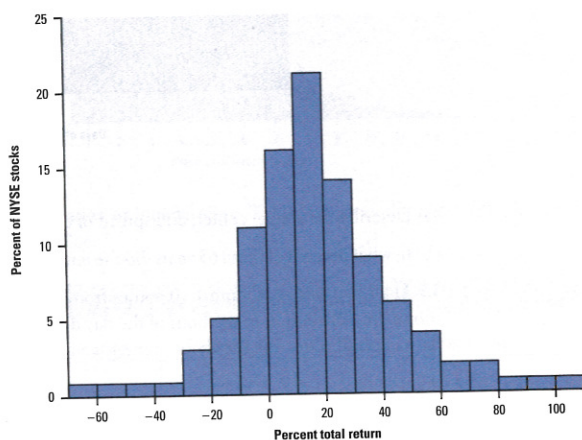


Exercises

1.7 Stock returns The total return on a stock is the change in its market price plus any dividend payments made. Total return is usually expressed as a percent of the beginning price. Figure 1.8 is a histogram of the distribution of total returns for all 1528 stocks listed on the New York Stock Exchange in one year.⁹ Note that it is a histogram of the percents in each class rather than a histogram of counts.

Figure 1.8

Histogram of the distribution of percent total return for all New York Stock Exchange common stocks in one year, for Exercise 1.7.



- Describe the overall shape of the distribution of total returns.
- What is the approximate center of this distribution? (For now, take the center to be the value with roughly half the stocks having lower returns and half having higher returns.)
- Approximately what were the smallest and largest total returns? (This describes the spread of the distribution.)
- A return less than zero means that an owner of the stock lost money. About what percent of all stocks lost money?

1.8 Freezing in Greenwich, England Figure 1.9 is a histogram of the number of days in the month of April on which the temperature fell below freezing at Greenwich, England.¹⁰ The data cover a period of 65 years.

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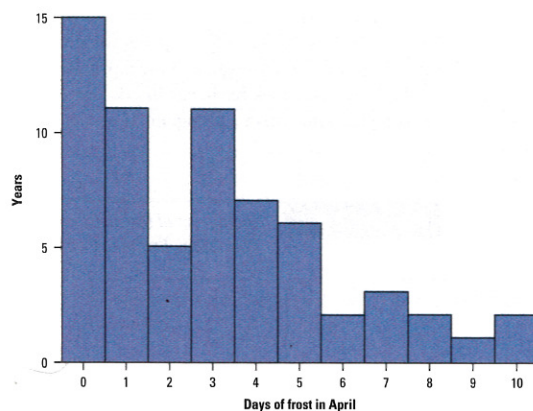
1

Answers to Exercises 1.7–1.12

- 1.7** (a) The distribution of total returns is roughly symmetric, though some students might say *slightly* skewed to the right.
 (b) About 15%.
 (c) *Smallest*: between -70% and -60% . *Largest*: between 100% and 110% .
 (d) About 23%.

Figure 1.9

The distribution of the number of frost days during April at Greenwich, England, over a 65-year period, for Exercise 1.8.

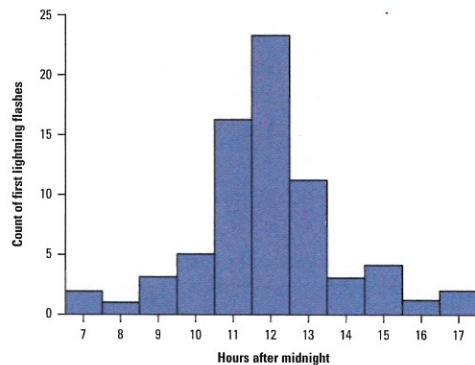


- (a) Describe the shape, center, and spread of this distribution. Are there any outliers?
 (b) In what percent of these 65 years did the temperature never fall below freezing in April?

1.9 Lightning storms Figure 1.10 comes from a study of lightning storms in Colorado. It shows the distribution of the hour of the day during which the first lightning flash for that day occurred. Describe the shape, center, and spread of this distribution.

