CHAPTER 6

Solutions Key

Percents

ARE YOU READY? PAGE 327

1. proportion

2. decimal

3. ratio

4. simplest form

5. $\frac{8}{10} = 8 \div 10 = 0.8$

6. $\frac{53}{100} = 53 \div 100 = 0.53$

7. $\frac{739}{1000} = 739 \div 1000 = 0.739$

8. $\frac{7}{100} = 7 \div 100 = 0.07$

9. $\frac{2}{5} = 2 \div 5 = 0.4$

10. $\frac{5}{8} = 5 \div 8 = 0.625$

11. $\frac{7}{12} = 7 \div 12 = 0.58\overline{3}$

12. $\frac{13}{20} = 13 \div 20 = 0.65$

13. $0.05 = \frac{5}{100} = \frac{1}{20}$

14. $0.92 = \frac{92}{100} = \frac{23}{25}$

15. $0.013 = \frac{13}{1{,}000}$

16. $0.8 = \frac{8}{10} = \frac{4}{5}$

17. $0.006 = \frac{6}{1000} = \frac{3}{500}$

18. $0.305 = \frac{305}{1000} = \frac{61}{200}$

19. $0.0007 = \frac{7}{10{,}000}$

20. $1.04 = \frac{104}{100} = \frac{26}{25} = 1\frac{1}{25}$

21. $100n = 300$
$n = 3$

22. $38 = 0.4x$
$95 = x$

23. $16p = 1200$
$p = 75$

24. $9 = 27y$
$\frac{1}{8} = y$

25. $0.07m = 56$
$m = 800$

26. $25 = 100t$
$\frac{1}{4} = t$

27. $\frac{2}{3} = \frac{x}{12}$
$24 = 3x$
$8 = x$

28. $\frac{x}{20} = \frac{3}{4}$
$4x = 60$
$x = 15$

29. $\frac{8}{15} = \frac{x}{45}$
$360 = 15x$
$24 = x$

30. $\frac{16}{28} = \frac{4}{n}$
$16n = 112$
$n = 7$

31. $\frac{p}{100} = \frac{12}{36}$
$36p = 1200$
$p = 33\frac{1}{3}$

32. $\frac{42}{12} = \frac{14}{n}$
$42n = 168$
$n = 4$

33. $\frac{8}{y} = \frac{10}{5}$
$40 = 10y$
$4 = y$

34. $\frac{6}{9} = \frac{d}{24}$
$9d = 144$
$d = 16$

35. $\frac{21}{a} = \frac{7}{5}$
$7a = 105$
$a = 15$

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Think and Discuss

1. Possible answer: Like a fractions a percent compares a part to a whole. The whole equals 100, so 40% means 40 of 100 parts.

2. Possible answer: Write it as a fraction with a numerator of 5 and a denominator of 100. Then divide 5 by 100 to equal 0.05.

Exercises

1. $\frac{79}{100} = 79\%$

2. $\frac{25 + 25 + 4 + 4}{100} = \frac{58}{100} = 58\%$

3. $\frac{10 + 15 + 15 + 10}{100} = \frac{50}{100} = 50\%$

4. $65\% = \frac{65}{100} = \frac{13}{20}$

5. $82\% = \frac{82}{100} = \frac{41}{50}$

6. $12\% = \frac{12}{100} = \frac{3}{25}$

7. $38\% = \frac{38}{100} = \frac{19}{50}$

8. $75\% = \frac{75}{100} = \frac{3}{4}$

9. $22\% = \frac{22}{100} = 0.22$

10. $51\% = \frac{51}{100} = 0.51$

11. $8.07\% = \frac{8.07}{100} = \frac{807}{1{,}000} = 0.0807$

12. $1.6\% = \frac{1.6}{100} = \frac{16}{1{,}000} = 0.016$

13. $11\% = \frac{11}{100} = 0.11$

14. $\frac{10 + 20 + 30}{100} = \frac{60}{100} = 60\%$

15. $\frac{45}{100} = 45\%$

16. $\frac{38}{100} = 38\%$

17. $55\% = \frac{55}{100} = \frac{11}{20}$

18. $34\% = \frac{34}{100} = \frac{17}{50}$

19. $83\% = \frac{83}{100}$

20. $53\% = \frac{53}{100}$

21. $81\% = \frac{81}{100}$

22. $48\% = \frac{48}{100} = 0.48$

23. $9.8\% = \frac{9.8}{100} = \frac{98}{1{,}000} = 0.098$

24. $30.2\% = \frac{30.2}{100} = \frac{302}{1{,}000} = 0.302$

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25. $66.3\% = \frac{66.3}{100} = \frac{663}{1{,}000} = 0.663$

26. $8.39\% = \frac{8.39}{100} = \frac{839}{10{,}000} = 0.0839$

27. $2.70\% = \frac{2.70}{100} = \frac{270}{10{,}000} = \frac{27}{1000} = 0.0270$

28. $7.6\% = \frac{7.6}{100} = \frac{76}{1{,}000} = \frac{19}{250}$

$\frac{76}{1000} = 0.076$

29. $44\% = \frac{44}{100} = \frac{11}{25}$

$\frac{44}{100} = 0.44$

30. $3.148\% = \frac{3.148}{100} = \frac{3{,}148}{100{,}000} = \frac{1{,}574}{50{,}000} = \frac{787}{25{,}000}$

$\frac{3148}{100{,}000} = 0.03148$

31. $10.5\% = \frac{10.5}{100} = \frac{105}{1000} = \frac{21}{200}$

$\frac{105}{1000} = 0.105$

32. $\frac{18}{100} \square 22\%$

$\frac{18}{100} < \frac{22}{100}$

$\frac{18}{100} < 22\%$

33. $\frac{35}{52} \square 72\%$

$0.673 \square 0.72$

$0.673 < 0.72$

$\frac{35}{52} < 72\%$

34. $\frac{10}{50} \square 22\%$

$\frac{11}{50} \square \frac{22}{100}$

$\frac{11}{50} < \frac{11}{50}$

$\frac{11}{50} < 22\%$

35. $\frac{11}{20} \square 56\%$

$0.55 < 0.56$

$\frac{11}{20} < 56\%$

36. $41\% \square \frac{13}{30}$

$0.41 < 0.43$

$41\% < \frac{13}{30}$

37. $\frac{17}{20} \square 85\%$

$\frac{17}{20} \square \frac{85}{100}$

$\frac{17}{20} = \frac{17}{20}$

$\frac{17}{20} = 85\%$

38. $\frac{3}{5} \square 60\%$

$\frac{3}{5} \square \frac{60}{100}$

$\frac{3}{5} = \frac{3}{5}$

$\frac{3}{5} = 60\%$

39. $15\% \square \frac{4}{30}$

$0.15 > 0.133$

$15\% > \frac{4}{30}$

40. a. $11\% = \frac{11}{100}$ or 11 to 100

b. $\frac{11}{100} = \frac{7}{x}$

$11x = 700$

$x = 63.6$

about 64 grams

41. $\frac{5}{7} \approx 71\%$, so Liz has completed a greater percent of homework. Brad must finish a greater percent at home.

42. Possible answer: A ratio and a percent both express a part of a whole. A ratio is given as a fraction and a percent is a ratio of a number to 100, indicated by adding the percent sign, %.

