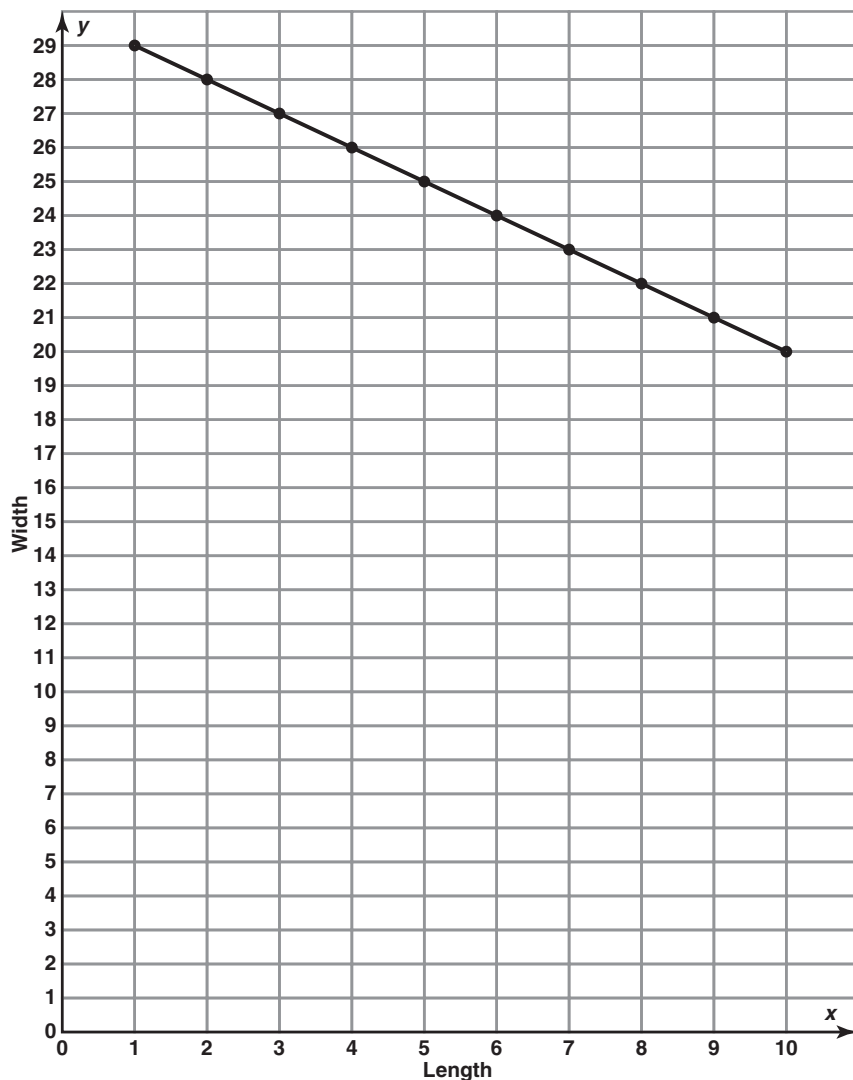


Figure 4



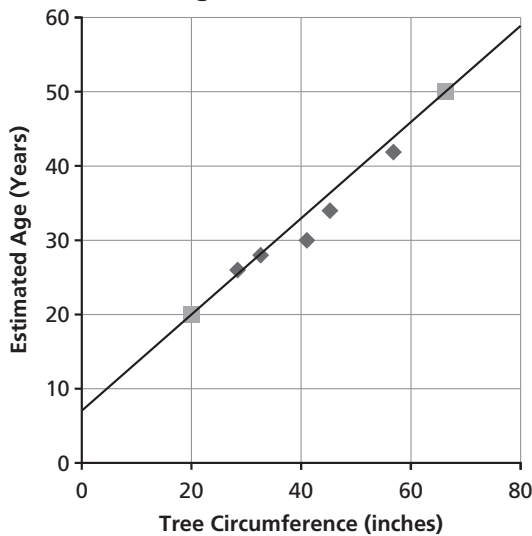
Skill: Identifying Inverse Variation

1. Inverse variation; $xy = 70$
2. Inverse variation; $xy = 48$
3. Direct variation; $y = 11x$
4. Direct variation; $y = 4.5x$
5. Inverse variation; $xy = 36$
6. Inverse variation; $xy = 6$

