

Measures of Center and Variability (Sections 2.3 and 2.4)

Example 0. As guests leave Hershey Park, a random sample of them are asked how many rides they have ridden in that day's visit.

2	3	4	5	8
2	3	4	5	8
3	4	4	6	10
3	4	5	7	12
3	4	5	7	15



- I. Make a dot plot of this data to the right of the table above.
- II. Is the distribution skewed left, skewed right, or symmetric?
- III. Find the mean of the data above and mark it on the dot plot above.
- IV. Find the median of the data above and mark it on the dot plot above.

Example 1. In a small class a teacher notes that the grades on a 10-point quiz for her 5 students are: 10, 10, 7, 6, 4.

- What is the mean?
- What is the median?

Example 2. In a small class a teacher notes that the grades on a 10-point quiz for her 6 students are: 10, 10, 9, 7, 6, 4.

- What is the mean?
- What is the median?

What is the **mode** in each of the three examples above?

Example 3. The GPA data for our class is repeated below. Compare the **mean** gpa for male vs. female. Compare the **median** gpa for male vs. female.

Variable: GPA for Gender = Female

Decimal point is at the colon.

Leaf unit = 0.1

2 : 0044
2 : 566788
3 : 011234444
3 : 88
4 : 00

Variable: GPA for Gender = Male

Decimal point is at the colon.

Leaf unit = 0.1

2 : 0014
2 : 577899
3 : 1224
3 : 68

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Range. Find the range of each data set in Examples 0 – 3 from the previous page.

Standard Deviation. Follow these instructions to compute the standard deviation of the data in Example 1 “by hand.”

1. Complete the table below:

x	10	10	7	6	4	FIND MEAN of $x =$	
$x - \text{mean}$						← These are the “deviations”	
$(x - \text{mean})^2$						FIND SUM =	

2. Divide the SUM of the squared deviations by $n - 1$ to compute the **variance** of the data.

VARIANCE = _____

3. Compute the square root of variance to find the **standard deviation** of the data.

STANDARD DEVIATION = _____ (we use the letter s for the sample standard deviation)

Using a TI calculator:

- I. Put data into list L1 (starts off with STAT > EDIT...)
- II. Choose STAT > CALC > 1-Var Stats and hit ENTER.

The Empirical Rule. If the distribution of the data is bell-shaped, then approximately:

- _____ of the observations fall within one standard deviation of the mean
- _____ of the observations fall within two standard deviations of the mean
- _____ of the observations fall within three standard deviations of the mean



Example 4. We know that the heights of adult males follow a generally bell-shaped distribution with a mean 68 inches and standard deviation of 2.5 inches.

- Sketch this distribution, labeling the horizontal axis.
- If I have a random sample of adult males whose mothers breastfed them and the average height from this sample is 73 inches. Does this seem like a significant result?