43. $0.4 \cdot 100 = 40\%$
$0.03 \cdot 100 = 3\%$

44. C; $0.08 < 0.8$

45. Sean's team : $\frac{19}{25} = 76\%$, which is greater, then 68%.

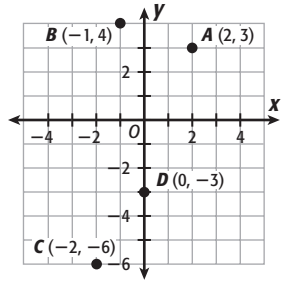
46. $1 - \frac{1}{2} = \frac{1}{2}$

47. $6 + 6 = 12$

48. $6 - (-1) = 7$

49. $\frac{1}{2} + 3 = 3\frac{1}{2}$

50-53.



6-2, PAGE 334

Think and Discuss

1. Possible answer: Divide 3 by 4 and write the decimal as a percent. Write an equivalent fraction with a denominator of 100 and then write the equivalent percent.

2. $\frac{25}{100} = \frac{1}{4}$

0.25, 25%

Exercises

1. $0.6 = \frac{6}{10} = \frac{60}{100} = 60\%$

2. $0.32 = \frac{32}{100} = 32\%$

3. $0.544 = \frac{544}{1000} = \frac{54.4}{100} = 54.4\%$

4. $0.06 = \frac{6}{100} = 6\%$

5. $0.087 = \frac{87}{1000} = \frac{8.7}{100} = 8.7\%$

6. $\frac{1}{4} = 1 \div 4 = 0.25 = 25\%$

7. $\frac{3}{25} = 3 \div 25 = 0.12 = 12\%$

8. $\frac{11}{20} = 11 \div 20 = 0.55 = 55\%$

9. $\frac{7}{40} = 7 \div 40 = 0.175 = 17.5\%$

10. $\frac{5}{8} = 5 \div 8 = 0.625\%$

11. Use mental math. 50 multiplied by 2 is 100 so 20 multiplied by 2 is 40. 40%.

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12. $0.15 = \frac{15}{100} = 15\%$

13. $0.83 = \frac{83}{100} = 83\%$

14. $0.325 = \frac{325}{1000} = \frac{32.5}{100} = 32.5\%$

15. $0.081 = \frac{81}{1000} = \frac{8.1}{100} = 8.1\%$

16. $0.42 = \frac{42}{100} = 42\%$

17. $\frac{3}{4} = 3 \div 4 = 0.75 = 75\%$

18. $\frac{2}{5} = 2 \div 5 = 0.4 = 40\%$

19. $\frac{3}{8} = 3 \div 8 = 0.375 = 37.5\%$

20. $\frac{3}{16} = 3 \div 16 = 0.1875 = 18.75\%$

21. $\frac{7}{25} = 7 \div 25 = 0.28 = 28\%$

22. The denominator is not a factor of 100, so mental math is not a good choice. Using a calculator is the best method. $30 \div 75 = 0.4 = 40\%$

23. $45\% \blacksquare \frac{2}{5}$

$\frac{45}{100} > \frac{40}{100}$

$45\% > \frac{2}{5}$

24. $9\% \blacksquare 0.9$

$\frac{9}{100} \blacksquare 0.9$

$0.09 < 0.9$

$9\% < 0.9$

25. $\frac{7}{12} \blacksquare 60\%$

$0.583 < 0.60$

$\frac{7}{12} < 60\%$

26. $0.037 \blacksquare 37\%$

$3.7\% < 37\%$

$0.037 < 37\%$

27. $\frac{1}{2} \cdot 900 = 450$

$\frac{1}{10} \cdot 450 = 45$

$\frac{1}{5} \cdot 45 = 9$

$\frac{9}{900} = 0.01 = 1\%$

1% of the students are boys who play trumpet in the band.

28. $\frac{90{,}000}{250{,}000} = \frac{9}{25} = \frac{36}{100} = 36\%$

36% of the plant species are found in the rain forests.

29. After writing the fraction as 0.4, the student didn't move the decimal two places to the right to get 40%.

30. Possible answer: Use division to write the fraction as a decimal and write the decimal as a percent, or write an equivalent fraction with a denominator of 100 and write the new numerator with a percent sign.

31. $\frac{15}{12} = 15 \div 12 = 1.25 = 125\%$

32. D; $0.045 = 4.5\%$

33. Possible answer: Find the area of Melanie's floor, then write a ratio of the portion that the rug covers to the whole floor and convert this fraction to a percent.

34.

$y = 5x + 2$		
x	$5x + 2$	y
-2	$5(-2) + 2$	-8
-1	$5(-1) + 2$	-3
0	$5(0) + 2$	2
1	$5(1) + 2$	7
2	$5(2) + 2$	12

35.

$y = -2x$		
x	$-2x$	y
-2	$-2(-2)$	4
-1	$-2(-1)$	2
0	$-2(0)$	0
1	$-2(1)$	-2
2	$-2(2)$	-4

36.

$y = -\frac{2}{3}x - 4$		
x	$-\frac{2}{3}x - 4$	y
-2	$-\frac{2}{3}(-2) - 4$	$-\frac{8}{3}$
-1	$-\frac{2}{3}(-1) - 4$	$-\frac{10}{3}$
0	$-\frac{2}{3}(0) - 4$	-4
1	$-\frac{2}{3}(1) - 4$	$-\frac{14}{3}$
2	$-\frac{2}{3}(2) - 4$	$-\frac{16}{3}$

37. $\frac{x}{6} = \frac{1}{15}$

$15x = 6$

$x = \frac{6}{15}$

$x = 0.4m$

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Think and Discuss

1. Possible answer: Find $\frac{1}{2}$ of 88, or find 10% of 88 and multiply by 5.

2. Possible answer: 15% is about $\frac{1}{7}$ because $\frac{15}{100} = \frac{3}{20}$ is close to $\frac{1}{7}$ and because $100 \div 15$ rounds to 7.

3. Possible answer: When you want to estimate the item's sale price or the sales tax on an item; when a store needs to collect sales tax on an item.

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Exercises

1. Possible answer:

$30\% \text{ of } 86 \approx \frac{1}{3} \cdot 86$

$\approx \frac{1}{3} \cdot 90$

≈ 30

30% of 86 is about 30.

2. Possible answer:

$52\% \text{ of } 83 \approx \frac{1}{2} \cdot 83$

$\approx \frac{1}{2} \cdot 80$

≈ 40

52% of 83 is about 40.

3. Possible answer:

$10\% \text{ of } 48 \approx \frac{1}{10} \cdot 48$

$\approx \frac{1}{10} \cdot 50$

≈ 5

10% of 48 is about 5.

4. Possible answer:

$27\% \text{ of } 63 \approx \frac{1}{4} \cdot 63$

$\approx \frac{1}{4} \cdot 60$

≈ 15

27% of 63 is about 15.

5. Yes; 35% of \$43.99 is close to $\frac{1}{3}$ of \$45, which is \$15. Since \$45 − \$15 = \$30, Darden will have enough money.

6. Possible answer:
5% of 82
82 is about 80, so find 5% of 80.
1% of 80 = .80
5% of 80 = 5 · 0.80 = 4.0
5% of 82 is about 4.

7. Possible answer:
39% of 19
39% is about 40% and 19 is about 20, so find 40% of 20.
10% of 20 = 2.0
40% of 20 = 4 · 2.0 = 8.0
39% of 19 is about 8.

8. Possible answer:
21% of 68
21% is about 20% and 68 is about 70, so find 20% of 70.
10% of 70 = 7.0
20% of 70 = 2 · 7.0 = 14.0
21% of 68 is about 14.

