

12.2 Variability

Calculus

Solutions

12.2 Practice

Find the following values for each data set.

7, 8, 10, 10, 13

1. Median

$$10$$

2. Range

$$13 - 7 = 6$$

3. Mean

$$\frac{7 + 8 + 10 + 10 + 13}{5}$$

$$\frac{48}{5}$$

$$9.6$$

4. Mean Absolute Deviation

$$|7 - 9.6| = 2.6$$

$$|8 - 9.6| = 1.6$$

$$|10 - 9.6| = 0.4$$

$$|10 - 9.6| = 0.4$$

$$|13 - 9.6| = 3.4$$

$$\frac{8.4}{5}$$

$$1.68$$

110, 114, 104, 108, 106

104, 106, 108, 110, 114

5. Median

$$108$$

6. Range

$$114 - 104 = 10$$

7. Mean

$$\frac{104 + 106 + 108 + 110 + 114}{5}$$

$$\frac{542}{5}$$

$$108.4$$

8. Mean Absolute Deviation

$$|104 - 108.4| = 4.4$$

$$|106 - 108.4| = 2.4$$

$$|108 - 108.4| = 0.4$$

$$|110 - 108.4| = 1.6$$

$$|114 - 108.4| = 5.6$$

$$\frac{14.4}{5}$$

$$2.88$$

42, 36, 51, 47
36, 42, 47, 51

9. Median

$$\frac{42+47}{2} = 44.5$$

10. Range

$$51 - 36 = 15$$

11. Mean

$$\frac{36+42+47+51}{4}$$

$$\frac{176}{4}$$

44

12. Mean Absolute Deviation

$$\begin{aligned} |36-44| &= 8 \\ |42-44| &= 2 \\ |47-44| &= 3 \\ |51-44| &= 7 \end{aligned} \rightarrow \frac{20}{4}$$

5

20, 32, 17, 34, 41, 84

17, 20, 32, 34, 41, 84

13. Median

33

14. Range

$$84 - 17 = 67$$

15. Mean

$$\frac{17+20+32+34+41+84}{6}$$

$$\frac{228}{6}$$

38

16. Mean Absolute Deviation

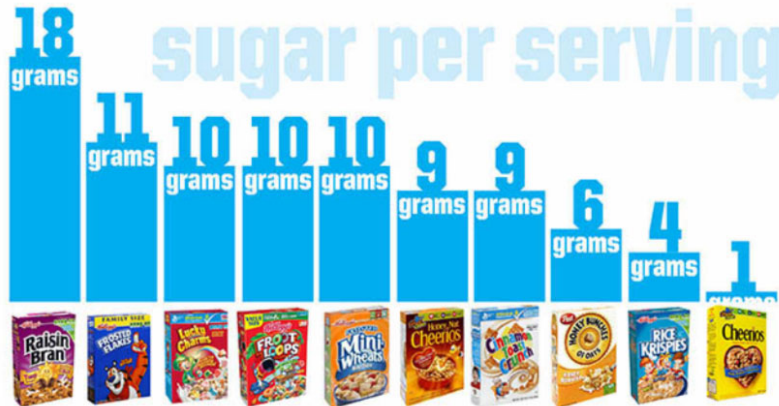
$$\begin{aligned} |17-38| &= 21 \\ |20-38| &= 18 \\ |32-38| &= 6 \\ |34-38| &= 4 \\ |41-38| &= 3 \\ |84-38| &= 46 \end{aligned} \rightarrow \frac{68}{6}$$

11.333

12.2 Variability

12.2 Test Prep

Use the graph below to answer 17-19.



17. Find measures of central tendency.

a. Mean = $\frac{88}{10} = 8.8$

b. Median = 9.5

c. Mode = 10

d. Are there any outliers? Yes, 18

18. Find the variability.

a. Range = $18 - 1 = 17$

b. Mean Absolute Deviation (MAD) =

$$|18 - 8.8| = 9.2$$

$$|10 - 8.8| = 1.2$$

$$|9 - 8.8| = 0.2$$

$$|11 - 8.8| = 2.2$$

$$|10 - 8.8| = 1.2$$

$$|6 - 8.8| = 2.8$$

$$|10 - 8.8| = 1.2$$

$$|9 - 8.8| = 0.2$$

$$|4 - 8.8| = 4.8$$

$$|1 - 8.8| = 7.8$$

$$\frac{30.8}{10} = 3.08$$

19. Describe the sugar in the cereals shown above.

Most cereals have around 9 or 10 grams of sugar. The average is 8.8 grams.

18 is an outlier, but a small one so it doesn't really throw mean off. To be safe, we could use the median of 9.5 grams to describe the central tendency.

The mean absolute deviation is 3.08.