

Calculating the Mean, Median, Mode, Midrange: show formulas and all work

1. x: 2, 3, 7

$$\bar{x} = \frac{\sum x}{n} = \frac{2+3+7}{3} = \frac{12}{3} = 4 \quad \text{Median} = 3 \quad \text{Mode} = \text{No mode} \quad \text{Midrange} = \frac{\text{Max} + \text{Min}}{2} = \frac{7+2}{2} = \frac{9}{2} = 4.5$$

2. x: 3, 5, 6, 10

$$\bar{x} = \frac{\sum x}{n} = \frac{3+5+6+10}{4} = \frac{24}{4} = 6 \quad \text{Median} = \frac{5+6}{2} = 5.5 \quad \text{Mode} = \text{No mode}$$

$$\text{Midrange} = \frac{\text{Max} + \text{Min}}{2} = \frac{10+3}{2} = \frac{13}{2} = 6.5$$

3. x: 5, 1, 2, 13, 9 Sort the Data x: 1, 2, 5, 9, 13

$$\bar{x} = \frac{\sum x}{n} = \frac{1+2+5+9+13}{5} = \frac{30}{5} = 6 \quad \text{Median} = 5 \quad \text{Mode} = \text{No mode}$$

$$\text{Midrange} = \frac{\text{Max} + \text{Min}}{2} = \frac{13+1}{2} = \frac{14}{2} = 7$$

4. x: 7, 2, 12, 15, 4, 2 Sort the Data x: 2, 2, 4, 7, 12, 15

$$\bar{x} = \frac{\sum x}{n} = \frac{2+2+4+7+12+15}{6} = \frac{42}{6} = 7 \quad \text{Median} = \frac{4+7}{2} = 5.5 \quad \text{Mode} = 2$$

$$\text{Midrange} = \frac{\text{Max} + \text{Min}}{2} = \frac{15+2}{2} = \frac{17}{2} = 8.5$$

5. Sort the Data x: 120, 120, 125, 130, 130, 130, 130, 135, 138, 140, 140, 143, 144, 150

$$\bar{x} = \frac{1875}{14} \approx 133.9 \quad \text{Median} = 132.5 \quad \text{Mode} = 130 \quad \text{Midrange} = 135$$

Calculating the Standard Deviation, Variance, Range: show formulas and all work

6. x: 2, 3, 7

x	$x - \bar{x}$	$(x - \bar{x})^2$
2	2-4=-2	4
3	3-4=-1	1
7	7-4=3	9
		$\sum = 14$

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}} \quad s = \sqrt{\frac{14}{2}} = \sqrt{7} \approx 2.6 \quad s^2 = 7 \quad \text{Range} = \text{Max} - \text{Min} = 7 - 2 = 5$$

Calculate the standard deviation again for this data set and this time assume the data is for a population.

$$\sigma = \sqrt{\frac{\sum (x - \mu)^2}{N}} \quad \sigma = \sqrt{\frac{14}{3}} \approx 2.2$$

7. x: 3, 5, 6, 10

x	$x - \bar{x}$	$(x - \bar{x})^2$
3	3-6=-3	9
5	5-6=-1	1
6	6-6=0	0
10	10-6=4	16
		$\Sigma = 26$

$$s = \sqrt{\frac{26}{3}} \approx 2.9 \quad s^2 = \frac{26}{3} \approx 8.7 \quad \text{Range} = \text{Max} - \text{Min} = 10 - 3 = 7$$

Calculate the standard deviation again for this data set and this time assume the data is for a population.

$$\sigma = \sqrt{\frac{26}{4}} \approx 2.5$$

8. x: 5, 1, 2, 13, 9 Sort the Data x: 1, 2, 5, 9, 13

x	$x - \bar{x}$	$(x - \bar{x})^2$
1	1-6=-5	25
2	2-6=-4	16
5	5-6=-1	1
9	9-6=3	9
13	13-6=7	49
		$\Sigma = 100$

$$s = \sqrt{\frac{100}{4}} \approx 5 \quad s^2 = 25 \quad \text{Range} = \text{Max} - \text{Min} = 13 - 1 = 12$$

9. x: 7, 2, 12, 15, 4, 2 Sort the Data x: 2, 2, 4, 7, 12, 15

x	$x - \bar{x}$	$(x - \bar{x})^2$
2	2-7=-5	25
2	2-7=-5	25
4	4-7=-3	9
7	7-7=0	0
12	12-7=5	25
15	15-7=8	64
		$\Sigma = 148$

$$s = \sqrt{\frac{148}{5}} \approx 5.4 \quad s^2 = 29.6 \quad \text{Range} = \text{Max} - \text{Min} = 15 - 2 = 13$$

10. Do problem #9 on page 105 in Section 3-3.

$$s = \sqrt{\frac{1062.92857}{13}} \approx 9.0 \qquad s^2 = \frac{1062.92857}{13} \approx 81.8 \qquad \text{Range} = \text{Max} - \text{Min} = 150 - 120 = 30$$

This problem is ***a pain in the neck*** because there is a lot of data (n=14) and the mean is not an integer value. You will be very happy to use your TI-83 Plus or TI-84 pre-programmed functions for these calculations! Stay tuned next week when we learn how to use the statistical power of the TI.

Calculating Z-Scores: show formulas and all work

Read Section 2-6, Measures of Relative Standing, then do the following problems. There are no pre

11. Do problem #5 on page 117. Answers in the back of the book on pg. 653

12. Do problem #7 on page 117. Answers in the back of the book on pg. 653

13. Do problem #9 on page 117. Answers in the back of the book on pg. 653

14. Do problem #11 on page 117. Answers in the back of the book on pg. 653

15. Answers may vary: For your instructor:

Grandpa Karl:	6'2" or 74" Z-Score ~ 1.79 Not Unusual (he is my tallest grandpa)
Grandma Amanda:	5'3" or 63" Z-Score ~ -0.24 Not Unusual (she is my shortest grandma)
Sister Claire:	5'7" or 67" Z-Score ~ 1.36 Not Unusual (she is my tallest sister)
Father Walter:	5'9" or 69" Z-Score = 0.00 Not Unusual
Son Jeffrey:	6'2" or 74" Z-Score ~ 1.79 Not Unusual (my tallest son)

Jeffrey is still growing. His coach thinks he will be 6'3" tall within a year or so. Will he then be unusual?

My immediate family is "ordinary" or "usual." So I threw in my cousin. We all look up to him!

Cousin Carl:	6'6" or 78" Z-Score ~ 3.21 Unusual (my unusually tall cousin, he is also very funny)
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Me:	5'10" or 70" Z-Score ~ 0.36 Definitely NOT unusually tall (just unusually smart)
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