Goal of Statistics:

To answer a question about a big group by collecting data and analyzing data from a smaller part of the group.

Ex: A bag contains many numbers in it. You put your hand inside the bag and draw 4 numbers out. The numbers you obtain are 5, 5, 17, and -2. What is the average of all the numbers in the bag?



Ex: You want to know the average age of all Rio Hondo students who are registered for a class at Rio Hondo at noon on 1/27/2014. Since you don't have the time to talk to all 20,000 such people, you decide to ask the first 10 people you see at Rio Café at noon for their ages. The ages you obtained were 17, 18, 18, 18, 19, 21, 24, 26, 26, and 39 (average of these ages is 22.6). What is the average age of all Rio Hondo students who are registered for a class at Rio Hondo at noon on 1/27/2014?



All Rio Hondo Students who are registered for a class at Rio Hondo at noon on 1/27/2014



Ages of all Rio Hondo Students who are registered for a class at Rio Hondo at noon on 1/27/2014

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The 10 Rio Hondo Students who are registered for a class at Rio Hondo at noon on 1/27/2014 that we collected data from

Ages of the 10 Rio Hondo Students who are registered for a class at Rio Hondo at noon on 1/27/2014 that we collected data from Want to know the average age of all Rio Hondo Students who are registered for a class at Rio Hondo at noon on 1/27/2014 (unknown)

Data: 17, 18, 18, 18, 19, 21, 24, 26, 26, 39

Data Average: 22.6

Definitions:

- The <u>population</u> is the large group of objects (usually people) that we are trying to answer a question about.
- 2) The <u>population data</u> or <u>census</u> is the data that is obtained from the entire population (usually unknown).
- 3) A <u>population parameter</u> is a number that can be calculated from the population data (unknown).
- Note: The population parameter is the number we are trying hard to figure out.

Definitions:

- 4) A <u>sample</u> is the smaller group of objects (usually people) that we collect data from.
- 5) The <u>sample data</u> is the data that is obtained from the sample (known).
- 6) A <u>sample statistic</u> is a number that can be calculated from the sample data (known).

Note: The sample statistic is used to estimate the population parameter.

Population Parameters and Sample Statistics

Population Parameters



p	μ	σ	$oldsymbol{\sigma}^2$
Population Proportion (percentage)	Population Mean (average)	Population Standard Deviation	Population Variance

Sample Statistics



\hat{p}	\overline{X}	S	s^2
Sample Proportion (percentage)	Sample Mean (average)	Sample Standard Deviation	Sample Variance

Population

Population Data (unknown)

Population Parameters (unknown)





 $p \mu \sigma \sigma^2$

Sample



Sample Data (known)



Sample Statistics (known)

 \hat{p} \overline{x} S

 S^2

Examples of identifying populations, samples, population data, sample data, population parameters and sample statistics ...

- Ex 1: In order to figure out the percentage of people who live in Las Vegas but don't gamble, Greg went door to door and asked everyone who lives on Mountain Vista Street if they gamble. Of the 72 people Greg asked, 54 said that they don't gamble.
- a) What is the population?
- answer a) All people who live in Las Vegas
- b) What is the population data?

answer b) The collection of yes's and no's from each person who lives in Las Vegas. A yes means they don't gamble and a no means they do gamble.

- Ex 1: In order to figure out the percentage of people who live in Las Vegas but don't gamble, Greg went door to door and asked everyone who lives on Mountain Vista Street if they gamble. Of the 72 people Greg asked, 54 said that they don't gamble.
- c) What is the sample?
- answer c) The 72 people who live on Mountain Vista Street that Greg talked to.
- d) What is the sample data?
- answer d) The 54 yes's and 18 no's that Greg obtained as answers from the 72 people who live on Mountain Vista Street. (A yes means they don't gamble and a no means they do gamble.)

- Ex 1: In order to figure out the percentage of people who live in Las Vegas but don't gamble, Greg went door to door and asked everyone who lives on Mountain Vista Street if they gamble. Of the 72 people Greg asked, 54 said that they don't gamble.
- e) What is the population parameter (symbol and in words)?

answer e) p = The percentage of all people who live in Las Vegas who don't gamble.

f) What is the sample statistic (symbol, in words, and value)? answer f) \hat{p} = The percentage of the 72 people who live on Mountain Vista Street who don't gamble = 54/72 = 75%. (A yes means they don't gamble and a no means they do gamble.) Ex 1: In order to figure out the percentage of people who live in Las Vegas but don't gamble, Greg went door to door and asked everyone who lives on Mountain Vista Street if they gamble. Of the 72 people Greg asked, 54 said that they don't gamble.

g) What is your best guess for the percentage of people who live in Las Vegas but don't gamble?

answer g) $p \approx \hat{p} = 75\%$

Ex 2: In order to figure out the average age of all current Rio Hondo Students, Greg asked the 40 students in his stats class for their ages. Their ages

are...

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21	20	22	23	22	20	24	23	23	20
21	21	21	20	26	21	22	28	19	26
26	20	22	20	20	21	21	31	25	22
22	22	22	51	35	22	23	20	22	20

average = 23.25

a) What is the population?

answer a) All current Rio Hondo students

b) What is the population data?answer b) The ages of each of the 20,000 or so current RioHondo students

Ex 2: In order to figure out the average age of all current Rio Hondo Students, Greg asked the 40 students in his stats class for their ages. Their ages

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21	20	22	23	22	20	24	23	23	20
21	21	21	20	26	21	22	28	19	26
26	20	22	20	20	21	21	31	25	22
22	22	22	51	35	22	23	20	22	20

average = 23.25

c) What is the sample?

answer c) The 40 Rio Hondo students in Greg's stats class

d) What is the sample data?

answer d) The ages of the 40 Rio Hondo students in Greg's stats class that are listed above

Ex 2: In order to figure out the average age of all
current Rio Hondo Students, Greg asked the 40
students in his stats class for their ages. Their ages

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21	20	22	23	22	20	24	23	23	20
21	21	21	20	26	21	22	28	19	26
26	20	22	20	20	21	21	31	25	22
22	22	22	51	35	22	23	20	22	20

average = 23.25

e) What is the population parameter (symbol and in words)?

answer e) μ = The average age of all current Rio Hondo students

f) What is the sample statistic (symbol, in words, and value)? answer f) \overline{X} = The average age of the 40 Rio Hondo students in

Greg's stats class = 23.25 years old

Ex 2: In order to figure out the average age of all current Rio Hondo Students, Greg asked the 40 students in his stats class for their ages. Their ages

are...

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21	20	22	23	22	20	24	23	23	20	
21	21	21	20	26	21	22	28	19	26	
26	20	22	20	20	21	21	31	25	22	
22	22	22	51	35	22	23	20	22	20	

average = 23.25

g) What is your best guess for the average age of all current Rio Hondo students?

answer g) $\mu \approx \overline{x} = 23.25$ years old