table. For each inequality symbol, write the name of the symbol, find the opposite of the symbol, then write the name of the opposite.

	Inequality Symbol	Name of the Symbol	Opposite of Symbol	Name of Opposite Symbol
1.	>			
2.	=			
3.	≤			
4.	≠			
5.	<			
6.	≥			

(#7-12) Directions: Translate the following population claims into symbolic notation using the parameter symbols and inequality notation. Statements with ( $=, \geq, \leq$ ) are called the “Null Hypothesis” ( $H_0$ ). Statements with ( $\neq, >, <$ ) are called the “Alternative Hypothesis” ( $H_A$ ). Is the population claim in symbolic notation that you wrote a Null Hypothesis ( $H_0$ ) or an Alternative Hypothesis ( $H_A$ )?

7. “The population mean average weight is more than 100 pounds.”
8. “The population standard deviation for children is less than the population standard deviation for adults.”
9. “At least 11% of the population is now infected with this disease.”
10. “The population variance is probably 115 or lower.”
11. “The population mean average final exam score at our college is about the same as another college nearby.”
12. “The population percentage of women infected with this disease is significantly different than the population percentage of men infected.”