Bell Ringer

Thursday 10/31

Determine if the sequence is an arithmetic sequence. If so, write the recursive and explicit formulas and find a_{15}

1. 2, 4, 6, 8, ... $d=2$

R: $a_1=2$, $a_n=a_{n-1}+2$

E: $a_n=2+(n-1)(2)$

$a_{15}=2+14(2)$
$=2+28$
$=30$

2. 2, 4, 8, 16, ... Not Arith.

3. -19, -15, -11, -7, ... $+4$

R: $a_1=-19$
$a_n=a_{n-1}+4$

E: $a_n=-19+(n-1)(4)$

$a_{15}=-19+(14)(4)$
$-19+56$
$=37$

4. ~~36, 33, 30, 27, ...~~

Ch 5 Test Retakes due Thursday Nov 7

Ch 7 Quiz Tues Nov 5
Ch 7 Test Fri Nov 8

Essential Question

How can you describe the variation of a data set?

Let's gather some data!!
Height of 10 students (in inches)

69, 62, 66, 65, 66, 60, 72, 70, 64, 67

Mean: average $\bar{x} = 66.1$ in

Median: middle least → greatest

60, 62, 64, 65, 66 | 66, 67, 69, 70, 72

66

Mode: most 66

Range: max − min = 72 − 60 = 12"

If you have a data set, how do you find each of these and what do they mean??

Mean:

Median:

Mode:

Range:

n = # of data values

x: 60, 62, 64, 65.66, 66, 67, 69, 70, 72

$\bar{x} = 66.1$ " $\pm$ 3.448 $\rightarrow$ 69.5 $\pm$ 3.44 $\leftarrow$ 66.1 $\rightarrow$ 62.6 $\pm$ 3.44

$x - \bar{x}$: -6.1, -4.1, -2.1, -1.1, -0.1, -0.1, .9, 2.9, 3.9, 5.9

$(x-\bar{x})^2$: 37.21, 16.81, 4.41, 1.21, .01, .01, .81, 8.41, 15.21, 34.81

$\frac{(x-\bar{x})^2}{n} \approx 11.89$

$\sqrt{11.89} = 3.448 = \sigma x$

Core Concept

Mean

The **mean** of a numerical data set is the sum of the data divided by the number of data values. The symbol $\bar{x}$ represents the mean. It is read as "x-bar."

Median

The **median** of a numerical data set is the middle number when the values are written in numerical order. When a data set has an even number of values, the median is the mean of the two middle values.

Mode

The **mode** of a data set is the value or values that occur most often. There may be one mode, no mode, or more than one mode.

Standard Deviation

Core Concept

Standard Deviation

The **standard deviation** of a numerical data set is a measure of how much a typical value in the data set differs from the mean. The symbol σ represents the standard deviation. It is read as "sigma." It is given by

$$\sigma = \sqrt{\frac{(x_1 - \overline{x})^2 + (x_2 - \overline{x})^2 + \cdots + (x_n - \overline{x})^2}{n}}$$

where n is the number of values in the data set. The deviation of a data value x is the difference of the data value and the mean of the data set, $x - \overline{x}$.

Step 1 Find the mean, $\overline{x}$.

Step 2 Find the deviation of each data value, $x - \overline{x}$.

Step 3 Square each deviation, $(x - \overline{x})^2$.

Step 4 Find the mean of the squared deviations. This is called the *variance*.

Step 5 Take the square root of the variance.

Name_____ Hour_____ Calculating Standard Deviation ws

The standard deviation is used to tell how far on average any data point is from the mean. The smaller the standard deviation, the closer the scores are on average to the mean. When the standard deviation is large, the scores are more widely spread out on average from the mean.

The **standard deviation** is calculated to find the **average distance from the mean.**

Practice Problem #1. Calculate the standard deviation of the following test data by hand. Use the chart to record the steps.

Test Scores: 22, 99, 102, 33, 57, 75, 100, 81, 62, 29 = 660/10

mean: 66 **n:** 10

Test Score (x)	**Difference from the mean** $(x-\bar{x})$	**(Difference from the mean)^2** $(x-\bar{x})^2$
22	22-66 = -44	1,936
99	99-66 33	1,089
102	102-66 36	1,296
33	33-66 -33	1,089
57	57-66 -9	81
75	75-66 9	81
100	100-66 34	1,156
81	81-66 15	225
62	62-66 -4	16
29	29-66 -37	1,369
	Sum of (Difference from the mean)^2 $\sum(x-\bar{x})^2$	8,338

Sum of **(Difference from the mean)^2** divided by the total number of scores, n. → **This is your variance.**

$$\frac{\sum(x-\bar{x})^2}{n} = 833.8$$

Final Step:

Standard deviation = square root of what you just calculated (variance).

$$\textbf{Standard Deviation} = \sqrt{\frac{\sum(x-\bar{x})^2}{n}} = 28.876$$

on avg people scored 66 on test w/in 28 pts above or below

For the following sets of data, calculate the mean and standard deviation of the data. Describe the mean and standard deviation in words after calculating it.

1. The data set gives the prices (in dollars) of different cordless phones at an electronics store.

35, 50, 60, 60, 75, 65, 80

2. The data set gives the number of home runs for the 10 batters who hit the most home runs during the 2018 Major League Baseball regular season.

51, 48, 47, 46, 45, 43, 41, 40, 40, 39

3. The data gives the waiting time (in minutes) of different people at the DMV.

11, 7, 14, 2, 8, 13, 3, 6, 10, 3, 8, 4, 8, 4, 7

4. The data gives the calories in a 1-ounce serving of different breakfast cereals.

135, 115, 120, 110, 110, 100, 105, 110, 125