9. Possible answer:
7% of 109
109 is about 110, so find 7% of 110.
1% of 110 = 1.10
7% of 110 = 7 · 1.10 = 7.70
7% of 109 is about 7.7.

10. Possible answer:
Find 15% of \$23.
15% = 10% + 5%
10% of \$23 = \$2.30
5% of \$23 = \$2.30 ÷ 2 = \$1.15
\$2.30 + \$1.15 = \$3.45
Mrs. Coronado should leave about \$3.45 for a 15% tip.

11. Possible answer:

$8\% \text{ of } 261 \approx \frac{1}{10} \cdot 261$

$\approx \frac{1}{10} \cdot 260$

≈ 26

8% of 261 is about 26.

12. Possible answer:

$34\% \text{ of } 93 \approx \frac{1}{3} \cdot 93$

≈ 31

≈ 34% of 93 is about 31.

13. Possible answer:

$53\% \text{ of } 142 \approx \frac{1}{2} \cdot 142$

$\approx \frac{1}{2} \cdot 140$

≈ 70

53% of 142 is about 70.

14. Possible answer:

$23\% \text{ of } 98 \approx \frac{1}{4} \cdot 98$

$\approx \frac{1}{4} \cdot 100$

≈ 25

23% of 98 is about 25.

15. Possible answer:

$51\% \text{ of } 432 \approx \frac{1}{2} \cdot 432$

≈ 216

51% of 432 is about 216.

16. Possible answer:

$18\% \text{ of } 42 \approx \frac{1}{5} \cdot 42$

$\approx \frac{1}{5} \cdot 40$

≈ 8

18% of 42 is about 8.

17. Possible answer:

$11\% \text{ of } 132 \approx \frac{1}{10} \cdot 132$

$\approx \frac{1}{10} \cdot 130$

≈ 13

11% of 132 is about 13.

18. Possible answer:

$54\% \text{ of } 39 \approx \frac{1}{2} \cdot 39$

$\approx \frac{1}{2} \cdot 40$

≈ 20

54% of 39 is about 20.

19. 25% of \$23.99

$\frac{1}{4} \cdot \$24.00 = \$6.00$

\$24.00 − \$6.00 = \$18.00

Fancy Feet has the better price of \$18.00.

20. Possible answer:
41% of 16
41% is about 40%, so find 40% of 16.
10% of 16 = 1.6
40% of 16 = 4 · 1.6 = 6.4
41% of 16 is about 6.4.

21. Possible answer:
8% of 310
310 is about 300, so find 8% of 300.
1% of 300 = 3
8% of 300 = 8 · 3 = 24
8% of 310 is about 24.

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22. Possible answer:
83% of 70
83% is about 80%, so find 80% of 70.
10% of 70 = 7
80% of 70 = 8 · 7 = 56
83% of 70 is about 56.

23. Possible answer:
2% of 634
634 is about 600, so find 2% of 600.
1% of 600 = 6
2% 0f 600 = 2 · 6 = 12
2% of 634 is about 12.

24. Possible answer:
58% of 81
58% is about 60% and 81 is about 80, so find 60% of 80.
10% of 80 = 8
60% of 80 = 6 · 8 = 48
58% of 81 is about 48.

25. Possible answer:
24% of 49
24% is about 25% and 49 is about 50, so find 25% of 50.
10% of 50 = 5
25% of 50 = 2.5 · 5 = 12.5
24% of 49 is about 12.5 or 12.

26. Possible answer:
11% of 99
11% is about 10% and 99 is about 100, so find 10% of 100.
10% of 100 = 10
11% of 99 is about 10.

27. Possible answer:
63% of 39
63% is about 60% and 39 is about 40, so find 60% of 40.
10% of 4 = 4
60% of 40 = 6 · 4 = 24
63% of 39 is about 24.

28. Since $8.92 is about $9, find 15% of $9.
15% = 10% + 5%
10% of $9 = $0.90
5% of $9 = $0.90 ÷ 2 = $0.45
$0.90 + $0.45 = $1.35
Marc should leave about $1.35 for a 15% tip.

29. Possible answer:
31% of 180
Find 30% of 200.
10% of 200 = 20
3 · 20 = 60
31% of 180 is about 60.

30. Possible answer:
18% of 150
Find 20% of 150.
10% of 150 = 15
2 · 15 = 30
18% of 150 is about 30.

31. Possible answer:
3% of 96
Find 3% of 100.
1% of 100 = 1
3% of 100 = 3 · 1 = 3
3% of 96 is about 3.

32. Possible answer:
2% of 198
Find 2% of 200.
1% of 200 = 2
2% of 200 = 2 · 2 = 4
2% of 198 is about 4.

33. Possible answer:
78% of 90
Find 80% of 90.
10% of 90 = 9
8 · 9 = 72
78% of 90 is about 72.

34. Possible answer:
52% of 234
Find 50% of 230.
10% of 230 = 23
5 · 23 = 115
52% of 234 is about 115.

35. Possible answer:
19% of 75
Find 20% of 75.
10% of 75 = 7.5
2 · 7.5 = 15
19% of 75 is about 15.

36. Possible answer:
4% of 311
Find 4% of 300.
1% of 300 = 3
4% of 300 = 4 · 3 = 12
4% of 311 is about 12.

37. Estimate the amount of increase.
20% of 22
20% of 20
10% of 20 = 2
20% of 20 = 4
Add the amount of increase to the original amount.
32 + 4 = 26
There are about 26 ounces in the new package.

38. Estimate the sales tax.
7% of $60.85
7% of $60
1% of $60 = $0.60
7% of $60 = $4.20
Add the sales tax to the cost of the frame.
$60 = $4.20 = $64.20
It will cost about $64.20 to get a painting framed.

39. Estimate the 15% tip.
15% of $11.67
15% of $12.00
10% of $12 = $1.20
5% of $12 = $1.20 ÷ 2 = $0.60
$1.20 + $0.60 = $1.80
$2.00 − $1.80 = $0.20
0.20 ÷ 12 = 0.0166 = 1.66%
Camden left about 2% more.

40. 19.3% of 82
20% of 80
10% of 80 = 8
20% of 80 = 16
Ali had about 16 hits.

41. a. Possible answer:
78% of 391
75% of 400
10% of 400 = 40
75% of 400 = 300
About 300 people are willing to give out their e-mail address on the Internet.

b. Possible answer:
67% of 391
65% of 400
10% of 400 = 40
65% of 400 = 260
About 260 people are not willing to give out their credit card number on the Internet.

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42. a. Possible answer:
27% of $43,000
25% of $40,000
10% of $40,000 = $4,000
25% of $40,000 = $10,000
Sandi plans to spend about $10,000 on rent this year.

b. Possible answer:
$10,000 ÷ 12
$10,000 ÷ 10 = $1000
Sandi plans to spend about $1000 on rent each month.

43. Possible answer: If 3000 people are surveyed, about how many people are willing to give out their street address?

44. Possible answer: If you are checking to see if you have enough money to buy an item, it is important to know if your estimate is too high or too low.

45. Possible answer:

First Way	Second Way
Work phone number:	53% − 11% = 42%
53% of 391	42% of 391
50% of 400 = 200	40% of 400 = 160

Social Security number:
11% 0f 391
10% of 400 = 40
200 − 40 = 160
About 160 more people are willing to give out their work phone number than their Social Security number over the Internet.

46. C; 65% of 66
65% of 70
10% of 70 = 7
65% of 70 = 45.5
45%

47. Possible answer: Find 10% by moving the decimal point left one, and then divide by two to find 5%. Add together to find 15%.

