

8.1 The Range of a Set of Data

GOAL

Arrange a set of data in order, and determine its range.

1. Calculate the range of each set of data.

a) 4, 9, 20 _____

b) 3, 4, 5, 6, 7 _____

c) 1.1, 3.4, 6.6, 7.8 _____

d) 32, 44, 56, 68, 80 _____

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The **range** is the difference between the greatest and least value in a set of data.

For example, the range of 2, 4, 6, 6, and 9 is 7 because $9 - 2 = 7$.

2. Order each set of data from least to greatest. Then, determine its range.

a) 5, 1, 6, 9, 2 _____

b) 11, 17, 10, 16, 21 _____

c) 60, 20, 40, 90, 50 _____

d) 4973, 1763, 5087, 2975 _____

3. Ashley collected data on the number of hours she and her friends watch television each week. What is the range in the data?

Student	Ashley	Nicholas	Jessica	Nestor	Pavlo	Gail	Judy
Hours of TV	4.0	1.5	3.0	5.0	2.5	0.5	6.5

4. This table shows visits by Canadians to the Maritime provinces. What is the range in the data?

Province or Territory	Number of Visits (thousands)
Newfoundland and Labrador	3236
Prince Edward Island	897
Nova Scotia	7164
New Brunswick	5613

8.2 The Median and Mode of a Set of Data

GOAL

Determine the median and the mode of a set of data.

1. This table shows the number of juice boxes sold at the school cafeteria over the last week.

Type of Juice	Number of Boxes
apple	32
orange	32
lemonade	25
grape	28
grapefruit	14

- a) Order the data from least to greatest.

- b) What is the median of this set of data? _____
- c) What is the mode of this set of data? _____
2. Determine the median and mode for these sets of data.
- a) 4, 6, 9, 8, 7, 6, 9
median _____ mode _____
- b) 152, 158, 159, 154, 152, 157, 154, 159, 154
median _____ mode _____
- c) 0, 1, 4, 2, 3, 1, 2, 1
median _____ mode _____
- d) 13, 14, 12, 10, 13, 11, 10, 13
median _____ mode _____

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The median and the mode are both representative values of a set of data.

The **median** is the middle value of the ordered data.

For example, for the set 2, 3, 4 the median is 3, and for the set 2, 3, 4, 5 the median is 3.5.

The **mode** is the value or item that occurs most often in a set of data.

For example, for the set 1, 5, 6, 6, 6, 7 the mode is 6, and for the set 1, 1, 5, 6, 6, 7 the modes are 1 and 6. For the set 1, 2, 5, 6, 7, 8 there is no mode.

8.3 The Mean of a Set of Data

GOAL

Determine the mean of a set of data.

- Determine the mean of each set of data, to the nearest whole number.
 - 1, 3, 4, 4, 6, 8
 - 10, 40, 30, 20, 50, 80
 - 4, 2, 6, 8, 1, 2, 7, 3
 - 8, 8, 48, 2, 9, 2, 10
- The table below lists the number of hours each student spends on homework each week.

- Determine the mean, median, and mode of the number of hours.

mean _____

median _____

mode _____

- The teacher wants to give the class more homework. Which value would the teacher use to explain why more homework is needed? Explain.

- The students think the amount of homework is enough. Which value would the students use to explain why they do enough homework? Explain.

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The **mean** is a representative value of a set of data. It is determined by sharing the sum of the data evenly among the values in the set.

For example, the five values in the set 3, 6, 8, 14, 9 have a sum of 40. The mean is 8, because $40 \div 5 = 8$.

Student	Number of Hours
Ashley	4.5
Shandra	1.5
Imran	6.0
Gail	3.5
Nestor	2.0
Pavlo	5.0
Nicholas	4.5
Sandeep	3.0
Janice	2.0
Leslie	4.5
Rosa	6.5

8.4 Exploring Statistics

GOAL

Use statistics.

Pavlo collected data on some students in his class. He asked each student to estimate the amount of money they spend each year. Pavlo recorded his data in the following table.

Student	Amount Spent Each Year (\$)	Student	Amount Spent Each Year (\$)
Pavlo	350	Sandeep	670
Ashley	890	Rosa	350
Jessica	210	Eric	520
Nestor	460	Mark	800
Gail	190	Janice	740
Nicholas	350	Leslie	240
Shandra	550	Maureen	490
Taylor	980	Imran	550

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Statistics involves the collection, organization, and interpretation of data.

1. Order the amounts spent per year from least to greatest.

2. What is the range of the data? _____

3. What is the median of the data? _____

4. What is the mode of the data? _____

5. What is the mean of the data? _____

6. What is a good value to represent the typical amount of money spent in a year by a student in Pavlo's class? Explain your answer.

8.5 Outliers

GOAL

Identify the outliers in a set of data.

