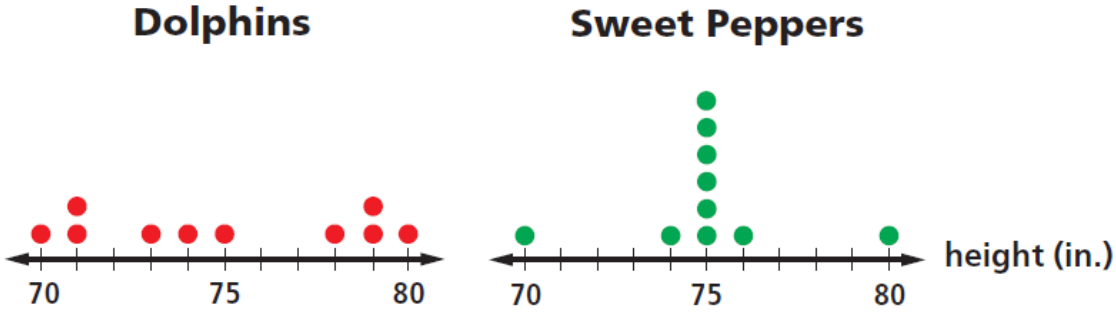
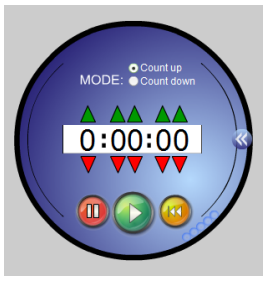
Activity 1

The two dot plots below display frequency distributions of the height of the players on two hypothetical women's basketball teams.



Step 1 Describe what you think is the main difference between the two dot plots from just looking at the graphs.



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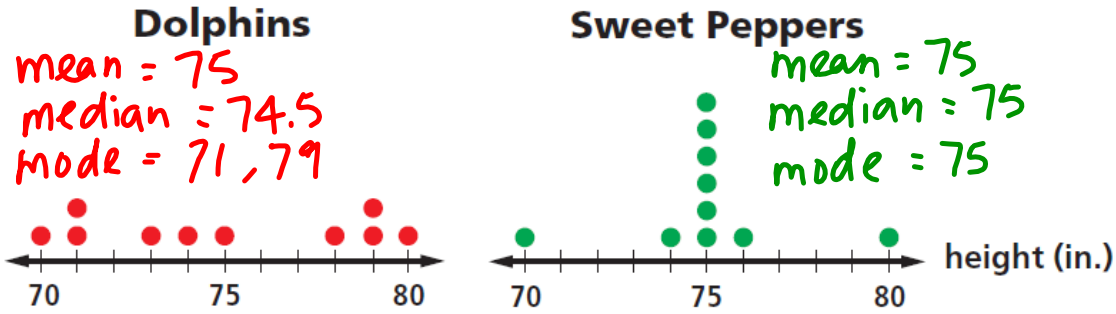
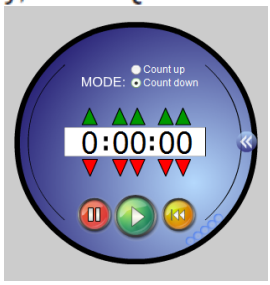


Step 2 Find the mean, median, mode, five-number summary, and IQR for each data set.



5-number summary

1) minimum (1)
2) maximum (5)
3) median (3)
4) 1st Quartile (2)
5) 3rd Quartile (4)