Investigation 4 Additional Practice

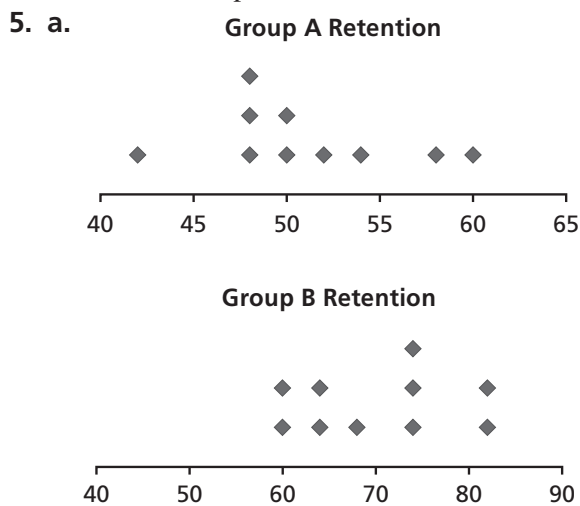
1. a. As circumference of a tree increases, so does its age in years.
- b. Sample answer: Around 38 years, because 38 is between 34 and 43, the ages of the trees in the table with circumferences of 45 and 57 inches respectively.

2. a. Age of Pin Oak Trees



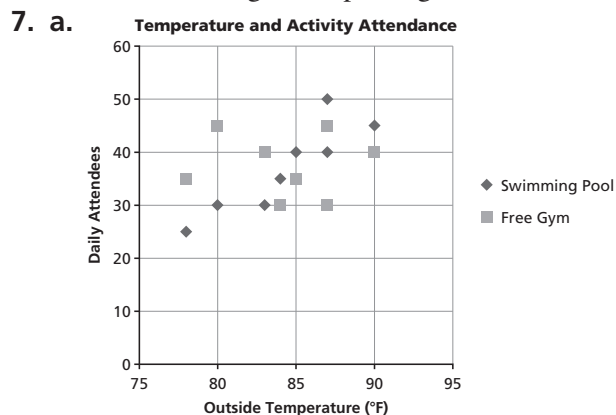
Thinking With Mathematical Models Answers

- b. $y = \frac{15}{23}c + \frac{160}{23}$
 c. Actual: approximately 0.99; Sample answer: All points lie very close to the line, and the correlation is positive, so a value near 1.0 is to be expected.
3. a. Sample answers:
 A: 0.98; B: -0.85; C: 0.15; D: -0.8
 b. C, D, B, A
4. a. The number of hours of sleep needed to feel rested decreases as age increases.
 b. -0.5; There is a negative correlation because the slope of the line is negative. The data values appear linear but are not very close to the line, so the correlation is not very strong.
 c. Sample answer: No; the trend is probably not valid for higher ages, because if the trend continues, at a certain age people would no longer need to sleep at all.



- b. Group A has a greater spread of scores, with a center around 50 words remembered. Group B has a smaller spread of scores, with a center around 70 words remembered.
6. a. Group A mean: 51; median: 50; standard deviation: approx. 5.27
 Group B mean: 70; median: 71; standard deviation: approx. 7.94

- b. No; the study was for people who studied by reading silently or using art techniques. Neither of these categories includes using a computer game.



- b. The outside temperature appears to have some effect on the number of swimmers, but it has little effect on the number of registrants for free gym. There appears to be a linear association in the swimming pool data, but not in the free gym data.
- c. No; the data for free gym weakens the correlation, so it would be better to use a model line that represents only the swimming pool data points.
8. a. The number of people who attend the swimming pool is fairly spread out with a center around 37.
 b. The number of people who attend free gym is clustered around 37.5.
9. The data are positively correlated. The correlation coefficient is closest to 0.50.
10. D, B, C, A
11. a. mean
 b. median
 c. standard deviation

Skill: Describing Data Sets

- The total boat rental charge increases at a rate of \$15 per hour.
- The snow is falling at a rate of 1.25 inches per hour.

Thinking With Mathematical Models Answers

3. The drink price increases at a rate of \$0.07 per ounce.
4. The plant has been growing at a rate of 0.25 inch per week.
5. The pool is draining at a rate of 1.6 gallons per minute.
6. The ice cube height is decreasing at a rate of 0.64 centimeter per minute as it melts.
7. The outside temperature is decreasing 12°F per hour or 0.2°F per minute.
8. The games cost an average of \$3 each.
9. Mean: 18; median 12; st. dev.: approx. 18.97
10. Mean: 1.2; median 1.2; st. dev.: approx. 0.17
11. Mean: 132; median 136; st. dev.: approx. 10.49
12. Mean: 6.7; median: 6.95; st. dev.: approx. 1.67
13. Mean: 3.5; median: 3.5; st. dev.: approx. 0.59
14. Mean: 70; median: 70.5; st. dev.: approx. 4.15
15. Mean: 140; median: 140; st. dev.: 30
16. Mean: 89.4; median: 90; st. dev.: approx. 7.14