48. $0.8 \cdot 96 = 76.8$ **49.** $30 \cdot 0.04 = 1.2$

50. $1.6 \cdot 900 = 1{,}440$ **51.** $0.005 \cdot 75 = 0.375$

52. $\frac{3}{2} = \frac{6}{x}$
$3x = 12$
$x = 4$
Brandi will need 4 quarts of white paint.

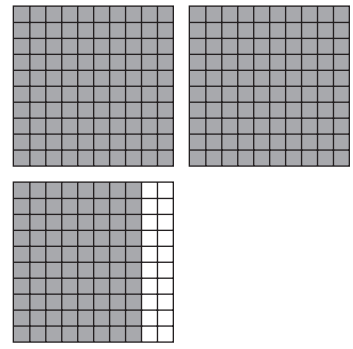
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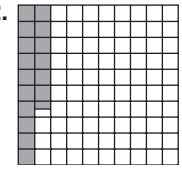
Think and Discuss

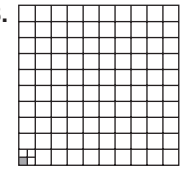
1. Shade 36 squares and $\frac{3}{4}$ of one more square since $75\% = \frac{3}{4}$.

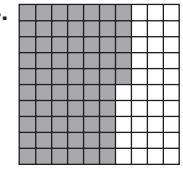
2. Shade a little more than half of a square since $0.7 > 0.5$.

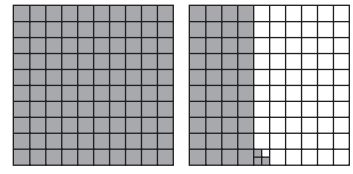
Try This

1.


2.


3.


4.


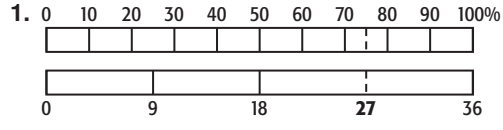
5.


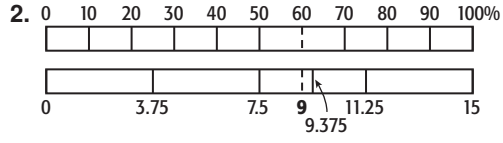
Think and Discuss

1. Set up a percent bar and mark the given percent on the bar. Make a quantity bar beneath the percent bar so that the 0's on both bars are aligned and the given number is aligned with 100% on the percent bar. The percent of the number should then be on the quantity bar directly beneath the marking on the percent bar.

2. Once you have marked the quantity bar with the correct value, you still have to estimate what number it represents.

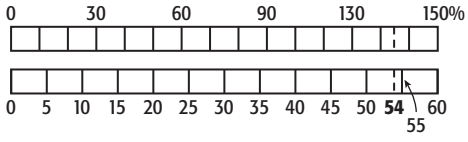
Try This

1.


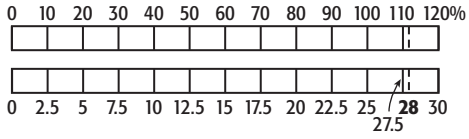
2.


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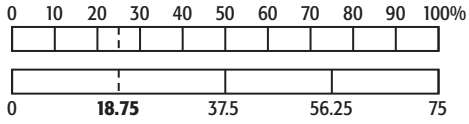
3.



4.



5.



6-4, PAGE 343

Think and Discuss

1. 150% means $\frac{150}{100}$, so the proportion is $\frac{150}{100} = \frac{n}{\text{number}}$.

2. Possible answer: Finding the amount you save when something is on sale or finding the amount of sales tax on a purchase.

Exercises

1. 30% of 80

$\frac{30}{100} = \frac{n}{80}$

$30 \cdot 80 = 100 \cdot n$

$2{,}400 = 100n$

$\frac{2{,}400}{100} = \frac{100n}{100}$

$24 = n$

30% of 80 is 24.

2. 38% of 400

$\frac{38}{100} = \frac{n}{400}$

$38 \cdot 400 = 100 \cdot n$

$15{,}200 = 100n$

$\frac{15{,}200}{100} = \frac{100n}{100}$

$152 = n$

38% of 400 is 152.

3. 200% of 10

$\frac{200}{100} = \frac{n}{10}$

$200 \cdot 10 = 100 \cdot n$

$2{,}000 = 100n$

$= \frac{100n}{100}$

$20 = n$

200% of 10 is 20.

4. 180% of 90

$\frac{180}{100} = \frac{n}{90}$

$180 \cdot 90 = 100 \cdot n$

$16{,}200 = 100n$

$\frac{16{,}200}{100} = \frac{100n}{100}$

$162 = n$

180% of 90 is 162.

5. $16\% \text{ of } 50 = 0.16 \cdot 50$

$= 8$

Estimate:

10% of 50 = 5, so 16% of 50 is more than 5.

Thus 8 is a reasonable answer.

6. $7\% \text{ of } 200 = 0.07 \cdot 200$

$= 14$

Estimate:

10% of 200 = 20, so 7% of 200 is less than 20.

Thus 14 is a reasonable answer.

7. $47\% \text{ of } 900 = 0.47 \cdot 900$

$= 423$

Estimate:

50% of 900 = 450, s 47% of 900 is less than 450.

Thus 423 is a reasonable answer.

8. $40\% \text{ of } 75 = 0.40 \cdot 75$

$= 30$

Estimate:

50% of 75 = 37.5, so 40% of 75 is less than 37.5.

Thus 30 is a reasonable answer.

9. Find 38% of 450

$0.38 \cdot 450 = 171$

171 students ride the bus to school.

10. 80% of 35

$\frac{80}{100} = \frac{n}{35}$

$2{,}800 = 100n$

$28 = n$

80% of 35 is 28.

11. 16% of 70

$\frac{16}{100} = \frac{n}{70}$

$1{,}120 = 100n$

$11.2 = n$

16% of 70 is 11.2.

12. 150% of 80

$\frac{150}{100} = \frac{n}{80}$

$12{,}000 = 100n$

$120 = n$

150% of 80 is 120.

13. 118% of 3000

$\frac{118}{100} = \frac{n}{3000}$

$354{,}000 = 100n$

$3540 = n$

118% of 3000 is 3540.

14. 5% of 58

$\frac{5}{100} = \frac{n}{58}$

$290 = 100n$

$2.9 = n$

5% of 58 is 2.9.

15. 1% of 4

$\frac{1}{100} = \frac{n}{4}$

$4 = 100n$

$0.04 = n$

1% of 4 is 0.04.

16. 103% of 50

$\frac{103}{100} = \frac{n}{50}$

$5{,}150 = 100n$

$51.5 = n$

103% of 50 is 51.5.

17. 225% of 8

$\frac{225}{100} = \frac{n}{8}$

$1{,}800 = 100n$

$18 = n$

225% of 8 is 18.

18. $9\% \text{ of } 40 = 0.09 \cdot 40$

$= 3.6$

Estimate:

10% of 40 = 4, so 9% of 40 is less than 4.

Thus 3.6 is a reasonable answer.

19. $20\% \text{ of } 65 = 0.20 \cdot 65$

$= 13$

Estimate:

10% of 65 is 6.5, so 20% of 65 is twice 6.5.

Thus 13 is a reasonable answer.

20. $36\% \text{ of } 50 = 036 \cdot 50$

$= 18$

Estimate:

50% of 50 is 25, so 36% of 50 is less than 25.

