

10-2 Distributions of Data

1. **EXERCISE** The amount of time that James ran on a treadmill for the first 24 days of his workout is shown.

Time (minutes)											
23	10	18	24	13	27	19	7	25	30	15	22
10	28	23	16	29	26	26	22	12	23	16	27

- a. Use a graphing calculator to create a histogram. Then describe the shape of the distribution.
b. Describe the center and spread of the data using either the mean and standard deviation or the five-number summary. Justify your choice.
2. **RESTAURANTS** The total number of times that 20 random people either ate at a restaurant or bought fast food in a month are shown.

Restaurants or Fast Food									
4	7	5	13	3	22	13	6	5	10
7	18	4	16	8	5	15	3	12	6

- a. Use a graphing calculator to create a box-and-whisker plot. Then describe the shape of the distribution.
b. Describe the center and spread of the data using either the mean and standard deviation or the five-number summary. Justify your choice.
3. **CCSS TOOLS** The total fundraiser sales for the students in two classes at Cantonville High School are shown.

Mrs. Johnson's Class (dollars)					
6	14	17	12	38	15
11	12	23	6	14	28
16	13	27	34	25	32
21	24	21	17	16	

Mr. Edmunds' Class (dollars)					
29	38	21	28	24	33
14	19	28	15	30	6
31	23	33	12	38	28
18	34	26	34	24	37

- a. Use a graphing calculator to create a histogram for each data set. Then describe the shape of each distribution.
b. Compare the distributions using either the means and standard deviations or the five-number summaries. Justify your choice.

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4. **RECYCLING** The weekly totals of recycled paper for the junior and senior classes are shown.

Junior Class (pounds)					
14	24	8	26	19	38
12	15	12	18	9	24
12	21	9	15	13	28

Senior Class (pounds)					
25	31	35	20	37	27
22	32	24	28	18	32
25	32	22	29	26	35

- Use a graphing calculator to create a box-and-whisker plot for each data set. Then describe the shape of each distribution.
- Compare the distributions using either the means and standard deviations or the five-number summaries. Justify your choice.

For Exercises 5 and 6, complete each step.

- Use a graphing calculator to create a histogram and a box-and-whisker plot. Then describe the shape of the distribution.
 - Describe the center and spread of the data using either the mean and standard deviation or the five-number summary. Justify your choice.
5. **FANTASY** The weekly total points of Kevin's fantasy football team are shown.

Total Points							
165	140	88	158	101	137	112	127
53	151	120	156	142	179	162	79

6. **MOVIES** The students in one of Mr. Peterson's classes recorded the number of movies they saw over the past month.

Movies Seen											
14	11	17	9	6	11	7	8	12	13	10	9
5	11	7	13	9	12	10	9	15	11	13	15

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CCSS TOOLS Complete each step.

a. Use a graphing calculator to create a histogram for each data set. Then describe the shape of each distribution.

b. Compare the distributions using either the means and standard deviations or the five-number summaries. Justify your choice.

7. **SAT** A group of students took the SAT their sophomore year and again their junior year. Their scores are shown.

Sophomore Year Scores					
1327	1663	1708	1583	1406	1563
1637	1521	1282	1752	1628	1453
1368	1681	1506	1843	1472	1560

Junior Year Scores					
1728	1523	1857	1789	1668	1913
1834	1769	1655	1432	1885	1955
1569	1704	1833	2093	1608	1753

8. **INCOME** The total incomes for 18 households in two neighboring cities are shown.

Yorkshire (thousands of dollars)					
68	59	61	78	58	66
56	72	86	58	63	53
68	58	74	60	103	64

Applewood (thousands of dollars)					
52	55	60	61	55	65
65	60	45	37	41	71
50	61	65	66	87	55

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9. **TUITION** The annual tuitions for a sample of public colleges and a sample of private colleges are shown. Complete each step
- Use a graphing calculator to create a box-and-whisker plot for each data set. Then describe the shape of each distribution.
 - Compare the distributions using either the means and standard deviations or the five-number summaries. Justify your choice.

Public Colleges (dollars)					
3773	3992	3004	4223	4821	3880
3163	4416	5063	4937	3321	4308
4006	3508	4498	3471	4679	3612

Private Colleges (dollars)					
10,766	13,322	12,995	15,377	16,792	9147
15,976	11,084	17,868	7909	12,824	10,377
14,304	10,055	12,930	16,920	10,004	11,806

10. **DANCE** The total amount of money that a random sample of seniors spent on prom is shown. Complete each step.
- Use a graphing calculator to create a box-and-whisker plot for each data set. Then describe the shape of each distribution.
 - Compare the distributions using either the means and standard deviations or the five-number summaries. Justify your choice.

Boys (dollars)					
253	288	304	283	348	276
322	368	247	404	450	341
291	260	394	302	297	272

Girls (dollars)					
682	533	602	504	635	541
489	703	453	521	472	368
562	426	382	668	352	587

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11. **BASKETBALL** Refer to the beginning of the lesson. The points that Craig scored in the remaining games are shown.

