IM 9–12 MATH v.1

Unit 1
Sequences and Functions

ALGEBRA 1

Lesson 9

Technological Graphing

Illustrative Mathematics®

Kendall Hunt

Learning Goal

Let's use technology to represent data.

Algebra 1

Illustrative Mathematics®

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It Begins With Data

Warm-up

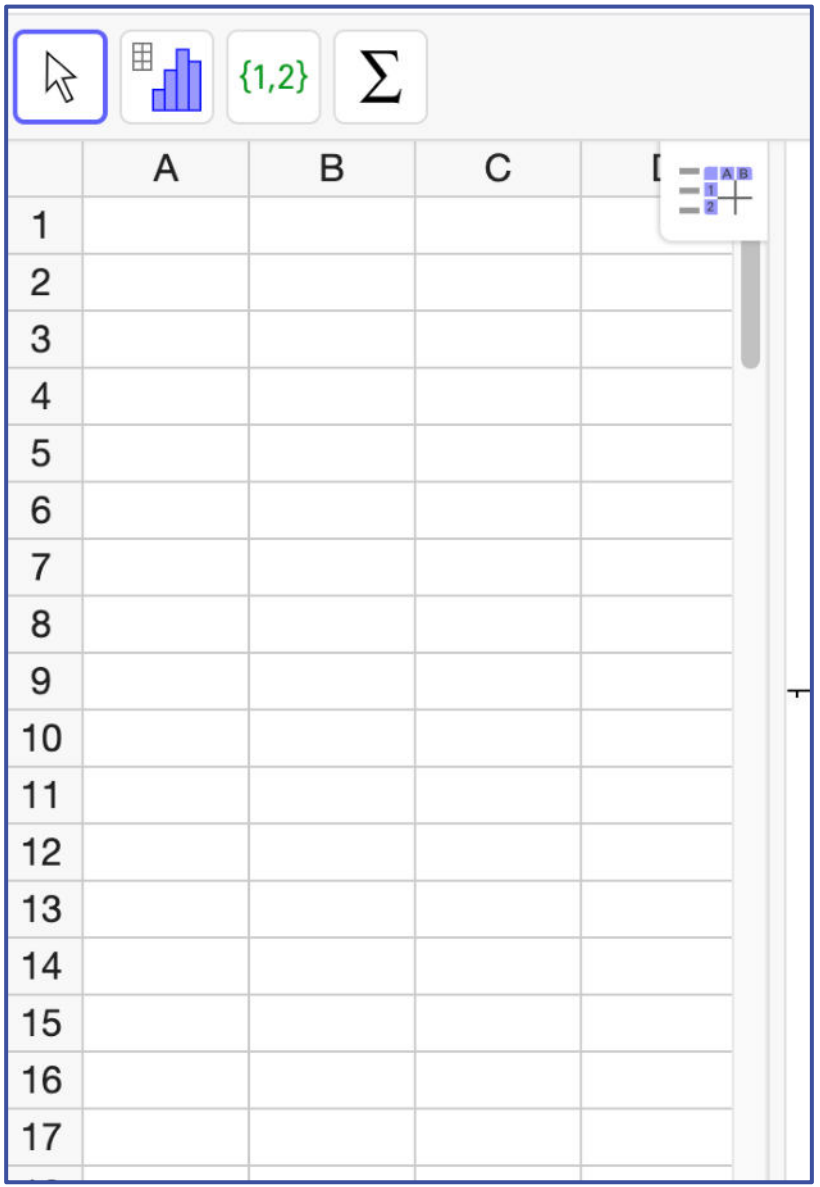
Open a spreadsheet window and enter the data so that each value is in its own cell in column A.

1. How many values are in the spreadsheet? Explain your reasoning.
2. If you entered the data in the order that the values are listed, the number 7 is in the cell at position A1 and the number 5 is in cell A5. List all of the cells that contain the number 13.
3. In cell C1 type the word “Sum”, in C2 type “Mean”, and in C3 type “Median”. You may wish to double-click or drag the vertical line between columns C and D to allow the entire words to be seen.

