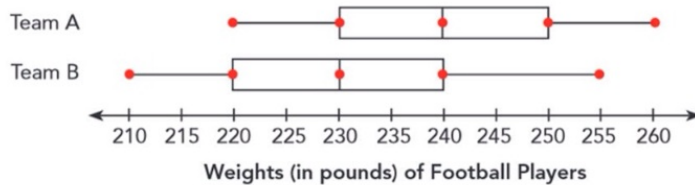


9.5 Making Inferences About Populations—p. 227-234

When you compare the means or medians of two populations, you need to take into account their measures of variation.

Compare the medians of two populations with the same measure of variation.

- 1.) The weights of the players on two football teams are summarized in the box plots.



Created with Doceri



- a. Show that the two teams have the same measure of variation (that is, the difference between the three quartiles) and the same interquartile range.

Team A	→	Team B
$Q_2 - Q_1 = 240 - 230$		$230 - 220$
$= 10 \text{ lbs}$		$= 10 \text{ lbs}$
$Q_3 - Q_2 = 250 - 240$		$240 - 230$
$= 10 \text{ lbs}$		$= 10 \text{ lbs}$
Interquartile Range = $250 - 230$		$240 - 220$
$= 20 \text{ lbs}$		$= 20 \text{ lbs}$

Their differences are the same for the two teams.

Created with Doceri



b. Express the difference in median weight in terms of the interquartile range.

The difference in median weight between the two teams is half the interquartile range.

4 of 15

Created with Doceri



c. What inference can you draw about the weight distributions of the players of the two teams?

50% of Team A players are heavier than the upper quartile of Team B.
Only 25% of the Team B players are heavier than the median of Team A.
Team A players are heavier in general.

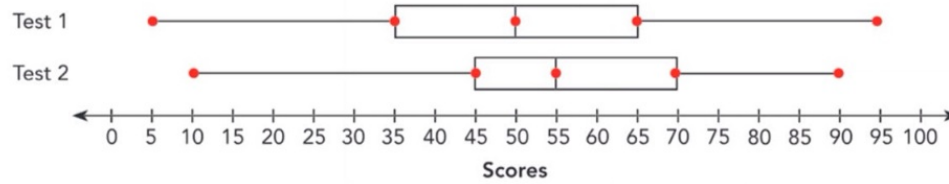
5 of 15

Created with Doceri



Use box plots to compare two populations.

2.) A class of students completed two science tests. The scores are presented in the box plots.



Created with Doceri



a. Find the median and the range of each test.

$$\begin{array}{l} \text{Test 1} \\ \hline \text{Median} = 50 \\ \text{Range} = 95 - 5 \\ \quad = 90 \end{array}$$

$$\begin{array}{l} \text{Test 2} \\ \hline \text{Median} = 55 \\ \text{Range} = 90 - 10 \\ \quad = 80 \end{array}$$

Created with Doceri



b. Which test has a wider spread of data?

Test 1 has a greater range than test 2. So, Test 1 has a wider spread of data.

8 of 15

Created with Doceri



c. On which test did the class perform better?

Test 1 : 50% of the scores are between 35 and 65.

Test 2 : 50% of the scores are between 45 and 70.

So, the class performed better on Test 2.

9 of 15

Created with Doceri



Compare two populations with the same mean but different mean absolute deviations.

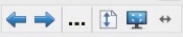
3.) The table shows the game scores of Mark and Jason.

Mark's Scores	2	3	8	5	3	4	4	6	5	4
Jason's Scores	9	5	1	1	2	8	9	2	1	6

Created with Doceri



10 of 15



Extend Page

a. Find the mean scores for Mark and Jason.

$$\begin{array}{r} \text{Mark} \\ \hline 2+3+8+5+3+4+4+6+5+4 \\ \hline 10 \end{array}$$

$$= \frac{44}{10}$$

$$= 4.4$$

$$\begin{array}{r} \text{Jason} \\ \hline 9+5+1+1+2+8+9+2+1+6 \\ \hline 10 \end{array}$$

$$= \frac{44}{10}$$

$$= 4.4$$

Created with Doceri



11 of 15



Extend Page

b. Calculate the mean absolute deviation of Mark's and Jason's scores.

Mark

2	4.4	2.4
3	4.4	1.4
8	4.4	3.6
5	4.4	0.6
3	4.4	1.4
4	4.4	0.4
4	4.4	0.4
6	4.4	1.6
4	4.4	0.6
4	4.4	0.4

$$\text{MAD} = \frac{12.8}{10} = 1.28$$

Jason

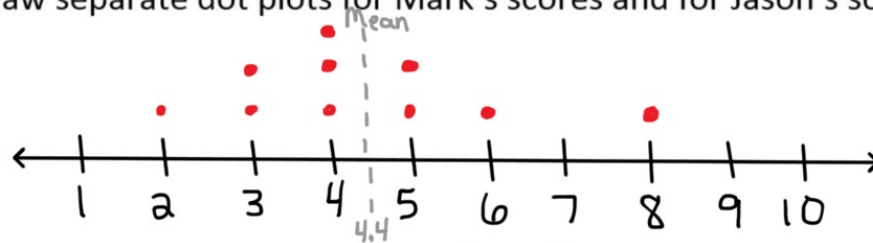
9	4.4	4.6
5	4.4	0.6
1	4.4	3.4
1	4.4	3.4
2	4.4	2.4
8	4.4	3.6
9	4.4	4.6
2	4.4	2.4
1	4.4	3.4
6	4.4	1.6

$$\text{MAD} = \frac{30}{10} = 3$$

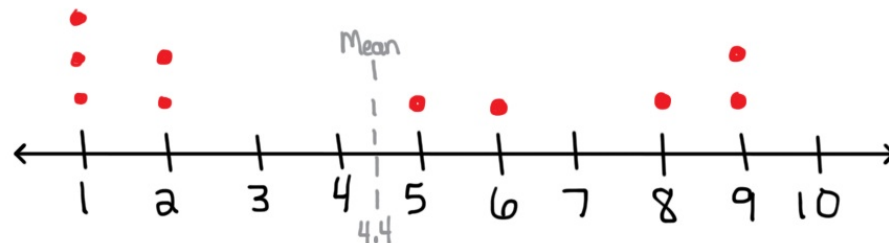
12 of 15

Created with Doceri

c. Draw separate dot plots for Mark's scores and for Jason's scores.



Mark's Scores



Jason's Scores

13 of 15

Created with Doceri

d. Compare Mark's and Jason's statistics. Then compare their dot plots.

- They have the same mean.
- Jason's MAD is twice Mark's.
- Mark's dots are close to the mean and Jason's are more spread out.

14 of 15

Created with Doceri



e. What conclusion can you make about the two players' performance in the game?

Mark's performance is more consistent since most of his scores are close to the mean.

Jason's performance is more inconsistent since his scores vary widely between very low and very high scores.

15 of 15

Created with Doceri

