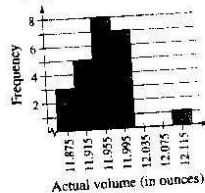
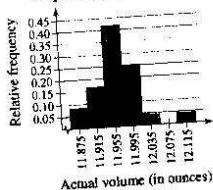


3. Liquid Volume 12-oz Cans

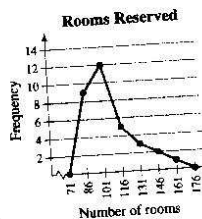


4. Liquid Volume 12-oz Cans

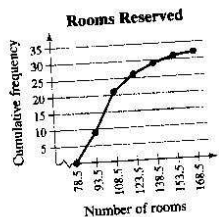


5.

Class	Midpoint, x	Frequency, f	Cumulative frequency
79-93	86	9	9
94-108	101	12	21
109-123	116	5	26
124-138	131	3	29
139-153	146	2	31
154-168	161	1	32
		$\Sigma f = 32$	



6.



CHAPTER 2 REVIEW EXERCISE SOLUTIONS

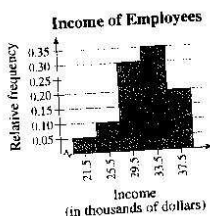
1.

Class	Midpoint	Boundaries	Frequency, f	Relative frequency	Cumulative frequency
20-23	21.5	19.5-23.5	1	0.05	1
24-27	25.5	23.5-27.5	2	0.10	3
28-31	29.5	27.5-31.5	6	0.30	9
32-35	33.5	31.5-35.5	7	0.35	16
36-39	37.5	35.5-39.5	4	0.20	20
			$\Sigma f = 20$	$\Sigma \frac{f}{n} = 1$	

7. 1

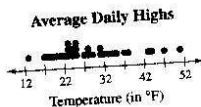
3 7 8 9
 2 0 1 2 3 3 3 4 4 5 5 5 7 8 8 9
 3 1 1 2 3 4 5 7 8
 4 3 4 7
 5 1

2.

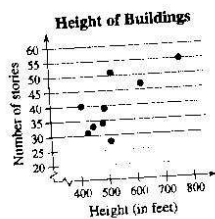


Greatest relative frequency: 32-35
 Least relative frequency: 20-23

8.

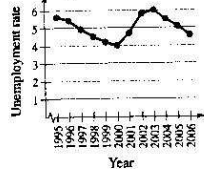


9.

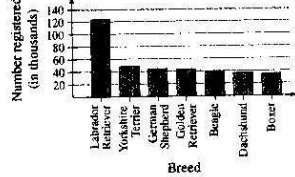


It appears as height increases, the number of stories increases.

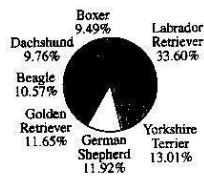
10. U.S. Unemployment Rate



11. American Kennel Club



12. American Kennel Club



13. $\bar{x} = 9.1$ 14. $\bar{x} = 40.6$
 median = 8.5 median = 42
 mode = 7 mode = 42

15.

Midpoint, x	Frequency, f	xf
21.5	1	21.5
25.5	2	51.0
29.5	6	177.0
33.5	7	234.5
37.5	4	150.0
	$n = 20$	$\sum xf = 634$

$$\bar{x} = \frac{\sum xf}{n} = \frac{634}{20} = 31.7$$

16.

x	f	xf
0	13	0
1	9	9
2	19	38
3	8	24
4	5	20
5	2	10
6	4	24
	$n = 60$	$\sum xf = 125$

$$\bar{x} = \frac{\sum xf}{n} = \frac{125}{60} \approx 2.1$$

17.
$$\bar{x} = \frac{\sum xw}{w} = \frac{(78)(0.15) + (72)(0.15) + (86)(0.15) + (91)(0.15) + (87)(0.15) + (80)(0.25)}{0.15 + 0.15 + 0.15 + 0.15 + 0.15 + 0.25}$$

$$= \frac{82.1}{1} = 82.1$$

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$$18. \bar{x} = \frac{\sum xw}{w} = \frac{(96)(0.20) + (85)(0.20) + (91)(0.20) + (86)(0.40)}{0.20 + 0.20 + 0.20 + 0.40}$$