Thus 18 is a reasonable answer.

21. $2.9\% \text{ of } 60 = 0.029 \cdot 60$

$= 1.74$

Estimate:

1% of 60 is 0.6, so 2.9% of 60 is more than 0.6.

Thus 1.74 is a reasonable answer.

22. $5\% \text{ of } 12 = 0.05 \cdot 12$

$= 0.6$

Estimate:

10% of 12 is 1.2, so 5% of 12 is half of 1.2.

Thus 0.6 is a reasonable answer.

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23. 220% of 18 = 2.20 · 18
= 39.6
Estimate:
200% of 18 is 36, so 220% of 18 is more than 36.
Thus 39.6 is a reasonable answer.

24. 0.2% of 160 = 0.002 · 160
= 0.32
Estimate:
1% of 160 is 1.6, so 0.2% of 160 is less than 1.6.
Thus 0.32 is a reasonable answer.

25. 155% of 8 = 1.55 · 8
= 12.4
Estimate:
100% of 8 is 8, so 155% of 8 is more than 8.
Thus 12.4 is a reasonable answer.

26. 86% of 19,396
0.86 · 19,396 = 16,680.56
About 16,681 bulldogs were registered.

27. 60% of 10 = 0.60 · 10 = 6

28. 25% of 160 = 0.25 · 160 = 40

29. 15% of 30 = 0.15 · 30 = 4.5

30. 10% of 84 = 0.10 · 84 = 8.4

31. 25% of 47 = 0.25 · 47 = 11.75

32. 59% of 20 = 0.59 · 20 = 11.8

33. 125% of 4,100 = 1.25 · 4,100 = 5,125

34. 150% of 150 = 1.5 · 150 = 225

35. 160% of 50 = 1.6 · 50 = 80

36. 350% of 20 = 3.5 · 20 = 70

37. 480% of 25 = 4.8 · 25 = 120

38. 115% of 200 = 1.15 · 200 = 230

39. 18% of 3.4 = 0.18 · 3.4 ≈ 0.61

40. 0.9% of 43 = 0.009 · 43 ≈ 0.39

41. 98% of 4.3 = 0.98 · 4.3 ≈ 4.21

42. 1.22% of 56 = 0.0122 · 56 ≈ 0.68

43. 30% of $15.99 = 0.30 · $15.99 = $4.80

44. 25% of $10.00 = 0.25 · $10.00 = $2.50
$10.00 − $2.50 = $7.50
The sale price of the flip-flops is $7.50.

45. 9% of 25 = 0.09 · 25 = 2.25
The granola bar contains 2.25 grams of fiber.

46. 58.3% of 5.6 = 0.583 · 5.6 = 3.2648
There are about 3.26 grams of pure gold in the ring.

47. 78.4% of 1.25 = 0.784 · 1.26 = 0.98
Spica's apparent magnitude is 0.98.

48. $39.95 + $64.00 = $103.95
5.5% of $103.95 = 0.055 · $103.95 = $5.71725
The sales tax is $5.72 so add that to the total.
$103.95 + $5.72 = $109.67
The total cost of the purchases was $109.67.

49. Possible answer: In a class of 30 students, 21 students have computers at home.

50. Possible answer: The student set up the proportion incorrectly. The student should have used $\frac{5}{100} = \frac{n}{26}$.

51. Possible answer: Either write a proportion and solve, or write 18% as a decimal and multiply it by 40.

52. 55 of $6.25 = 0.05 · $6.25 = $0.3125 ≈ $0.31
Francois's pay raise was $0.31 an hour.
With his raise, he will earn $6.56 per hour.
105% of $6.25 = 1.05 · $6.25 = $6.5625 ≈ $6.56.
105% of $6.25 is the same as $6.25 + 5% of $6.25.

53. C; 48% of 875 = 0.48 · 875 = 420
420 students are boys.

54. 80% of 15 = 0.80 · 15 = 12
12 mg of zinc

55. $5.25 ÷ 3 = $1.75 per pound

56. 295 ÷ 5 = 59 words per minute

57. 0.0125 · 100 = 1.25% **58.** 0.26 · 100 = 26%

59. 0.389 · 100 = 38.9% **60.** 0.099 · 100 = 9.9%

61. 0.407 · 100 = 40.7%

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Think and Discuss

1. Possible answer: Write a proportion and solve for the unknown value, or write an equation where one side is percent times the whole and solve for the unknown value.

2. Possible answer: The proportion method seems easier since the equation is ready to solve by cross multiplication.

3. Restate the question as a percent problem.

Exercises

1. What percent of 100 is 25?
$\frac{n}{100} = \frac{25}{100}$
$n \cdot 100 = 100 \cdot 25$
$100n = 2500$
$\frac{100n}{100} = \frac{2500}{100}$
$n = 25$
25 is 25% of 100.

2. What percent of 5 is 4?
$4 = n \cdot 5$
$\frac{4}{5} = \frac{n \cdot 5}{n}$
$0.8 = n$
$80\% = n$
4 is 80% of 5.

3. 6 is 10% of what number?
$6 = 10\% \cdot n$
$6 = 0.10 \cdot n$
$\frac{6}{0.10} = \frac{0.10 \cdot n}{0.10}$
$60 = n$
6 is 10% of 60.

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4. 8 is 20% of what number?

$$\frac{20}{100} = \frac{8}{n}$$
$$20 \cdot n = 100 \cdot 8$$
$$20n = 800$$
$$\frac{20n}{20} = \frac{800}{20}$$
$$n = 40$$

8 is 20% of 40.

5. What percent of 50 is 9?

$$\frac{n}{100} = \frac{9}{50}$$
$$n \cdot 50 = 100 \cdot 9$$
$$50n = 900$$
$$\frac{50n}{50} = \frac{900}{50}$$
$$n = 18$$

9 is 18% of 50.

6. What percent of 30 is 27?

$$27 = n \cdot 30$$
$$\frac{27}{30} = \frac{n \cdot 30}{30}$$
$$0.9 = n$$

90% = n

27 is 90% of 30.

7. 7 is 14% of what number?

$$7 = 14\% \cdot n$$
$$7 = 0.14 \cdot n$$
$$\frac{7}{0.14} = \frac{0.14 \cdot n}{0.14}$$
$$50 = n$$

7 is 14% of 50.

8. 30 is 15% of what number?

$$\frac{15}{100} = \frac{30}{n}$$
$$15 \cdot n = 100 \cdot 30$$
$$15n = 3000$$
$$\frac{15n}{15} = \frac{3000}{15}$$
$$n = 200$$

30 is 15% of 200.

9. Restate the question. \$9.60 is what percent of \$120?

$$\$9.60 = n \cdot \$120$$
$$\frac{\$9.60}{\$120} = \frac{n \cdot \$120}{\$120}$$
$$0.08 = n$$
$$8\% = n$$

The sales tax is 8%.

10. What percent of 60 is 40?

$$40 = n \cdot 60$$
$$0.\overline{6} = n$$

40 is $66\frac{2}{3}\%$ of 60.

11. What percent of 48 is 16?

$$\frac{n}{100} = \frac{16}{48}$$
$$48n = 1600$$
$$n = 33\frac{1}{3}$$

16 is $33\frac{1}{3}\%$ of 48.

12. What percent of 45 is 9?

$$\frac{n}{100} = \frac{9}{45}$$
$$45n = 900$$
$$n = 20$$

9 is 20% of 45.

13. What percent of 6 is 18?

$$18 = n \cdot 6$$
$$3 = n$$

18 is 300% of 6.

