Name: _____ Date: _____

Lesson 13.3 Histograms

Draw a histogram for each set of data. Include a title.

1. The table shows the number of goals scored by a hockey player during one season.

Number of Goals	0–1	2–3	4–5	6–7
Frequency	9	8	3	1

2. The table shows the number of spoons in the kitchens of 45 households.

Number of Spoons	0–3	4–7	8–11	12–15	16–19
Frequency	5	15	20	2	3

Name: _____ Date: _____

3. The table shows the number of computers in 16 laboratories in a university.

Number of Computers	0–2	3–5	6–8	9–11
Frequency	9	6	0	1

4. The table shows the number of buttons on 16 jackets.

Number of Buttons	5–10	11–16	17–22	23–28
Frequency	2	7	6	1

Name: _____ Date: _____

The times taken by 30 students to complete a mathematics assignment are shown in the table. The times were rounded to the nearest minute. Use the data to answer questions 5 to 7.

Time (*t* minutes)	21–25	26–30	31–35	36–40	41–45
Frequency	2	6	10	8	*p*

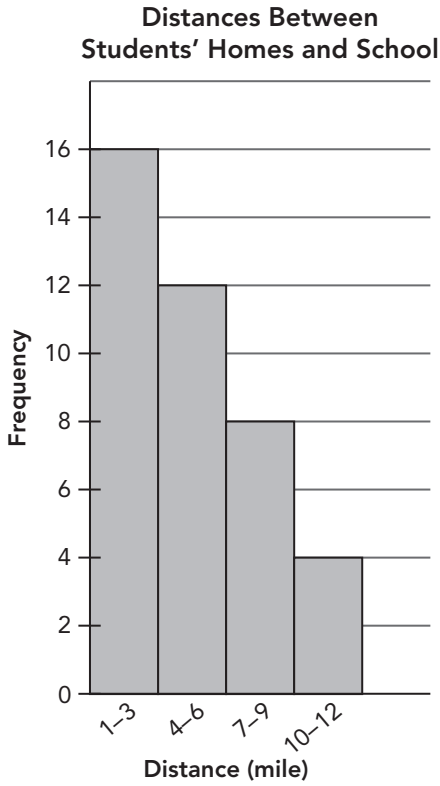
5. Find the value of *p*.

6. Draw a histogram to represent the data. Include a title. Briefly describe the data.

7. What percent of students took at least 36 minutes to complete their assignment?

Name: _____ Date: _____

The histogram shows the distances between a group of students' homes and the school. The distances are rounded to the nearest mile. Use the histogram to answer questions 8 to 10.



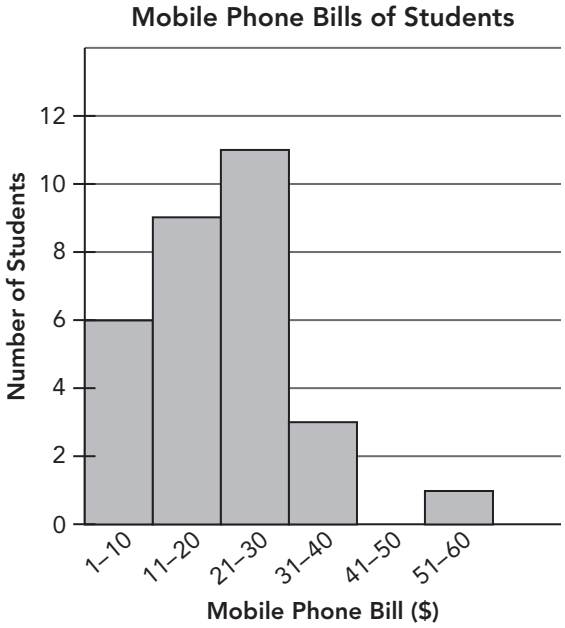
8. How many observations are there?

9. What percent of the students live at most 6 miles from the school?

10. Briefly describe the data.

Name: _____ Date: _____

The histogram shows the mobile phone bills of a group of 30 students in one month. The amount of money is rounded to the nearest dollar. Use the histogram to answer questions 11 to 13.



11. How many students have a mobile phone bill greater than $30?

12. What fraction of the students has mobile phone bills of at least $21?

13. Briefly describe the data. Explain whether the histogram shows any outlier of the data set.

Name: _____ Date: _____

The data shows the parking durations, in minutes, of 20 cars in a car park. Use the data to answer questions 14 to 17.

