

AIM: What is Standard Deviation?

Standard Deviation: gives us a way to understand how spread out the data is from the mean.

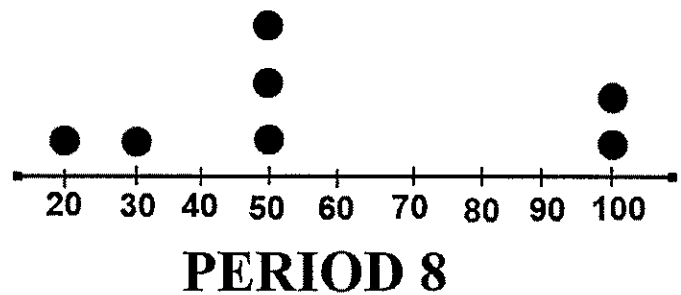
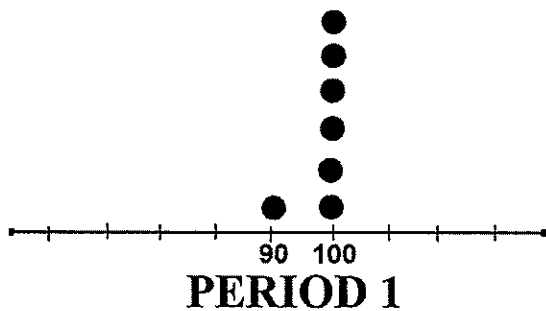
The larger the standard deviation, the more spread out the data is

The dot plot looks: skewed

The smaller the standard deviation, the closer the data is.

The dot plot looks: symmetrical

1. Ms. Cronin & Ms. Ackerman collects data from their period one and period eight classes. A sample of the results of the study of snap chat messages received per day, are listed in the dot plot below.



- a) Predict which class will have a greater standard deviation. Period 8

- b) To the nearest *tenth*, determine the standard deviation of each class.

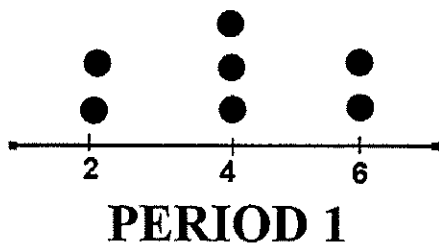
Period 1 $S_x =$ 3.7

Period 8 $S_x =$ 31.5

- c) Does the standard deviation answer(s) reinforce your pick from (a) Explain.

Yes because in Period 8 the data is more spread out.

2. Ms. Cronin & Ms. Ackerman collects data from their period one and period eight classes. A sample of the results of the study, of the number of hours per week students watched Netflix, are listed in the dot plot below.



- a) Predict which class will have a smaller standard deviation. Period 1

b) To the nearest *hundredth*, determine the standard deviation of each class.

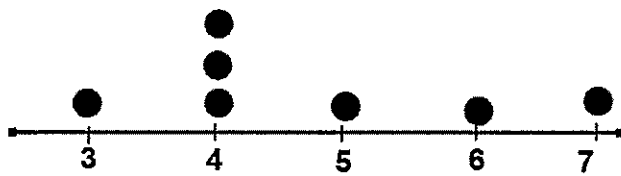
Period 1 $S_x =$ 1.63

Period 8 $S_x =$ 5.99

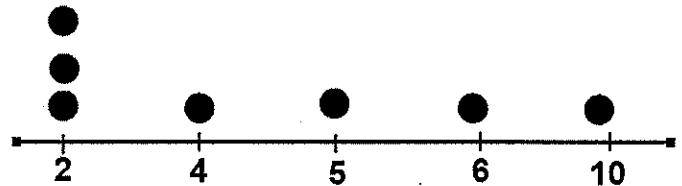
c) Does the standard deviation answer(s) reinforce your pick from (a) Explain.

Yes because Period one's data is closer together.

3. Ms. Cronin & Ms. Ackerman collect data from their period one and period eight classes. A sample of the results of the study, of the number of hours per week students play video games, are listed in the dot plot below.



PERIOD 1



PERIOD 8

a) Predict which class will have a greater standard deviation. Period 8

b) To the nearest *tenth*, determine the standard deviation of each class.

Period 1 $S_x =$ 1.4

Period 8 $S_x =$ 2.9

c) Does the standard deviation answer(s) reinforce your pick from (a) Explain.