	A
1	7
2	8
3	4
4	13
5	5
6	15
7	14
8	8
9	12
10	2

	A
11	8
12	13
13	12
14	13
15	6
16	1
17	9
18	4
19	9
20	15

It Begins With Data



It Begins With Data

Warm-up

- What value is in cell A7?
- What was interesting or challenging about this activity?

Finding Spreadsheet Statistics

- Statistics are values that are calculated from data, such as the mean, median, or interquartile range.
- After you change the value in A1 to change the mean in the first set of questions, you should continue to use the changed value for the second set of questions rather than reset them to the values from the warm-up.
- Note that GeoGebra is like any other computer program. It needs directions written in a specific way for it to execute a command. For example, if you forget to type the = symbol or don't capitalize "Sum," the formula won't work.
- Pause after typing the formulas and ensure that cells D1, D2, and D3 display numbers for each statistic.

Finding Spreadsheet Statistics

Using the data from the warm-up, we can calculate a few **statistics** and look at the data.

- Next to the word Sum, in cell D1, type =Sum(A1:A20)
- Next to the word Mean, in cell D2, type =Mean(A1:A20)
- Next to the word Median, in cell D3, type =Median(A1:A20)

1. What are the values for each of the statistics?
2. Change the value in A1 to 8. How does that change the statistics?
3. What value can be put into A1 to change the mean to 10.05 and the median to 9?

Finding Spreadsheet Statistics

We can also use Geogebra to create data displays.

- Click on the letter A for the first column so that the entire column is highlighted.
- Click on the button that looks like a histogram to get a new window labeled One Variable Analysis .
- Click Analyze to see a histogram of the data.

1. Click the button $\sum x$ to see many of the statistics.
   a. What does the value for n represent?
   b. What does the value for $\sum x$ represent?
   c. What other statistics do you recognize?