14. 56 is 140% of what number?

$$\frac{140}{100} = \frac{56}{n}$$
$$140n = 5600$$
$$n = 40$$

56 is 140% of 40.

15. 45 is 20% of what number?

$$45 = 0.20 \cdot n$$
$$225 = n$$

45 is 20% if 225.

16. What percent of 80 is 10?

$$n \cdot 80 = 10$$
$$n = 0.125$$
$$n = 12.5\%$$

12.5% of 80 is 10.

17. What percent of 12.4 is 12.4?

$$\frac{n}{100} = \frac{12.4}{12.4}$$
$$12.4n = 1240$$
$$n = 100$$

12.4 is 100% of 12.4.

18. 18 is 15% of what number?

$$18 = 0.15 \cdot n$$
$$120 = n$$

18 is 15% of 120.

19. 9 is 30% of what number?

$$\frac{30}{100} = \frac{9}{n}$$
$$30n = 900$$
$$n = 30$$

9 is 30% of 30.

20. 210% of what number is 147?

$$\frac{210}{100} = \frac{147}{n}$$
$$210n = 4700$$
$$n = 70$$

210% of 70 is 147.

21. 8.8 is 40% of what number?

$$8.8 = 0.40 \cdot n$$
$$22 = n$$

8.8 is 40% of 22.

22. Restate the problem. \$0.21 is what percent of \$3?

$$\frac{n}{100} = \frac{\$0.21}{\$3.00}$$
$$3n = 21$$
$$n = 7$$

The sales tax rate is 7%.

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23. 5 is what percent of 9?
$5 = n \cdot 9$
$0.\overline{5} = n$
5 is 55.6% of 9.

24. What is 45% of 39?
$n = 0.45 \cdot 39$
$n = 17.55$
17.6 is 45% of 39.

25. 55 is 80% of what number?
$55 = 0.80 \cdot n$
$68.75 = n$
55 is 80% of 68.8 (rounded).

26. 12 is what percent of 19?
$12 = n \cdot 19$
$0.632 \approx$ n
12 is 63.2% of 19.

27. What is 155% of 50?
$n = 1.55 \cdot 50$
$n = 77.5$
77.5 is 155% of 50.

28. 5.8 is 0.9% of what number?
$5.8 = 0.009 \cdot n$
$644.\overline{4} = n$
5.8 is 0.9% of 644.4.

29. 36% of what number is 57?
$0.36 \cdot n = 57$
$n = 158.\overline{3}$
36% of 158.3 is 57.

30. What percent of 64 is 40?
$n \cdot 64 = 40$
$n = 0.625$
62.5% of 64 is 40.

31. $\$30 - \$25 = \$5$
$\$5.00 - \$3.75 = \$1.25$
\$1.25 is what percent of \$25?
$\frac{n}{100} = \frac{\$1.25}{\$25}$
$25n = 125$
$n = 5$
The sales tax rate is 5%.

32. Beach City
\$0.83 is what percent of \$10?
$\frac{n}{100} = \frac{\$0.83}{\$10}$
$10n = 83$
$n = 8.3$
Beach City has a sales tax rate of 8.3%

Desert City
\$0.42 is what percent of \$5?
$\frac{n}{100} = \frac{\$0.42}{\$5}$
$5n = 42$
$n = 8.4$
Desert City has a sales rate of 8.4%
Desert City has the greater sales tax rate.

33. You use the number 100 in a proportion to solve a percent problem. *Percent* means "per hundred."

34. a. 45% of what number is 126?
$0.45 \cdot n = 126$
$n = 280$
About 280 people were surveyed.

b. 4% of 280 is what number?
$0.04 \cdot 280 = n$
$11.2 = n$
11 people surveyed had type AB blood.

35. 9 is 20% of what number?
$9 = 0.20 \cdot n$
$45 = n$
Beethoven wrote 45 pieces of chamber music.

36. 19.3% of 3,635 is what number?
$0.193 \cdot 3635 = n$
$701{,}555 = n$
Lincoln's second speed was about 700 words.

37. How many laps is the race?

38. Less than 35; 110% is greater than 100%, so 100% of the number, which is the number itself, much be less than 35.

39. Subtract \$10,000 from \$32,000 and find how much she needs in commission.
8% of what number is 22,000?
$0.08 \cdot n = 22{,}000$
$n = 275{,}000$
She needs to make more than \$275,000 per month in sales.

40. C; 30 is 20% of what number?
$30 = 0.20 \cdot n$
$150 = n$
150 students are in the club.

41. What is 30% of \$250?
$n = 0.30 \cdot \$250$
$n = 75$
Jason saved \$75 for college.

42. $-3.92 \div 7 = -0.56$

43. $10.68 \div 3 = 3.56$

44. $23.2 \div 0.2 = 116$

45. $19.52 \div 6.1 = 3.2$

46. 45% of 26
$0.45 \cdot 26 = n$
$11.7 = n$

47. 22% of 30
$0.22 \cdot 30 = n$
$6.6 = n$

48. 15% of 17
$0.15 \cdot 17 = n$
$2.55 = n$

49. 68% of 98
$0.68 \cdot 98 = n$
$66.64 = n$

READY TO GO ON? PAGE 350

1. $9\% = \frac{9}{100}$

2. $43\% = \frac{43}{100}$

3. $5\% = \frac{5}{100} = \frac{1}{20}$

4. $18\% = \frac{18}{100} = \frac{9}{50}$

5. $22\% = 0.22$

6. $90\% = 0.90$

7. $29\% = 0.29$

8. $55 = 0.05$

9. $0.85 = 85\%$

10. $0.026 = 2.6\%$

11. $0.1111 = 11.11\%$

12. $0.56 = 56\%$

13. $\frac{14}{81} = 14 \div 81 \approx 0.173 = 17.3\%$

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14. $\frac{25}{52} = 25 \div 52 \approx 0.481 = 48.1\%$

15. $\frac{55}{78} = 55 \div 78 \approx 0.705 = 70.5\%$

16. $\frac{13}{32} = 13 \div 32 \approx 0.406 = 40.6\%$

17. Possible answer:

49% of 46 $\approx \frac{1}{2} \cdot 46 \approx 23$

49% of 46 is about 23.

18. Possible answer:

9% of 25 $\approx \frac{1}{10} \cdot 25 \approx 2.5$

9% of 25 is about 2.5.

19. Possible answer:

36% of 150 $\approx \frac{1}{3} \cdot 150 \approx 50$

36% of 150 is about 50.

20. Possible answer:
5% of 60
1% of 60 = 0.6
5% of 60 = 5 · 0.6 = 3
5% of 60 is 3.

21. Possible answer:

18% of 80 $\approx \frac{1}{5} \cdot 80 \approx 16$

18% of 80 is about 16.

22. Possible answer:

26% of 115 $\approx \frac{1}{4} \cdot 120 \approx 30$

26% of 155 is about 30.

23. Possible answer:
91% of 300 ≈ 90% of 300
10% of 300 = 30
90% of 300 = 9 · 30 = 270
91% of 300 is about 270.

24. Possible answer:
42% of 197 ≈ 40% of 200
10% of 200 = 20
40% of 200 = 4 · 20 = 80
42% of 197 is about 80.

25. Possible answer:
15% of \$21.85 ≈ 15% of \$22
10% of \$22 = \$2.20
5% of \$22 = \$2.20 ÷ 2 = \$1.10
\$2.20 + \$1.10 = \$3.30
15% of \$21.85 is about \$3.30.

