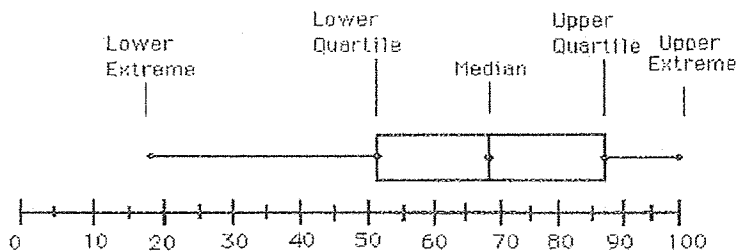


**DATA ANALYSIS (DAY 2) NOTES**



Interquartile Range (IQR) =  
Upper Quartile (Q3) -  
Lower Quartile (Q1)

A box-and-whisker plot can be useful for handling many data values. They allow people to explore data and to draw informal conclusions. It shows only certain statistics rather than all the data. *Five-number summary* is another name for the visual representations of the box-and-whisker plot. The five-number summary consists of the median, the quartiles, and the smallest and greatest values in the distribution. Immediate visuals of a box-and-whisker plot are the center, the spread, and the overall range of distribution.

**Steps to Constructing a Box-and-Whisker Plot**

Step 1	<ul style="list-style-type: none"> <li>Order the data from least to greatest</li> </ul>
Step 2	<ul style="list-style-type: none"> <li>Determine the smallest term and the greatest term.</li> <li>Determine the median of the entire set of data</li> </ul>
Step 3	<p>Your data is now divided into two groups</p> <ul style="list-style-type: none"> <li>Determine the median of the lower half (lower quartile).</li> <li>Determine the median of the upper half (upper quartile)</li> </ul>
Step 4	<p>You now have your "FIVE-NUMBER" Summary</p> <ul style="list-style-type: none"> <li>Determine a range for your number line and appropriate intervals</li> <li>Construct a number line with your range and intervals</li> <li>Plot each of your "FIVE-NUMBER" points.</li> <li>Draw a box connecting lower quartile with your median and your upper quartile with your median.</li> <li>Connect your whiskers from the smallest data point to the lower quartile.</li> <li>Connect your whisker from the greatest data point to the upper quartile.</li> </ul>

**How to construct a Box-and-Whisker Plot with a graphing calculator.**

Step 1	Input data
Step 2	Choose box-and-whisker plot
Step 3	Adjust your window
Step 4	Use the trace button to determine the "FIVE-NUMBER" summary

The range of each section of the box-and-whisker plot will vary in appearance even though each section represents the SAME number of data pieces.

## EXAMPLES ~ Organizing Data

1. Use the data:

You found the following prices (in dollars) of 20 different styles of bicycle helmets.

<del>52</del>	<del>67</del>	102	<del>65</del>	<del>68</del>	<del>89</del>
99	92	<del>80</del>	<del>89</del>	<del>59</del>	<del>79</del>
<del>79</del>	90	<del>75</del>	<del>78</del>	<del>63</del>	94
<del>79</del>	<del>64</del>				

a) Make a stem-and-leaf plot.

Stem	Leaf
5	2, 9
6	3, 4, 7*, 8
7	5, 8, 9, 9*, 9
8	0, 5, 9, 9*
9	0, 2, 4, 9
10	2

b) Identify the "FIVE-NUMBER" summary points.

Lowest term: \$52

Highest term: \$102

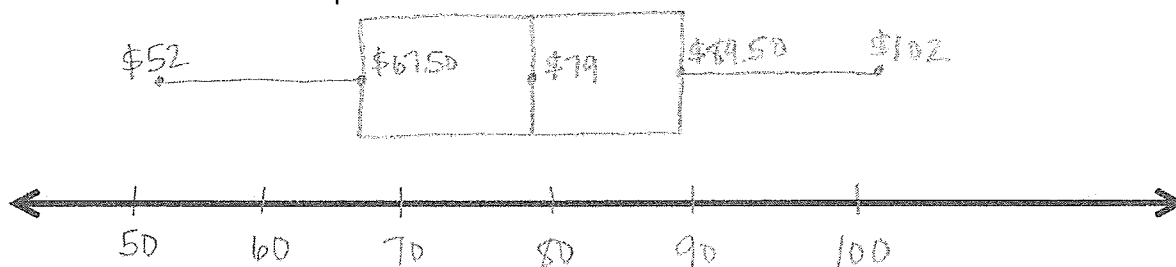
Median: \$79

Lower Quartile: \$67.50

Upper Quartile: \$89.50

c) Identify the interquartile range of the data.  $\$89.50 - \$67.50 = \$22.00$

d) Draw a box-and-whisker plot.