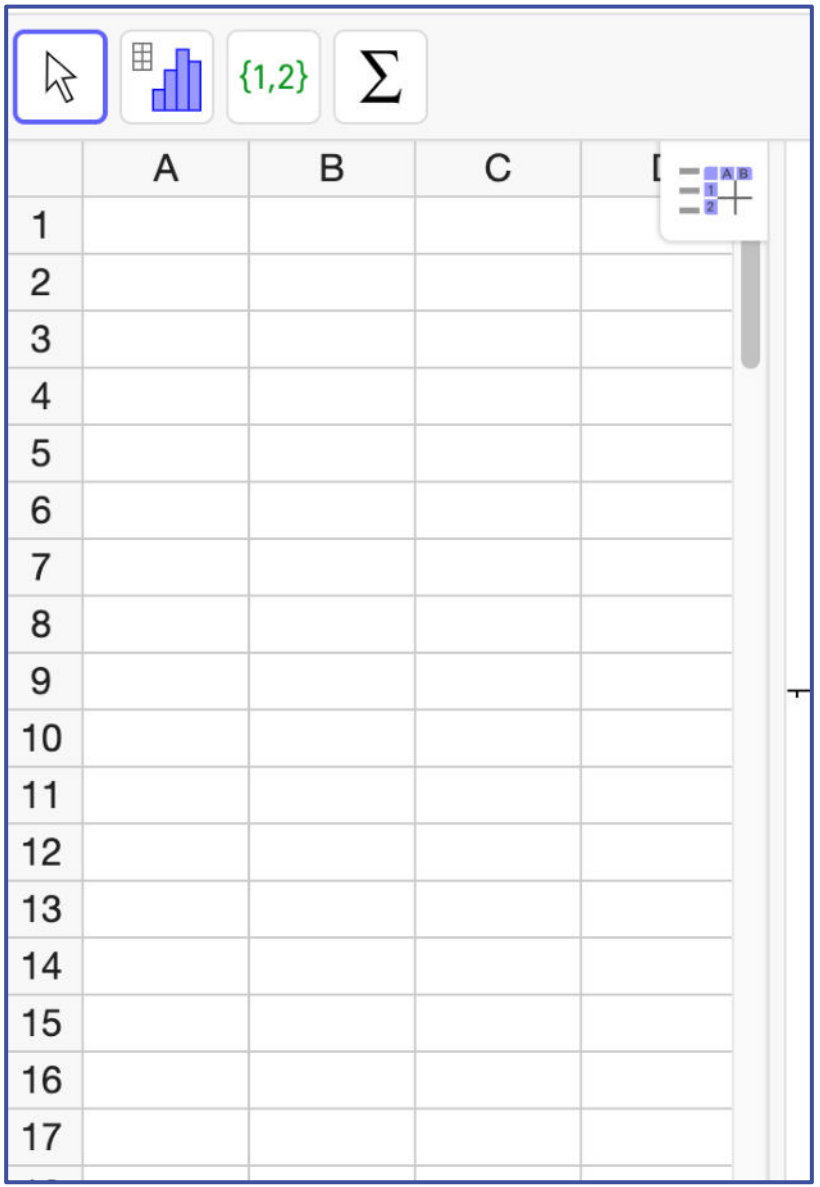
Finding Spreadsheet Statistics

2. Adjust the slider next to the word Histogram. What changes?
3. Click on the button to the right of the slider to bring in another window with more options. Then, click the box next to Set Classes Manually and set the Width to 5. What does this do to the histogram?
4. Click the word Histogram and look at a box plot and dot plot of the data. When looking at the box plot, notice there is an x on the right side of box plot. This represents a data point that is considered an outlier. Click on the button to the right of the slider and uncheck the box labeled Show Outliers to include this point in the box plot. What changes? Why might you want to show outliers? Why might you want to include or exclude outliers?

Finding Spreadsheet Statistics

- What happened to the statistics when you changed the value for A1 to 8 in the spreadsheet?
- Why did the mean increase?
- Why did the median stay the same?
- What did you notice when you changed the width of the classes for the histogram?

Finding Spreadsheet Statistics



Making Digital Displays

Use the data you collected from the numerical, statistical question from a previous lesson. Use technology to create a dot plot, boxplot, and histogram for your data. Then find the mean, median, and interquartile range for the data.

Making Digital Displays

- What were some challenges that you faced using technology and how did you overcome them?
- What width did you use for you histogram? Why?
- What is the appropriate measure of center for your data set?Which display allows you to calculate the IQR the most easily?
- Can you find the median using your histogram?

Technological Graphing

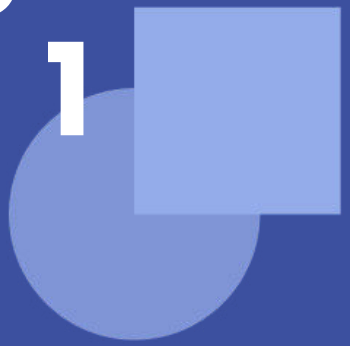
Lesson Synthesis

- How do you create data displays using technology?
- What are some advantages of using technology to display data and calculate statistics?
- When do you think it is appropriate to use technology to display data or to calculate statistics?

I can create graphic representations of data and calculate statistics using technology.

Learning Targets

Algebra 1



What Are These Values?

Cool-down

1. What are the mean and median for the data?
2. How many values are in the data set?
3. What is the interquartile range for the data? Explain or show your reasoning.

n	100
Mean	51.68
σ	29.2957
s	29.4433
Σx	5168
Σx^2	352906
Min	1
Q1	23
Median	51
Q3	77
Max	105

statistic

A quantity that is calculated from sample data, such as mean, median, or MAD (mean absolute deviation).