









Population	A <i>population</i> is when the <u>entire group is surveyed</u>
Sample	A <i>sample</i> is when only <u>part of the group is surveyed</u>
Biased sample	A <i>biased sample</i> <u>does not</u> represent the whole population. A part of the population is <u>favorable</u> over others
Unbiased sample	An <i>unbiased sample</i> is when the sample <u>represents</u> the entire population, is selected at <u>random</u> and is <u>large</u> enough to provide accurate data.

1. For each question, identify the population and the sample.

a.  <sup>population</sup>  <sup>sample</sup>  
 The students in a school      The students in a math class

b.  <sup>sample</sup>  <sup>population</sup>  
 The grizzly bears with GPS collars in a park      The grizzly bears in a park

c.  <sup>sample</sup>  <sup>population</sup>  
 150 quarters      All quarters in circulation

d.  <sup>population</sup>  <sup>sample</sup>  
 All books in a library      10 fiction books in a library

2. Choose the best answer choice

You want to estimate the number of students in a high school who ride the school bus. Which sample is unbiased?

- (A) 4 students in the hallway → not enough students
- (B) all students in the marching band
- (C) 50 seniors at random → may have mostly drivers
- (D) 100 students at random during lunch



3. Place the word **BIASED** or **UNBIASED** under each example.

<p style="text-align: center;">★</p> <div style="border: 1px solid black; padding: 5px; background-color: #e0e0e0;"> <p>A survey conducted at an ice cream store asked customers whether they liked ice cream or not.</p> </div> <p style="text-align: center; font-size: 1.2em;">Biased</p>	<p style="text-align: center;">★</p> <div style="border: 1px solid black; padding: 5px; background-color: #e0e0e0;"> <p>A reporter asked every tenth person coming out of a theater how well they liked the movie.</p> </div> <p style="text-align: center; font-size: 1.2em;">Unbiased</p>	<p style="text-align: center;">★</p> <div style="border: 1px solid black; padding: 5px; background-color: #e0e0e0;"> <p>A survey asked the girls in 7th-grade what their favorite candy was.</p> </div> <p style="text-align: center; font-size: 1.2em;">Biased</p>
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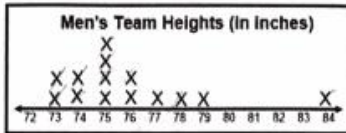
Name \_\_\_\_\_

Date \_\_\_\_\_

**Aim: Graphic Representations and Measures of Variation**

Do now:

Complete the table.



Least value	73
Greatest value	84
Range or spread of distribution	$84 - 73 = 11$
Outlier	84
Mean	$1064 \div 14 = 76$
Median	75
Mode	75

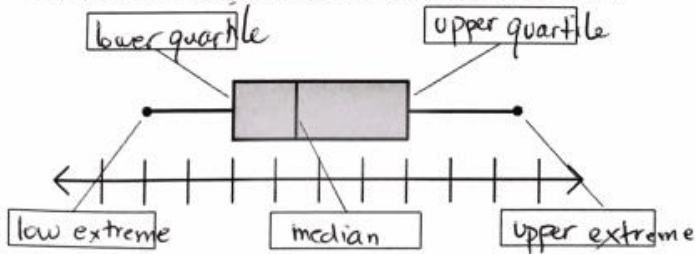
73, 73, 74, 74, 75, 75, 75, 75, 76, 76, 77, 78, 79, 84

**Range** A measure of <sup>spread</sup> ~~spread~~ variation that subtracts highest - lowest

**Shape of Graphs**

cluster	peak	symmetrical	skewed left	skewed right	outlier
a group of data points that crowd near each other	the value that has the most points	the same number of data points above and below a middle point	most of the data points are clustered near high values (tail on left)	most of the data points are clustered near lower values (tail on right)	a data point far away from the other data points

A box-and-whisker plot shows the variability of a data set.



Each whisker represents 25% of the data

The interquartile range Upper quartile - lower quartile  
(the middle 50% of data)

**Example 1 - Analyze**

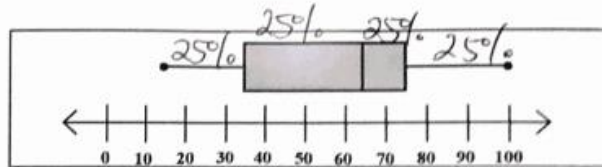
a. What is the median? 65

b. What is the least value? 15

c. What is the upper quartile? 75

d. What is the lower quartile? 35

e. What is the interquartile range?  $75 - 35 = 40$



f. What percent of the values are above 75?

g. What percent of the values are below 65?

h. What percent of the values are above 35?

75%

**Example 2 - Construct**

Construct a box and whisker for the following set of data:

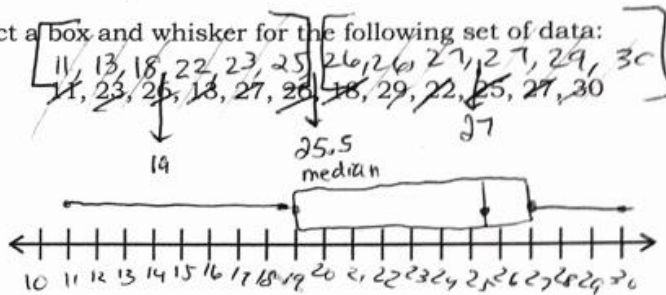
Lower Extreme: 11

Lower Quartile (Q1): 19

Median (Q2): 25.5

Upper Quartile (Q3): 27

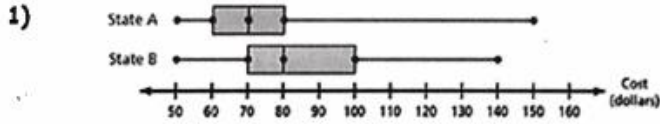
Upper Extreme: 30



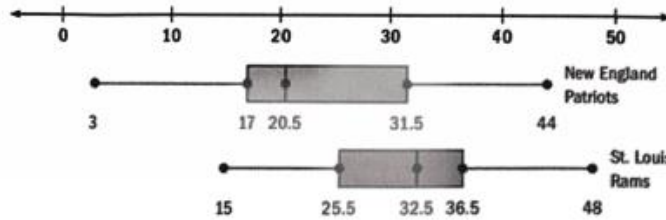
**REAL WORLD ANALYSIS**

**Speeding tickets in two states**

Use this space to write explanations



- 1)
- a) Compare the shapes of the distributions. *A is more widespread than B. The middle 50% of B is wider.*
  - b) Compare the measures of center and the least and greatest values. *A's median < B's median. A's upper extreme > B's upper extreme.*
  - c) Compare the measures of variation (the range and interquartile range). *A: range: 150-50=100. IQR 140-50=90.*
- 2) Football The box-and-whisker plots below represent the number of points scored in each game of the 2001-2002 season for the New England Patriots and the St. Louis Rams. What conclusions can you make about the data?



*the Rams generally scored more points than the Patriots. They also are more consistent because the range/spread is less.*