25	38	105	75	65	95	28	40	80	115
70	110	95	45	30	90	86	80	100	62

14. Complete the frequency table to show this data.

Duration (min)	0–29	30–59	60–89	90–119
Frequency				

15. Draw a histogram using the interval. Include a title.

16. What percent of the parking durations are greater than 59 minutes?

17. Briefly describe the data.

Name: _____ Date: _____

The heights of 50 plants of one species are shown in the table. The heights are rounded to the nearest centimeter. Use the data to answer questions 18 to 22.

Height (cm)	1–10	11–20	21–30	31–40	41–50	51–60	61–70
Number of Plants	1	2	*x*	6	12	*y*	10

The heights of 36 plants are at least 41 centimeters high.

18. Find the values of *x* and *y*.

19. Draw a histogram using the interval. Include a title.

Name: _____ Date: _____

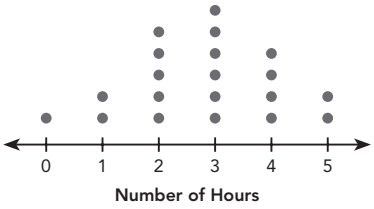
20. The height of a healthy plant should be greater than 30 centimeters. What percent of the plants are in poor health?

21. If the plants were to be categorized as follows:
poor growth: heights between 1 centimeter and 30 centimeters,
normal growth: heights between 31 centimeters and 50 centimeters, and
excellent growth: heights between 51 centimeters and 70 centimeters,
draw a histogram for the above data using the new categories.

22. Compare the two histograms. Describe a situation when one histogram would be more useful than the other.

Lesson 13.2

1.

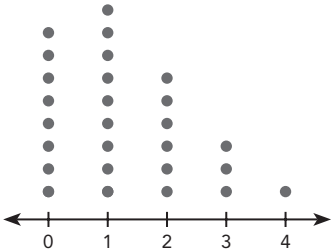


2. Number of observations
$= 1 + 2 + 5 + 6 + 4 + 2 = 20$
There are 20 observations.

3. Most students spend 2 to 3 hours reading for pleasure.

4. Percent $= \frac{2}{20} \times 100\% = 10\%$
10% of the students spend 5 hours reading for pleasure.

5.



6. Number of observations
$= 8 + 9 + 6 + 3 + 1 = 27$
There are 27 observations.

7. Most students own 0 or 1 mobile phone charm.

8. Percent $= \frac{3 + 1}{27} \times 100\% \approx 15\%$
Approximately 15% of the students own more than 2 mobile phone charms.

9. Number of students
$= 2 + 4 + 6 + 4 + 2 + 2 = 20$
The number of students surveyed is 20.

10. Most students watched 2 movies.

11. Percent $= \frac{4 + 2 + 2}{20} \times 100\% = 40\%$
40% of the students watched at least three movies.

12. The dot plot has a "tail" on the right. Most of the data are from 1 to 3, and the distribution is slightly right skewed. The data spans from 0 to 5.
Range: $5 - 0 = 5$
From the description of the dot plot, the students saw about 1 to 3 movies, and all of them saw 0 to 5 movies.

13. Number of students
$= 1 + 2 + 4 + 8 + 5 + 2 + 2 + 1 = 25$
25 students took the quiz.

14. Percent $= \frac{2 + 2 + 1}{25} \times 100\% = 20\%$
20% of the students scored at least 8 points.

15. Most students scored 6 points.

16. The dot plot is nearly symmetrical. These data show a nearly symmetrical dot plot centered around 6. Most of the data falls between 5 and 7. The data spans from 3 to 10.
Range: $10 - 3 = 7$
From the description of the dot plot, most of the students scored between 5 and 7 points.