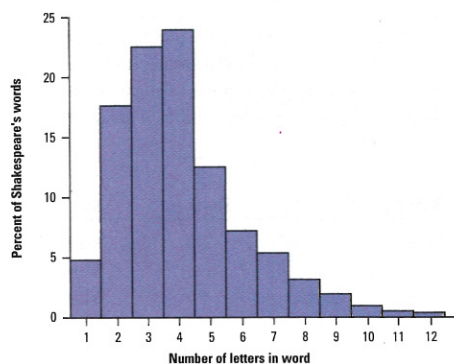
Figure 1.10

The distribution of the time of the first lightning flash each day at a site in Colorado, for Exercise 1.9.



1.10 Shakespeare Figure 1.11 shows the distribution of lengths of words used in Shakespeare's plays.¹¹ Describe the shape, center, and spread of this distribution.

Figure 1.11 The distribution of lengths of words used in Shakespeare's plays, for Exercise 1.10.



1.11 Presidential ages at inauguration Table 1.4 gives the ages of all U.S. presidents when they took office.

Table 1.4 Ages of the presidents at inauguration

President	Age	President	Age	President	Age
Washington	57	Lincoln	52	Hoover	54
J. Adams	61	A. Johnson	56	F. D. Roosevelt	51
Jefferson	57	Grant	46	Truman	60
Madison	57	Hayes	54	Eisenhower	61
Monroe	58	Garfield	49	Kennedy	43
J. Q. Adams	57	Arthur	51	L. B. Johnson	55
Jackson	61	Cleveland	47	Nixon	56
Van Buren	54	B. Harrison	55	Ford	61
W. H. Harrison	68	Cleveland	55	Carter	52
Tyler	51	McKinley	54	Reagan	69
Polk	49	T. Roosevelt	42	G. H. W. Bush	64
Taylor	64	Taft	51	Clinton	46
Fillmore	50	Wilson	56	G. W. Bush	54
Pierce	48	Harding	55		
Buchanan	65	Coolidge	51		

(a) Make a histogram of the ages of presidents at inauguration. Use class intervals 40 to 44, 45 to 49, and so on. Each interval should contain the left-hand endpoint, but not the right endpoint.

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- 1.10** Skewed to the right with a center between 5 and 6 letters. The range is 11 letters.
- 1.11** (a) See the *Teacher's Solutions Manual* for graph.

1.11 (b) Symmetric with a single peak at the center of about 55 years. The range is $69 - 42 = 27$ years.

(c) The youngest was Teddy Roosevelt; the oldest was Ronald Reagan.

(d) He was among the younger presidents but was not an outlier.

1.12 (a) See the *Teacher's Solutions Manual* for graph.

(b) The distribution contains a large gap (from 2 to 38 grams). The diet drinks contain no sugar, but the regular soft drinks contain a large amount of sugar. Both graphs show that the sugar content for regular drinks is slightly skewed to the right.

(b) Describe the shape, center, and spread of the distribution.

(c) Who was the youngest president? Who was the oldest?

(d) Was Bill Clinton, at age 46, unusually young?

1.12 Sugar high Carbonated soft drinks are the single biggest source of refined sugars in the American diet.¹² Diets high in refined sugars can promote obesity, which increases the risks of diabetes, high blood pressure, stroke, and heart disease. Sugary soft drinks also promote tooth decay. Forty grams of sugar equates to approximately 10 teaspoons of sugar. The table below shows the number of grams of sugar per 12-fluid-ounce can of 22 popular soft drinks.

Soft drink	Sugar (g)	Soft drink	Sugar (g)
7Up	39	Mello Yellow	47
7Up Plus	2	Minute Maid Orange Soda	48
A&W Root Beer	46	Mountain Dew	46
Cherry Coca-Cola	42	Pepsi-Cola	41
Coca-Cola Classic	39	Pepsi One	0
Coke Zero	0	Pibb Extra	39
Diet Coke	0	Royal Crown Soda	42
Diet Pepsi	0	Sierra Mist	39
Dr Pepper	40	Sprite	38
Fresca	0	Sunkist Orange Soda	52
IBC Root Beer	43	Welch's Sparkling Grape Soda	51

(a) Construct an appropriate graph of these data. A dotplot might suffice, but a stemplot or histogram might be preferable due to the large spread. If you use the *One-Variable Statistical Calculator* applet, you can experiment with different class widths.

(b) Describe what you see; that is, describe the distribution.