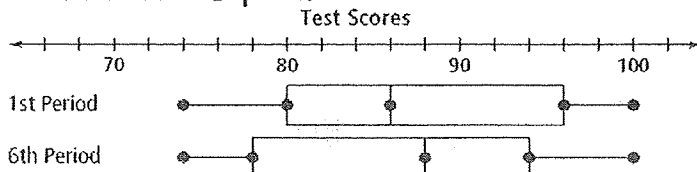


e) Describe the results

- The cheapest helmet = \$52
  - The most expensive helmet = \$102
  - 50% of the helmets range from \$67.50 to \$89.50.
  - 25% of the helmets range from \$89.50 to \$102
  - 25% of the cheaper helmets range from \$52 to \$67.50
- [Additional answers are possible]

EXAMPLES ~ Interpreting data.

2. Use the box-and-whisker plot below. What does it tell you about the test scores in each class? Explain.



• 50% of the scores ranged from an 80% to 96% for 1st period & 78% to 94% for 6th period.

• Both periods have a low score of 74% & a high score of 100%.

• The median score for 1st period was 86% & for 6th period was 89%.

[Additional answers are possible].

3. Make box-and-whisker plots to compare the data sets.

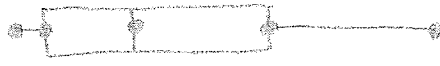
Test scores:

Andrew's: 79 80 87 87 99 94 77 86	Tommy's: 93 79 78 82 91 87 80 99
Identify the "FIVE-NUMBER" summary points.	Identify the "FIVE-NUMBER" summary points.
Lowest term: <u>77%</u>	Lowest term: <u>78%</u>
Highest term: <u>99%</u>	Highest term: <u>99%</u>
Median: <u>80.5%</u>	Median: <u>84.5%</u>
Lower Quartile: <u>79.5%</u>	Lower Quartile: <u>79.5%</u>
Upper Quartile: <u>90.5%</u>	Upper Quartile: <u>92%</u>

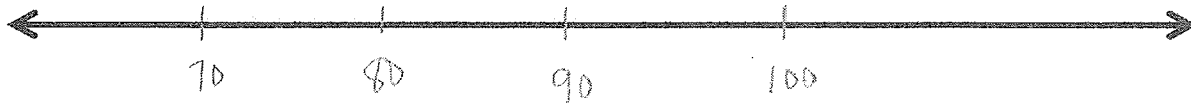
77 79 80 80.5 87 87 94 99

78 79 80 82 87 91 92 99

TOMMY'S TEST SCORES



ANDREW'S TEST SCORES



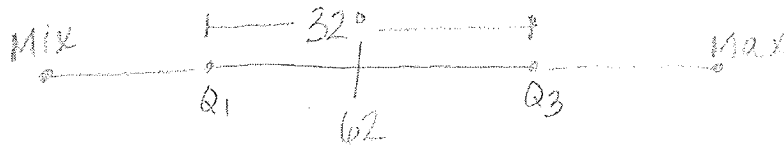
Describe the results:

• ANDREW'S lowest test score was a 77%, while Tommy's was a 78%.

• Both earned a 99% as their highest test score.

• 25% of Andrew's test score were 90.5% & above, while Tommy's were 92% & above.

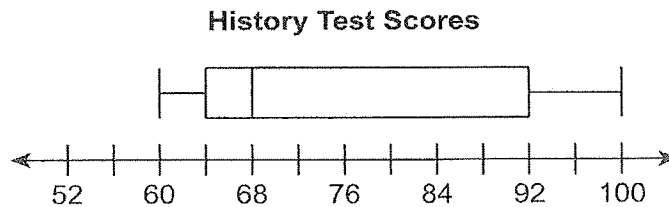
[Additional answers are possible].



4. The daily high temperatures, in degrees Fahrenheit ( $^{\circ}\text{F}$ ), of a town are recorded for one year. The median high temperature is  $62^{\circ}\text{F}$ . The interquartile range of high temperatures is 32. Which is most likely to be true?

- A. Approximately 25% of the days had a high temperature less than  $30^{\circ}\text{F}$ .  
 B. Approximately 25% of the days had a high temperature greater than  $62^{\circ}\text{F}$ .  
 C. Approximately 50% of the days had a high temperature greater than  $62^{\circ}\text{F}$ .  
 D. Approximately 75% of the days had a high temperature less than  $94^{\circ}\text{F}$ .

5. The box-and-whisker plot shown below represents students' test scores on Mr. Ali's history test.



- A. What is the range of scores for the history test?

Range:  $100 - 60 = 40\%$

- B. What is the best estimate for the percent of students scoring greater than 92 on the test?

Estimate:  $25\%$

Mr. Ali wanted more than half of the students to score 75 or greater on the test.

- C. Explain how you know that more than half of the students did not score greater than 75.

The median score on the history test was a 68%; therefore half of the students scored 68% or higher.