17. Number of observations
$= 4 + 8 + 4 + 2 + 1 + 1 = 20$
There are 20 observations.

18. Percent $= \frac{4 + 8}{20} \times 100\% = 60\%$
60% of the students have less than 2 board games.

19. Let x be the number of new children who were surveyed.

$$\frac{5}{7}(20 + x) = 12 + x$$

$$\frac{5}{7}(20) + \frac{5}{7}x = 12 + x$$

$$14\frac{2}{7} + \frac{5}{7}x = 12 + x$$

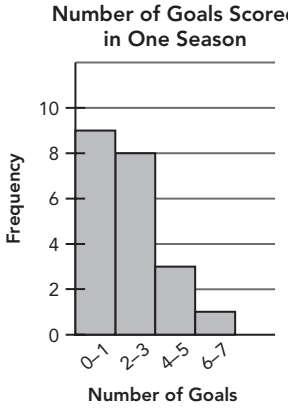
$$-\frac{2}{7}x = -2\frac{2}{7}$$

$$x = 8$$

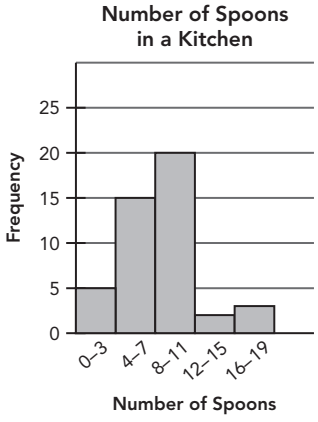
8 more children were surveyed.

Lesson 13.3

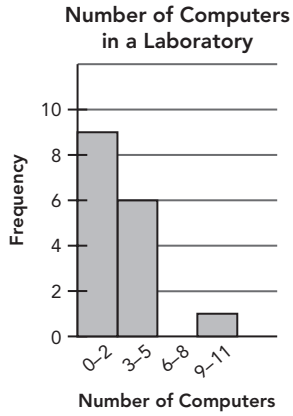
1.



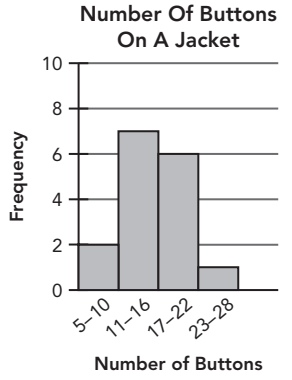
2.



3.



4.



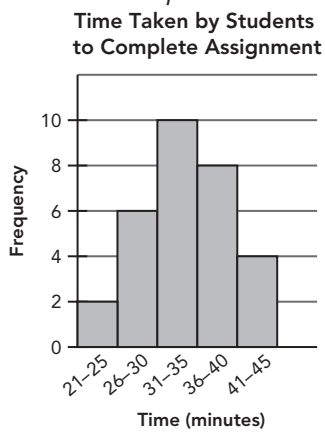
5. $2 + 6 + 10 + 8 + p = 30$

$26 + p = 30$

$p = 4$

The value of p is 4.

6.



The data shows that most students completed the mathematics assignment in between 31 minutes to 35 minutes.
The range of the data is 24. The data are well spread and the shape of the histogram is nearly symmetrical.

7. Percent $= \frac{8 + 4}{30} \times 100\% = 40\%$

40% of the students took at least 36 minutes to complete their assignment.

8. Number of observations
$= 16 + 12 + 8 + 4 = 40$
There are 40 observations.

9. Percent $= \frac{16 + 12}{40} \times 100\% = 70\%$

70% of the students live at most 6 miles from the school.

10. There are 40 students in the group. Most students live 1 to 3 miles from the school. The range of the data is 11. The histogram has a "tail" to the right. Most of the data is to the right of the interval 1–3, the shape of the histogram is right-skewed.

11. Four students have a bill greater than $30.

12. Fraction $= \frac{11 + 3 + 1}{40} = \frac{3}{8}$

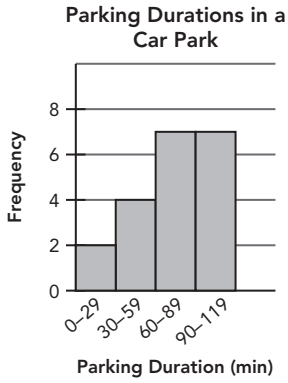
$\frac{3}{8}$ of the students paid at least $21 for their phone bill.

13. Most students have a phone bill between $11 and $30. The range of the data is $59. The histogram has a tail to the left. Most of the data is to the left of the interval 21–30, the shape of the histogram is left-skewed. There is 1 student who has a phone bill between $51 and $60, which is an outlier in the data.

14.

Duration (min)	0–29	30–59	60–89	90–119
Frequency	2	4	7	7

15.



16. Percent $= \frac{7 + 7}{20} \times 100\% = 70\%$

70% of the parking durations are greater than 59 minutes.