$$= \frac{88.8}{1} = 88.8$$

19. Skewed 20. Skewed 21. Skewed left

22. Skewed right 23. Median 24. Mean

25. Range = Max - Min = 8.26 - 5.46 = 2.8

26. Range = Max - Min = 19.73 - 15.89 = 3.84

27. $\mu = \frac{\sum x}{N} = \frac{96}{14} = 6.9$

$$\sigma = \sqrt{\frac{\sum(x - \mu)^2}{N}} = \sqrt{\frac{(4 - 6.9)^2 + (2 - 6.9)^2 + \dots + (3 - 6.9)^2 + (3 - 6.9)^2}{12}}$$

$$= \sqrt{\frac{295.7}{12}} \approx \sqrt{24.64} \approx 4.96$$

28. $\mu = \frac{\sum x}{N} = \frac{602}{9} \approx 66.9$

$$\sigma = \sqrt{\frac{\sum(x - \mu)^2}{N}}$$

$$= \sqrt{\frac{(52 - 66.9)^2 + (86 - 66.9)^2 + \dots + (68 - 66.9)^2 + (56 - 66.9)^2}{9}}$$

$$\approx \sqrt{\frac{862.87}{9}} \approx \sqrt{95.87} \approx 9.8$$

29. $\bar{x} = \frac{\sum x}{n} = \frac{36,801}{15} = 2453.4$

$$s = \sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}} = \sqrt{\frac{(2445 - 2453.4)^2 + \dots + (2377 - 2453.4)^2}{14}}$$

$$= \sqrt{\frac{1,311,783.6}{14}} \approx \sqrt{93,698.8} \approx 306.1$$

30. $\bar{x} = \frac{\sum x}{n} = \frac{416,659}{8} = 52,082.4$

$$s = \sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}} = \sqrt{\frac{(49,632 - 52,082.3)^2 + \dots + (49,924 - 52,082.3)^2}{7}}$$

$$= \sqrt{\frac{73,225,929.87}{7}} = \sqrt{10,460,847.12} \approx 3234.3$$

31. 99.7% of the distribution lies within 3 standard deviations of the mean.

$$\mu + 3\sigma = 49 + (3)(2.50) = 41.5$$

$$\mu - 3\sigma = 49 - (3)(2.50) = 56.5$$

99.7% of the distribution lies between \$41.50 and \$56.50.

32. $(46.75, 52.25) \rightarrow (49.50 - (1)(2.75), 49.50 + (1)(2.75)) \rightarrow (\mu - \sigma, \mu + \sigma)$
 68% of the cable rates lie between \$46.75 and \$52.25.

33. $n = 40 \quad \mu = 36 \quad \sigma = 8$
 $(20, 52) \rightarrow (36 - 2(8), 36 + 2(8)) \Rightarrow (\mu - 2\sigma, \mu + 2\sigma) \Rightarrow k = 2$

$$1 - \frac{1}{k^2} = 1 - \frac{1}{(2)^2} = 1 - \frac{1}{4} = 0.75$$

At least $(40)(0.75) = 30$ customers have a mean sale between \$20 and \$52.

34. $n = 20 \quad \mu = 7 \quad \sigma = 2$
 $(3, 11) \rightarrow (7 - 2(2), 7 + 2(2)) \rightarrow (\mu - 2\sigma, \mu + 2\sigma) \rightarrow k = 2$

$$1 - \frac{1}{k^2} = 1 - \frac{1}{(2)^2} = 1 - \frac{1}{4} = 0.75$$

At least $(20)(0.75) = 15$ shuttle flights lasted between 3 days and 11 days.

35. $\bar{x} = \frac{\sum xf}{n} = \frac{99}{40} \approx 2.5$

$$s = \sqrt{\frac{\sum (x - \bar{x})^2 f}{n - 1}} = \sqrt{\frac{(0 - 1.24)^2(1) + (1 - 1.24)^2(8) + \dots + (5 - 1.24)^2(3)}{39}}$$

$$= \sqrt{\frac{59.975}{39}} \approx 1.2$$

36. $\bar{x} = \frac{\sum xf}{n} = \frac{61}{25} \approx 2.4$

$$s = \sqrt{\frac{\sum (x - \bar{x})^2 f}{n - 1}}$$

$$= \sqrt{\frac{(0 - 2.44)^2(4) + (1 - 2.44)^2(5) + \dots + (6 - 2.44)^2(1)}{24}}$$

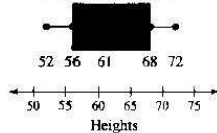
$$= \sqrt{\frac{72.16}{24}} \approx 1.7$$

37. $Q_1 = 56$ inches

38. $Q_3 = 68$ inches

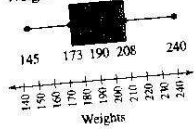
39. $IQR = Q_3 - Q_1 = 68 - 56 = 12$ inches

40. Height of Students



41. $IQR = Q_3 - Q_1 = 33 - 29 = 4$

42. Weight of Football Players



43. 23% of the students scored higher than 68.