1. Circle the outlier in each set of data.

- a) 2, 4, 3, 5, 2, 1, 14, 3
- b) 98, 145, 87, 99, 86, 92, 83
- c) 122, 114, 123, 118, 34, 132, 128

2. Nestor has seven packages of nuts. Each package has a different mass:

450 g, 120 g, 498 g, 500 g, 425 g, 478 g, 487 g.

Nestor wants to know the mass of a typical package of nuts. He decides to calculate the mean.

- a) Calculate the mean, including all seven values.
- b) Calculate the mean, not including any outliers.
- c) Which mean gives Nestor the best answer to his question? Why?

3. Jessica counted the number of pets for each family on her block. She got the following data:

2, 1, 1, 1, 0, 2, 8, 1, 2, 1, 7, 0, 1, 1, 1

a) Determine the mean, median, and mode, including all the data.

mean _____ median _____ mode _____

b) Determine the mean, median, and mode, not including any outliers.

mean _____ median _____ mode _____

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An **outlier** is a data value that is far from the other data values. You may choose not to include outliers when calculating the mean. Or, you may choose to use the median or the mode instead of the mean when there are outliers in a set of data.

8.6 Communicate about Data

GOAL

Explain why one measure represents a set of data better than another.

1. There is a prize for the person with the highest math score in Nestor's class. Nestor is keeping track of the test scores for the top four students.

Test Scores for Eight Tests								
Student	1	2	3	4	5	6	7	8
Nestor	84	70	92	72	82	80	92	76
Gail	75	90	93	98	94	95	96	75
Pavlo	90	89	70	79	100	85	76	90
Ashley	88	93	67	98	72	71	65	97

- a) Who should win the prize, based on the mean? Explain.

- b) Who should win the prize, based on the median? Explain.

- c) Who should win the prize, based on the mode? Explain.

- d) If it was your job to award the prize, who would you give it to? Give reasons for your answer.

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Communication Checklist

- Did you include all the important details?
- Did you make reasonable conclusions?
- Did you justify your conclusions?
- Were you convincing?

Chapter 8 Test Yourself

Circle the letter of the correct answer.

- What is the range of this data: 2, 3, 8, 3, 7, 1, 9?
 A. 8 B. 5 C. 9 D. 3
- What is the median of this data: 31, 32, 34, 35, 38, 40, 42?
 A. 11 B. 35 C. 36 D. 42
- What is the median of this data: 3, 3, 1, 4, 3, 2, 5?
 A. 1 B. 2 C. 3 D. 4
- What is the mode of this data: 17, 14, 19, 12, 14, 18, 17, 14?
 A. 7.5 B. 17 C. 14 D. 19
- What is the mode of this data: 9, 2, 4, 5, 8, 1, 0, 11, 7?
 A. 7 B. 11 C. 6 D. There is no mode.
- What is the mean of this data: 3, 2, 7, 4, 11, 10, 7?
 A. 6.3 B. 9 C. 7 D. 4.7
- Jessica collected data on the number of students in each class who play soccer.

Class	Class 7A	Class 7B	Class 7C	Class 7D	Class 7E	Class 7F
Number of Students	5	4	5	5	9	5

Which value best represents the typical number of students per class who play soccer?

- A. the range B. the outlier C. the mode D. the mean
- What is the mean of this data?

Month	January	February	March	April	May	June
Number of Days with Rain	4	9	22	16	14	6

- A. 3.4 B. 15.5 C. 9.2 D. 11.8

Chapter 8 Test Yourself continued

9. Calculate the mean of the following data, not including outliers.

12, 36, 14, 12, 18, 16, 32, 16

- A. 14.7 B. 19.5 C. 16.2 D. 22.4
10. Ashley kept track of her test scores so far this year.

Test	1	2	3	4	5	6
Score	58%	92%	88%	85%	88%	90%

What is the outlier in her set of data?

- A. 88% B. 58% C. 34% D. 92%
11. Nick divided a bag of milk powder into small plastic bags for a camping trip. He measured the mass of each bag:
205 g, 284 g, 250 g, 220 g, 266 g, 78 g, 199 g.
Nick correctly calculated the mean mass of an average bag of milk powder. What answer did he get?

- A. 78 g B. 206 g C. 237 g D. 284 g

12. Gail found this table in the newspaper:

Town	Istonville	Aurora	Taunton	Sunnyvale	Albridge
Population	1845	2954	897	1643	3082

What is the median of the populations?

- A. 1845 B. 897 C. 3082 D. 2954
13. Sandeep got the following grades on his tests: 75%, 72%, 74%, 77%, 55%. His teacher gave him an average of 74.5%. Why?
- A. Because Sandeep's mode grade was 74%.
B. Because Sandeep's median grade was 77%.
C. Because the grade 55% was an outlier, so it was not included in the mean.
D. Because the mode was the best way to represent Sandeep's grade.