17. Most of the parking durations are between 60 minutes and 119 minutes. The range of the data is 119. The histogram has a "tail" to the left. Most of the data is to the left of the interval 90–119, the shape of the histogram is left-skewed.

18. $12 + y + 10 = 36$

$y + 22 = 36$

$y = 36 - 22 = 14$

$1 + 2 + x + 6 + 12 + y + 10 = 50$

$x + y + 31 = 50$

$x + 14 + 31 = 50$

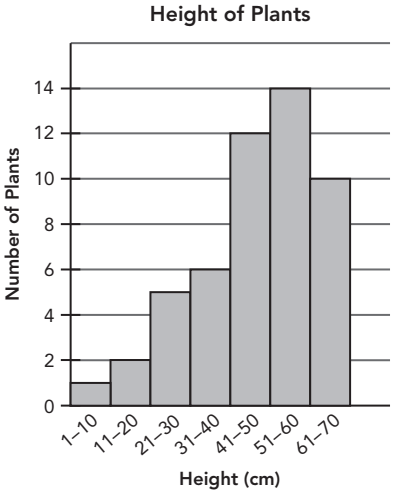
$x + 45 = 50$

$x = 50 - 45$

$= 5$

The value of x is 5, and the value of y is 14.

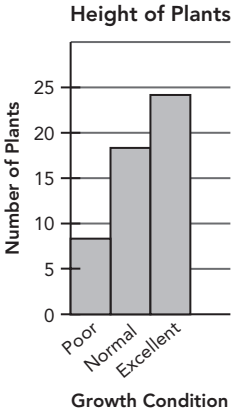
19.



20. Percent $= \frac{1 + 2 + 5}{50} \times 100\% = 16\%$

16% of the plants are in poor health.

21.



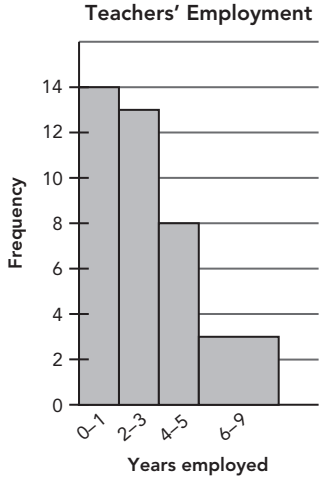
22. The first histogram, which uses more intervals, reveals more about the distribution of data. It shows the three intervals that contain the most data. This histogram will be more useful when you want to find out the height intervals of the tallest plants.

The second histogram, which uses fewer intervals with greater width, categorizes the plants into poor, normal, and excellent growth. This histogram will be more useful when you want general information on whether the plants are growing well.

Brain @ Work

1. When there are equal intervals, each bar width should be equal. However, the intervals are unequal. The width of the interval 6–9 is 2 times the other intervals. So, the frequency for this bar has to be divided by 2.

2.



Chapter 14

Lesson 14.1

1. Mean $= \frac{9 + 10 + 11 + 16 + 12 + 12 + 14}{7}$

$= 12$

2. Mean

$= \frac{20 + 22 + 21 + 23 + 25 + 24 + 26 + 28 + 27}{9}$

$= 24$

3. Mean $= \frac{17.4 + 20.3 + 84.1 + 31.2 + 53.7 + 11.7}{6}$

$= 36.4$

4. Mean $= \frac{3.8 + 5.2 + 4.8 + 5.0 + 4.6}{5} = 4.68$

The mean height of these five peacocks is 4.68 feet.

5. Mean

$= \frac{11.3 + 15.2 + 12.0 + 13.6 + 12.8 + 10.9 + 14.2 + 14.0}{8}$

$= 13$

The mean time these paper airplanes stayed in the air is 13 seconds.

6. Mean $= \frac{9 + 5 + 7 + 9 + 5}{5} = 7$

The mean number of pins that fell is 7.

7. Number of girls

$= 1 + 2 + 1 + 5 + 3 + 4 + 2 = 18$

There are 18 girls in the group.

8. Total number of headbands

$= 1 \cdot 4 + 2 \cdot 5 + 1 \cdot 6 + 5 \cdot 7 + 3 \cdot 8 + 4 \cdot 9 + 2 \cdot 10$

$= 135$

The total number of headbands is 135.