Investigation 5 Additional Practice

1. Examples will vary.

a. categorical	g. categorical
b. numerical	h. numerical
c. numerical	i. categorical
d. either	j. categorical
e. numerical	k. categorical
f. categorical	l. either
2. **Sample answers:** numerical: time length, speed, number of measures, number of parts, prices; categorical: genre, instrumentation, format
3. a. **Sample answer:** false, because 24% of seventh graders prefer pop music compared to 24.4% of eighth graders.
 b. **Sample answer:** true, because equal numbers of people who like country music are in sixth or seventh grade.
 c. **Sample answer:** true, because fewer eighth graders prefer pop music than rock music.
 d. **Sample answer:** false, because 20% of sixth graders prefer rock music while 17.4% of eighth graders prefer other types of music.

4. a.

	C	P	R	O
6th	25%	30%	20%	25%
7th	20%	24%	24%	32%
8th	33%	24%	26%	17%

b.

	C	P	R	O
6th	29%	34%	25%	29%
7th	29%	34%	38%	47%
8th	43%	31%	38%	24%

c.

	C	P	R	O	T
6th	7%	9%	6%	7%	29%
7th	7%	9%	9%	12%	37%
8th	11%	8%	9%	6%	34%
T	25%	26%	24%	25%	100%

5. a.

	Music	Games	Total
< 18	62	64	126
18–29	54	59	113
30–50	45	51	96
> 50	15	10	25
Total	176	184	360

b.

	Music	Games	Total
< 30	116	123	239
≥ 30	60	61	121
Total	176	184	360

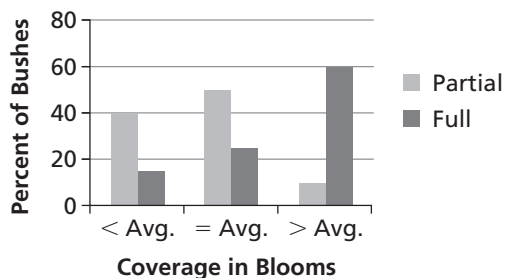
- c. **Sample answer:** No, because 116 is less than twice 60.
- d. **Sample answer:** It is more likely that they will purchase games, because $123 > 116$.
- e. **Sample answer:** It is about equally likely that a person over 30 will purchase music or games, because both percents are close to 50%.

6. a.

Direct Sun	Coverage in Blooms		
	< Avg.	Avg.	> Avg.
Partial	40%	50%	10%
Full	15%	25%	60%

Thinking With Mathematical Models Answers

b. Partial vs. Full Sunlight for Roses



c. **Sample answer:** No, because only 60% of the bushes planted in partial sunlight produced at least an average number of blooms compared to 85% of bushes planted in full sunlight.

7. 60%
24 out of 40
8. $\frac{6}{60} = \frac{1}{10} = 10\%$
9. (Figure 1)

9. $\frac{29.7}{30}, \frac{99}{100}, \frac{148.5}{150}$
10. $\frac{33}{30}, \frac{110}{100}, \frac{165}{150}$
11. $\frac{45}{30}, \frac{150}{100}, \frac{225}{150}$
12. $\frac{60}{30}, \frac{200}{100}, \frac{300}{150}$
13. 20
14. 33.3%
15. 93.8%
16. 66%
17. 30%
18. 36.0%
19. 166.7%
20. 117.6%
21. 206.3%

Skill: Proportions and Percents

1. $\frac{3}{30}, \frac{10}{100}, \frac{15}{150}$
2. $\frac{7.5}{30}, \frac{25}{100}, \frac{37.5}{150}$
3. $\frac{10}{30}$, approximately $\frac{33.3}{100}, \frac{50}{150}$
4. $\frac{12}{30}, \frac{40}{100}, \frac{60}{150}$
5. $\frac{15.6}{30}, \frac{52}{100}, \frac{78}{150}$
6. $\frac{19.5}{30}, \frac{65}{100}, \frac{97.5}{150}$
7. $\frac{21.3}{30}, \frac{71}{100}, \frac{106.5}{150}$
8. $\frac{24.15}{30}, \frac{80.5}{100}, \frac{120.75}{150}$

Figure 1

	Blue	Red	Green	Orange
7th grade	20%	28%	40%	12%
8th grade	16%	44%	32%	8%