$IQR = Q_3 - Q_1$

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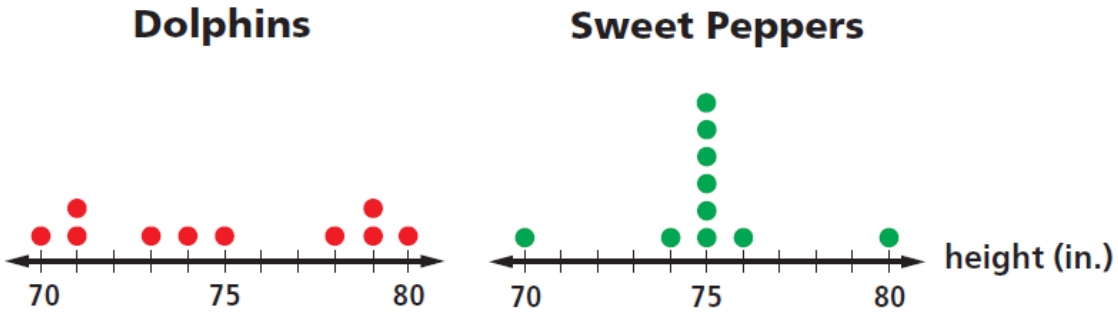


Step 3 Determine if any of the values from Step 2 are appropriate for distinguishing the main difference between the heights of the members of the two teams. Justify your conclusions.

Definition of Variance and Standard Deviation of a Population

Let μ be the mean of the population data set $x_1, x_2, \ldots, x_n$. Then the **variance** σ^2 and **standard deviation** σ **of the population** are

$$\sigma^2 = \frac{\text{sum of squared deviations}}{n} = \frac{\sum_{i=1}^{n}(x_i - \mu)^2}{n}$$

and

$$\sigma = \sqrt{\text{variance}} = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \mu)^2}{n}}.$$

Definition of Variance and Standard Deviation of a Sample

Let $\bar{x}$ be the mean of the sample data set $x_1, x_2, \ldots x_n$.

Then the **variance** s^2 and **standard deviation** s **of the sample** are

$$s^2 = \frac{\text{sum of squared deviations}}{n-1} = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}$$

and

$$s = \sqrt{\text{variance}} = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}.$$

Dolphins

Height (in.) x_i	Deviation (in.) $x_i - \mu$	Square of Deviation (in^2) $(x_i - \mu)^2$
70	$70 - 75 = -5$	25
71	$71 - 75 = -4$	16
Sum		

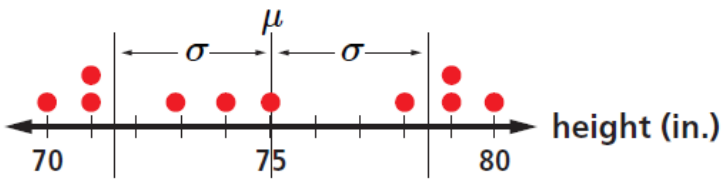
Dolphins

	Height (in.) x_i	Deviation (in.) $x_i - \mu$	Square of Deviation (in^2) $(x_i - \mu)^2$
	70	$70 - 75 = -5$	25
	71	$71 - 75 = -4$	16
	71	-4	16
	73	-2	4
	74	-1	1
	75	0	0
	78	3	9
	79	4	16
	79	4	16
Sum	750	0	128

The mean μ is $\frac{750}{10} = 75$ in., the variance $\sigma^2 = \frac{128}{10} = \frac{64}{5} =$ 12.8 in^2, and the standard deviation $\sigma = \sqrt{\frac{128}{10}} = \frac{8\sqrt{5}}{5} = \sqrt{12.8} \approx$ 3.58 in.

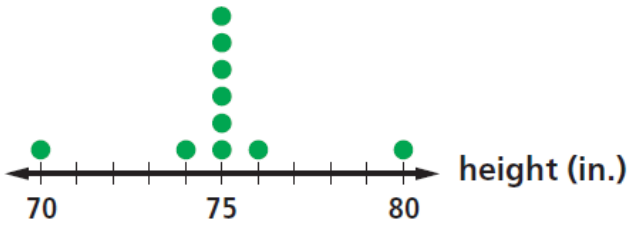
Below is a picture of the Dolphins' data showing how the standard deviation of 3.58 relates to the distribution.

Dolphins



You are asked to calculate the variance and standard deviation for the Sweet Peppers in Question 3.

Sweet Peppers



Sweet Peppers

Height (in.) x_i	Deviation (in.) $x_i - \mu$	Square of Deviation (in^2) $(x_i - \mu)^2$
70	$70 - 75 = -5$	25
Sum		