

Developing an Understanding for the Absolute Value Function

In this investigation you will learn how the absolute-value function tells how much an item of data or a whole set of data deviates from the mean.

Step 1: The data in the chart represents the pulse rate for 10 students.

Student	A	B	C	D	E	F	G	H	I	J
Pulse Rate	27	33	42	22	37	20	35	33	31	18
Difference from Mean										
Distance from the Mean										

Enter this data in List 1 in your graphing calculator.

Step 2: Find the difference between each data point and the mean of the data in list L1.

Record these numbers in the third row of the table and enter them into list L2. What do these numbers represent?

Step 3: Make a dot plot of the list L1 data and note the distance from each data point to the mean. Record your results in a fourth row and enter them into list L3.



How are these entries different from those in list L2?

How are they alike?

- Step 4: Next, plot points in the form (L2, L3). What numbers are in the domain and range of the graph?
- Step 5: Use the trace function on your calculator and use the arrow keys to step through the data points. Which input numbers are unchanged as output numbers?
- Step 6: Which input numbers are changed, and how?
- Step 7: Does it make sense to connect these points with a continuous graph? Why or why not?
- Step 8: How does this graph compare to the graph of $Y1 = \text{abs}(x)$ on your calculator?
- Step 9: Find the mean of the deviations stored in list L2. Compare it to the mean of the distances stored in list L3. Which do you think is a better measure of the spread of the data?
- Step 10: In your own words, write the rule for the function you graphed in Step 8. What number is output as y when the input, x , is positive or equal to zero? What number is output when x is negative? How can you use operations to change these numbers?