Points Scored			
18	10	18	21
9	25	13	17
17	12	24	19
20	17	27	21

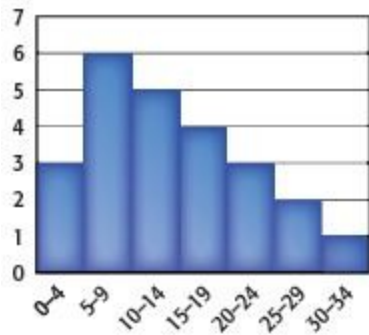
- Use a graphing calculator to create a box-and-whisker plot. Describe the center and spread of the data.
 - Craig scored 0, 2, 1, and 0 points in the first four games. Use a graphing calculator to create a box-and-whisker plot that includes the new data. Then find the mean and median of the new data set.
 - What effect does adding the scores from the first four games have on the shape of the distribution and on how you should describe the center and spread?
12. **SCORES** Allison's quiz scores are shown.

Math Quiz Scores					
83	76	86	82	84	57
86	62	90	96	76	89
76	88	86	86	92	94

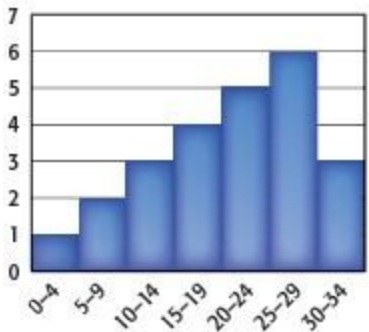
- Use a graphing calculator to create a box-and-whisker plot. Describe the center and spread.
- Allison's teacher allows students to drop their two lowest quiz scores. Use a graphing calculator to create a box-and-whisker plot that reflects this change. Then describe the center and spread of the new data set.

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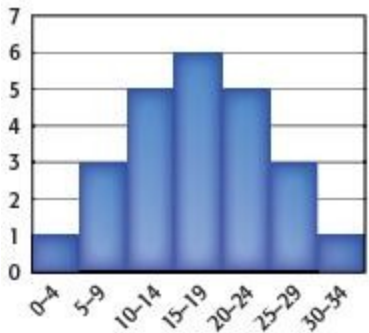
13. **CHALLENGE** Approximate the mean and median for each distribution of data.



a.



b.



c.

14. **CCSS ARGUMENTS** Distributions of data are not always symmetric or skewed. If a distribution has a gap in the middle, like the one shown, two separate clusters of data may result, forming a *bimodal distribution*. How can the center and spread of a bimodal distribution be described?

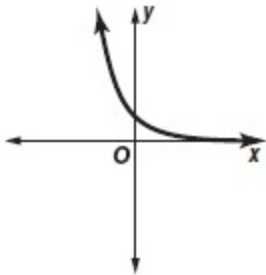


15. **OPEN ENDED** Find a real-world data set that appears to represent a symmetric distribution and one that does not. Describe each distribution. Create a visual representation of each set of data.

16. **WRITING IN MATH** Explain the difference between positively skewed, negatively skewed, and symmetric sets of data, and give an example of each.

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17. **DISTRIBUTIONS** Which of the following is a characteristic of a negatively skewed distribution?
- A The majority of the data are on the left of the mean.
 - B The mean and median are approximately equal.
 - C The mean is greater than the median.
 - D The mean is less than the median.
18. **SHORT RESPONSE** The average of the test scores of a class of c students is 80, and the average test scores of a class of d students is 85. When the scores of both classes are combined, the average score is 82. What is the value of $\frac{c}{d}$?
19. **SAT/ACT** What is the multiplicative inverse of $2i$?
- F $-2i$
 - G -2
 - H $\frac{-i}{2}$
 - J $\frac{1}{2}$
 - K $\frac{i}{2}$
20. Which equation best represents the graph?



- A $y = 4x$
 - B $y = x^2 + 4$
 - C $y = 4^{-x}$
 - D $y = -4x$
- Determine whether each survey question is biased. Explain your reasoning.**
21. What toppings do you prefer on your pizza?
22. What is your favorite class, and what teacher gives the easiest homework?
23. Don't you hate how high gas prices are?
24. **PARTIES** Suppose each time a new guest arrives at a party, he or she shakes hands with each person already at the party. Prove that after n guests have arrived, a total of $\frac{n(n-1)}{2}$ handshakes have taken place.

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25. **ASTRONOMY** The orbit of Pluto can be modeled by the equation $\frac{x^2}{39.5^2} + \frac{y^2}{38.3^2} = 1$, where the units are

astronomical units. Suppose a comet is following a path modeled by the equation $x = y^2 + 20$.

a. Find the point(s) of intersection of the orbits of Pluto and the comet.

b. Will the comet necessarily hit Pluto? Explain.

c. Where do the graphs of $y = 2x + 1$ and $2x^2 + y^2 = 11$ intersect?

d. What are the coordinates of the points that lie on the graphs of both $x^2 + y^2 = 25$ and $2x^2 + 3y^2 = 66$?

Determine whether each situation involves a *permutation* or a *combination*. Then find the number of possibilities.

26. the winner of the first, second, and third runners-up in a contest with 8 finalists

27. selecting two of eight employees to attend a business seminar

28. an arrangement of the letters in the word *MATH*

29. placing an algebra book, a geometry book, a chemistry book, an English book, and a health book on a shelf