Reproducible 4. Example for MAD (Mean Absolute Deviation)

Compare the mean height of male basketball players on the men's team to the mean height of female players on the women's team. Display the data on a dot plot. Discuss the variability in height within each team and between teams.

Men's Basketball Team

Height of male players in inches:

75, 73, 76, 78, 79, 78, 79, 81, 80, 82, 81, 84, 82, 84, 80, 84
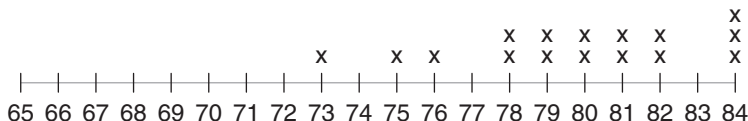
Women's Basketball Team

Height of female players in inches:

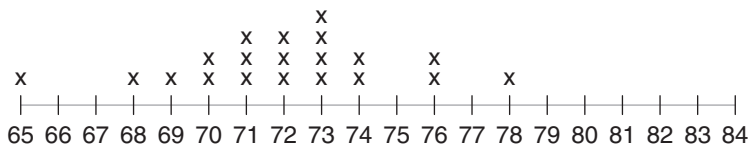73, 73, 73, 72, 69, 76, 72, 73, 74, 70, 65, 71, 74, 76, 70, 72, 71, 68, 71, 78

To compare the mean heights, simply find the mean of each data set.

Men's Mean Height = 79.75 inches   Women's Mean Height = 72.05 inches

There is a difference of 7.7 inches between the men's and women's basketball teams' mean heights.

Heights of Players on Men's Basketball Team

Heights of Players on Women's Basketball Team

From looking at the two distributions, we can see some overlap. Both teams have players with heights between 73 and 78 inches. We will use the mean and mean absolute deviation to compare the sets of data. Arrange the data in tables.

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Heights of male players	Deviation from the mean (in.)	Absolute deviation from the mean (in.)	Heights of female players	Deviation from the mean (in.)	Absolute deviation from the mean (in.)
75	−5	5	73	1	1
73	−7	7	73	1	1
76	−6	6	73	1	1
78	−8	8	72	0	0
79	−1	1	69	−3	3
78	−2	2	76	4	4
79	−1	1	72	0	0
81	1	1	73	1	1
80	0	0	74	2	2
82	2	2	70	−2	2
81	1	1	65	−7	7
84	4	4	71	−1	1
82	2	2	74	2	2
84	4	4	76	4	4
80	0	0	70	−2	2
84	4	4	72	0	0
			71	−1	1
			68	−4	4
			71	−1	1
			78	6	6

The mean absolute deviation (MAD) is calculated by taking the mean of the absolute deviations for each data point. The difference between each data point and the mean is recorded in the second column of each table. This is the deviation from the mean. (The means were rounded to 80 for the men's team and 72 for the women's team to find the differences.) The absolute deviation, which is the absolute value of the deviation from the mean, is recorded in the third column. The absolute deviations are summed and divided by the number of data points in the set to get the MAD for each set.

The men's team's mean absolute deviation is 3. The women's team's mean absolute deviation is 2.15. This shows a moderate variability in both sets, with more variability in the men's team.

The difference between the heights of the teams is approximately two and a half times the variability of the data sets ($7.7 \div 3 = 2.57$).