In Period 8 the hour 10 caused for the standard deviation to be greater

4. Can the standard deviation be zero? Explain. Yes because the data could share only one set of the same outcome.

5. Can the standard deviation be negative? Explain. No because the distance from the mean is always positive.

6. Describe how removing an outlier from a data set affects the standard deviations? The standard deviation will become smaller because the data would be closer together.

7. What is an advantage of using the range to describe a data set? Why do you think the standard deviation is considered a more reliable measure of variation than range?

The range can only measure the distance of the lowest & highest values. The standard deviation measures the data spread.

Test scores: 65, 80, 81, 82, 83, 83, 85
range = 20 S.D. = 7

8. Suppose that a teacher plans to give four students a quiz. The minimum possible score on the quiz is 0, and the maximum possible score is 10.

What is the smallest possible standard deviation of the students' scores? Give an example of a possible set of four student scores that would have this standard deviation.

ZERO because all four students can earn the same grade on their tests.

What is the set of four student scores that would make the standard deviation as large as it could possibly be? Use your calculator to find this largest possible standard deviation.



$$S_x = 5.7735$$

PRACTICE PROBLEMS

1. Eddie collects data from two different companies, each with four employees. The results of the study, based on each worker's age and salary, are listed in the tables below.

Company 1	
Worker's Names	Salary in Dollars
Megan	30,000
Anthony	32,000
Esha	35,000
Ryan	38,000

Company 2	
Worker's Names	Salary in Dollars
Tyler	29,000
Victoria	35,500
Jake	37,000
Rudy	65,000

- a) Predict which company will have a smaller standard deviation. Company 1

- b) Determine to the nearest ~~cent~~, the standard deviation of each company:

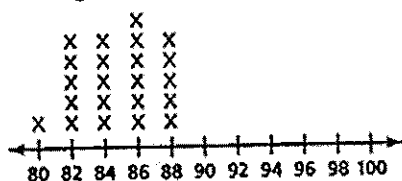
Company 1 $S_x =$ 3,500

Company 2 $S_x =$ 15,965

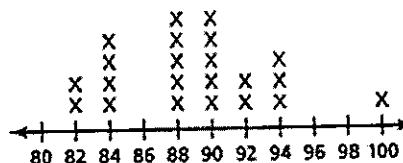
- c) Which company would you rather work for? Explain. Company one

because the S.D. is smaller

2. The dot plots shown below are grades from Mrs. Biscardi's class & Mr. Hendler's class. Which class will have a larger standard deviation? Determine the standard deviation of each class.



Mr. Hendler



Mrs. Biscardi

- a) Predict which class will have a larger standard deviation. Bisco's

- b) Determine the standard deviation of each class to the nearest *tenth*.

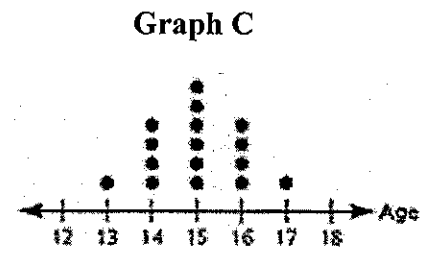
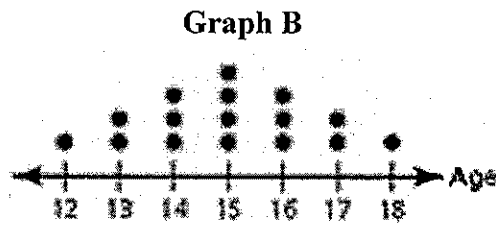
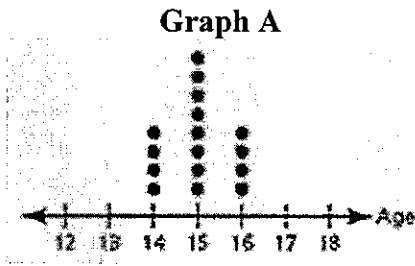
Mr. Hendler $S_x =$ 2.8

Mrs. Biscardi $S_x =$ 4.5

- c) Does the standard deviation answer(s) reinforce your pick from (a)? Explain. Yes,

Bisco's data is more spread out.

3. The dot plot below shows the ages of three different types of summer adventure clubs for teenagers. Which of the following data sets has the greatest standard deviation? Which data set has the least standard deviation?



a) Predict which data set will have a greater standard deviation. Graph B

b) Using your calculator, determine the standard deviation of each data set.

Group A $S_x =$ 0.73 Group B $S_x =$ 1.73 Group C $S_x =$ 1.03