26. 25% of 84 = 0.25 · 84 = 21

27. 52% of 300 = 0.52 · 300 = 156

28. 0.5% of 40 = 0.005 · 40 = 0.2

29. 160% pf 450 = 1.6 · 450 = 720

30. 41% of 122 = 0.41 · 122 = 50.02

31. 178% of 35 = 1.78 · 35 = 62.3

32. 29% of 88 = 0.29 · 88 = 25.52

33. 80% of 176 = 0.80 · 176 = 140.8

34. Find 15% of \$7.99
0.15 · \$7.99 = \$1.20
The discount on notebooks is \$1.20.

35. 14 is 445 of what number?

$\frac{44}{100} = \frac{14}{n}$

$44n = 1{,}400$

$n = 31.8\overline{1}$

14 is 44% of 31.8.

36. 22 is what percent of 900?

$\frac{n}{100} = \frac{22}{900}$

$900n = 2{,}200$

$n = 2.\overline{4}$

22 is 2.4% of 900.

37. 99 is what percent of 396?

$\frac{n}{100} = \frac{99}{396}$

$396n = 9{,}900$

$n = 25$

99 is 25% of 396.

38. 75 is 24% of what number?

$\frac{24}{100} = \frac{75}{n}$

$24n = 7{,}500$

$n = 312.5$

75 is 24% of 312.5.

39. \$7.15 is what percent of \$105.

$\frac{n}{100} = \frac{\$7.15}{\$105}$

$105n = 715$

$n = 6.8$

The sales tax rate is 6.8%.

FOCUS ON PROBLEM SOLVING, PAGE 351

1. Possible answer: You can estimate the answer, since Barry need to know if he has enough money, not an exact amount.
Yes; round \$5.85 to \$6 and \$14.99 to \$15; the total cost for the book and CD is about \$21.

2. Possible answer: You need to find an exact answer because you need to find the number of hour Valerie practiced last week.
40% · $n = 3$
$7.5 = n$
Valerie spent 7.5 hours practicing last week.

3. Possible answer: You can estimate the answer because it asks about how much Amber will save is she buys the coat today.

25% of \$157 is about $\frac{1}{4}$ 0183 160 = 40

Amber will save about \$40.

4. Possible answer: You need to find an exact answer to determine if Marcus stayed within his budget.
7.42 is what percent of 20?
$7.42 = n \cdot 20$
$0.371 = n$
No; \$7.42 is 37.1% of Marcus' allowance.

5. Possible answer: You need to find an exact answer to find the sale price.
20% of \$9840 = 0.20 · \$9840 = \$1968
\$9840 − \$1968 = \$7872
The sale price is \$7872.

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6. Possible answer: You need to find an exact answer to determine if more than 15% of the students play percussion instruments.
6 is what percent of 41?
$6 = n \cdot 41$
$0.146 \approx n$
No; 6 out of 41 students is only about 14.6% of the students.

6-6, PAGE 353

Think and Discuss

1. Possible answer: A 100% decrease is a decrease equal to the original amount. The difference between the original amount and a 100% decrease is zero.

2. Possible answer: 10 increased to 25 is a 150% increase of 10. The percent of increase must be greater than 100% for the amount of increase to exceed the original amount.

Exercises

1. 25 is decreased to 18.
$25 - 18 = 7$
$\text{percent of change} = \frac{7}{25}$
$= 0.28$
$= 28\%$
The percent of decrease is 28%.

2. 36 is increased to 84.
$84 - 36 = 48$
$\text{percent of change} = \frac{48}{36}$
≈ 1.333333
$\approx 133.3\%$
The percent of increase is about 133.3%

3. 62 is decreased to 52.
$62 - 52 = 10$
$\text{percent of change} = \frac{10}{62}$
≈ 0.161290323
$\approx 16.1\%$
The percent of decrease is about 16.1%.

4. 28 is increased to 96.
$96 - 28 = 68$
$\text{percent change} = \frac{68}{28}$
≈ 2.428571429
$\approx 242.9\%$
The percent of increase is about 242.9%.

5. $20\% \cdot 42.99 = d$
$0.20 \cdot 42.99 = d$
$8.598 = d$
$\$8.60 \approx d$
The discount on the sweater is $8.60.
$\$42.99 - \$\ 8.60 = \$34.39$
The sale price is $34.39.

6. First find the actual amount on increase.
Think: 98% of $12.50 is what number?
$98\% \cdot 12.50 = n$
$0.98 \cdot 12.50 = n$
$12.25 = n$
The amount of increase is $12.25. Now find the retail price.
Think: retail price = wholesale price + amount of increase
$r = \$12.50 + \$12.25$
$r = \$24.75$
The retail price of the pair of shoes is $24.75.

7. 72 is decreased to 45.
$72 - 45 = 27$
$\text{percent of change} = \frac{27}{72}$
$= 0.375$
$= 37.5\%$
The percent of decrease is 37.5%.

8. 55 is increased to 90.
$90 - 55 = 35$
$\text{percent of change} = \frac{35}{55}$
≈ 0.636363
$\approx 63.6\%$
The percent increase is about 63.6%.

9. 180 is decreased to 140.
$180 - 140 = 40$
$\text{percent change} = \frac{40}{180}$
≈ 0.22222222
$\approx 22.2\%$
The percent of decrease is about 22.2%.

10. 230 is increased to 250.
$250 - 230 = 20$
$\text{percent of change} = \frac{20}{230}$
≈ 0.086956522
$\approx 8.7\%$
The percent on increase is about 8.7%.

11. $15\% \cdot 65 = d$
$0.15 \cdot 65 = d$
$9.75 = d$
$\$9.75 = d$
The discount on the skateboard is $9.75.
$\$65 - \$9.75 = \$55.25$
The sale price is $55.25.

12. First find the actual amount of increase.
Think: 135% of $85 is what number?
$135\% \cdot 85 = n$
$1.35 \cdot 85 = n$
$114.75 = n$
The amount of increase is $114.75. Now find the retail price.
Think: retail price = wholesale price + amount of increase
$r = \$85 + \$114.75$
$r = \$199.75$
The retail price of the ring is $199.75.

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13. \$8.80 is increased to \$17.60.
$17.60 - 8.80 = 8.80$
$\frac{8.80}{8.80} = 1.00 = 100\%$
The percent of change is 100%.

14. 6.2 is decreased to 5.9.
$6.2 - 5.9 = 0.3$
$\frac{0.3}{6.2} \approx 0.048 \approx 4.8\%$
The percent of change is 4.8%.

15. 39.2 is increased to 56.3.
$56.3 - 39.2 = 17.1$
$\frac{17.1}{39.2} \approx 0.436 \approx 43.6\%$
The percent of change is 43.6%.

16. \$325 is decreased to \$100.
$325 - 100 = 225$
$\frac{225}{325} \approx 0.692 \approx 69.2\%$
The percent of change is 69.2%.

17. 75 is decreased by 40%.
$40\% \cdot 75 = n$
$0.40 \cdot 75 = n$
$30 = n$
The amount of decrease is 30.

18. 28 is increases by 150%.
$150\% \cdot 28 = n$
$1.5 \cdot 28 = n$
$42 = n$
The amount of increase is 42.