44. $\frac{84}{728} \approx 0.109 \rightarrow 11\%$ have larger audiences.

The station would represent the 89th percentile, P_{89} .

45. $x = 213 \Rightarrow z = \frac{x - \mu}{\sigma} = \frac{213 - 186}{18} \approx 1.5$

This player is not unusual.

46. $x = 141 \Rightarrow z = \frac{x - \mu}{\sigma} = \frac{141 - 186}{18} = -2.5$

This is an unusually light player.

47. $x = 178 \Rightarrow z = \frac{x - \mu}{\sigma} = \frac{178 - 186}{18} = -0.44$

This player is not unusual.

48. $x = 249 \Rightarrow z = \frac{x - \mu}{\sigma} = \frac{249 - 186}{18} \approx 3.5$

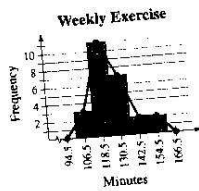
This is an unusually heavy player.

CHAPTER 2 QUIZ SOLUTIONS

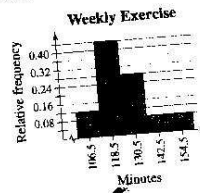
1. (a)

Class limits	Midpoint	Class boundaries	Frequency	Relative frequency	Cumulative frequency
101-112	106.5	100.5-112.5	3	0.12	3
113-124	118.5	112.5-124.5	11	0.44	14
125-136	130.5	124.5-136.5	7	0.28	21
137-148	142.5	136.5-148.5	2	0.08	23
149-160	154.5	148.5-160.5	2	0.08	25

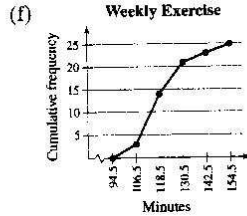
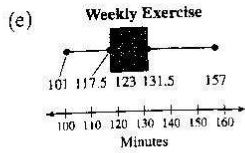
(b) Frequency Histogram and Polygon



(c) Relative Frequency Histogram

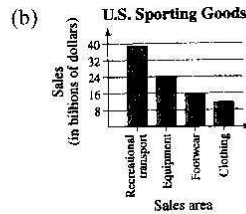


(d) Skewed



$$2. \bar{x} = \frac{\sum xf}{n} = \frac{3130.5}{25} \approx 125.2$$

$$s = \sqrt{\frac{\sum(x - \bar{x})^2 f}{n - 1}} = \sqrt{\frac{4055.04}{24}} \approx 13.0$$



$$4. (a) \bar{x} = \frac{\sum x}{n} = 751.6$$

median = 784.5
mode = (none)

The mean best describes a typical salary because there are no outliers.

(b) range = Max - Min = 575

$$s^2 = \frac{\sum(x - \bar{x})^2}{n - 1} = 48,135.1$$

$$s = \sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}} = 219.4$$

5. $\bar{x} - 2s = 155,000 - 2 \cdot 15,000 = \$125,000$

$\bar{x} + 2s = 155,000 + 2 \cdot 15,000 = \$185,000$

95% of the new home prices fall between \$125,000 and \$185,000.

6. (a) $x = 200,000 \quad z = \frac{x - \mu}{\sigma} = \frac{200,000 - 155,000}{15,000} = 3.0 \Rightarrow$ unusual price

(b) $x = 55,000 \quad z = \frac{x - \mu}{\sigma} = \frac{55,000 - 155,000}{15,000} \approx -6.67 \Rightarrow$ very unusual price

(c) $x = 175,000 \quad z = \frac{x - \mu}{\sigma} = \frac{175,000 - 155,000}{15,000} \approx 1.33 \Rightarrow$ not unusual

(d) $x = 122,000 \quad z = \frac{x - \mu}{\sigma} = \frac{122,000 - 155,000}{15,000} = -2.2 \Rightarrow$ unusual price

7. (a) $Q_1 = 76 \quad Q_2 = 80 \quad Q_3 = 88$

(b) $IQR = Q_3 - Q_1 = 88 - 76 = 12$

(c) Wins for Each Team