19. First find the actual amount of increase.
Think: 25% of 45 gal is what number?
$25\% \cdot 45 = n$
$0.25 \cdot 45 = n$
$11.25 = n$
The amount of increase is 11.25 gallons. Now find the capacity of the new water tank.
Think: capacity of new tank = capacity of original tank + amount increase
$c = 45 \text{ gal} + 11.25 \text{ gal}$
$c = 56.25 \text{ gal}$
The capacity of the new water tank is 56.25.

20. First find the actual amount of increase. Think: 28% of \$7 is what number?
$28\% \cdot 7 = n$
$0.28 \cdot 7 = n$
$1.96 = n$
The amount of increase is \$1.96. Now find the retail price.
Think: retail price = wholesale price + amount of increase
$r = \$7 + \$1.96$
$r = \$8.96$
The retail price of the purses is \$8.96.

21. First find the discount rate for the sunglasses.
Think: what percent of \$44.95 is \$26.97?
$n \cdot 44.95 = 26.97$
$n = \frac{26.97}{44.95}$
$n = 0.6$
$n = 60\%$
The discount rate for the store is 60%.
Use the discount rate to find the original price of the bathing suit.
Think: 60% of what number is 28.95?
$0.6 \cdot n = 28.95$
$n = \frac{28.95}{0.6}$
$n = 48.25$
The original price of the suit was \$48.25.

22. \$10 is $\frac{1}{2}$ of \$20 and $\frac{1}{2} = 50\%$ so \$20 to \$10 is a 50% decrease.
\$10 + \$10 = \$20 and \$10 is 100% of itself so \$10 to \$20 is a 100% increase.

23. a. 7% of what number was 2905?
$0.07 \cdot n = 2905$
$n = 41{,}500$
Their income for the year was \$41,500.

b. $41{,}500 \cdot 0.43 = 17{,}845$
\$17,845 was spent on household expenses.

c. 14,400 is what percent of 17,845?
$14{,}400 = n \cdot 17{,}845$
$0.807 \approx n$
Their mortgage is about 80.7% of their household expenses.

24. $99.4 - 428.7 = 562.7$
$\frac{562.7}{428.7} \approx 1.313 \approx 131.3\%$
During this ten-year period, health expenses increased about 131.3%.

25. 1990 Btu = 1950 Btu + 165% of 1950 Btu
Let n = 1950 Btu
$1990 \text{ Btu} = n + 165\%n$
$1990 \text{ Btu} = 1n + 1.65n$
$1990 \text{ Btu} = 2.65n$
$22{,}540 = 2.65n$
$8{,}506 \approx n$
About 8,506 trillion Btu were consumed in 1950.

26. $75.8\% \text{ of } 21.5 = 0.758 \cdot 21.5 \approx 16.3$
$21.5\% - 16.3\% = 5.2\%$
In 1990, 5.2% did not have a telephone.
$100 - 5.2 = 94.8$
In 1990, 94.8% of U.S. households had a telephone.

27. A; \$0.85 is increases to \$1.25.
\$1.25 − \$0.85 = \$0.40
$\frac{0.40}{0.85} = 0.4705 = 47.1\%$
The percent increase is 47.1%.

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28. No; a 50% increase over \$30 makes the new price \$45 and a sale of 50% off \$45 is \$22.50, not \$30.

29. $3\frac{2}{9} = \frac{29}{9}$

30. $6\frac{2}{3} = \frac{20}{3}$

31. $7\frac{1}{4} = \frac{29}{4}$

32. $3\frac{2}{5} = \frac{17}{5}$

33. $24\frac{1}{3} = \frac{73}{3}$

34. $34 \cdot 5280 = 179{,}520$ feet

35. $\frac{52 \text{ oz}}{x} = \frac{16 \text{ oz}}{1 \text{ lb}}$

$16x = 52$

$x = 3.25$ lb

3.25 pounds

36. $\frac{164 \text{ lb}}{x} = \frac{2000 \text{ lb}}{1 \text{ ton}}$

$2000x = 164$

$x = 0.082$

0.082 tons

6-7, PAGE 357

Think and Discuss

1. Six months is one-half year.

$t = 0.5$, $\frac{1}{2}$, or $\frac{6}{12}$

2. $I = P \cdot r \cdot t$

$10 = 100 \cdot r \cdot 2$

$10 = 200 \cdot r$

$\frac{10}{200} = \frac{200}{200} \cdot r$

$0.05 = r$

$5\% = r$

Exercises

1. $I = P \cdot r \cdot t$

$I = 300 \cdot 0.04 \cdot 2$

$I = 24$

The simple interest is \$24.

2. $I = P \cdot r \cdot t$

$I = 500 \cdot 0.02 \cdot 1$

$I = 10$

The simple interest is \$10.

3. $I = P \cdot r \cdot t$

$120 = P \cdot 0.06 \cdot 5$

$120 = 0.3P$

$\frac{120}{0.3} = \frac{0.3P}{0.3}$

$400 = P$

The principal amount is \$400.

4. $I = P \cdot r \cdot t$

$240 = 4000 \cdot r \cdot 2$

$240 = 8000r$

$\frac{240}{8000} = \frac{8000r}{8000}$

$0.03 = r$

The interest rate is 3%.

5. $A = P + I$

$10000 = 8000 + I$

$-8000 \quad -8000$

$2{,}000 = I$

$I = P \cdot r \cdot t$

$2000 = 8000 \cdot 0.06 \cdot t$

$2000 = 480t$

$\frac{2000}{480} = \frac{480t}{480}$

$4.17 \approx t$

It will take just over 4 years for the total amount to exceed \$10,000.

6. $I = P \cdot r \cdot t$

$I = 600 \cdot 0.07 \cdot 2$

$I = 84$

The simple interest is \$84.

7. $I = P \cdot r \cdot t$

$I = 12{,}000 \cdot 0.03 \cdot 9$

$I = 3240$

The simple interest is \$3240.

8. $I = P \cdot r \cdot t$

$364 = 1300 \cdot r \cdot 7$

$364 = 9100r$

$\frac{364}{9100} = \frac{9100r}{9100}$

$0.04 = r$

The interest rate is 4%.

9. $I = P \cdot r \cdot t$

$440 = P \cdot 0.05 \cdot 4$

$440 = 0.2P$

$\frac{440}{0.2} = \frac{0.2P}{0.2}$

$2{,}200 = P$

The principal amount is \$2200.

10. $I = P \cdot r \cdot t$

$455 = P \cdot 0.07 \cdot 5$

$455 = 0.35P$

$\frac{455}{0.35} = \frac{0.35P}{0.35}$

$1{,}300 = P$

The principal amount is \$1300.

11. $I = P \cdot r \cdot t$

$231 = 700 \cdot r \cdot 3$

$231 = 2100r$

$\frac{231}{2100} = \frac{2100r}{2100}$

$0.11 = r$

The interest rate is 11%.

12. $A = P + I$

$9{,}000 = 6000 + I$

$-6000 \quad -6000$

$3000 = I$

$I = P \cdot r \cdot t$

$3000 = 6000 \cdot 0.055 \cdot t$

$3000 = 330t$

$\frac{3000}{330} = \frac{330t}{330}$

$9.09 \approx t$

It will take just over 9 years for the total to reach \$9,000.

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13. $A = P + I$
$6500 = 4000 + I$
$-4000 = -4000$
$2500 = I$
$I = P \cdot r \cdot t$
$2500 = 4000 \cdot 0.07 \cdot t$
$2500 = 280t$
$\frac{2500}{280} = \frac{280t}{280}$
$8.93 \approx t$
It will take almost 9 years for the total t reach $6500.

14. $I = P \cdot r \cdot t$
$441.90 = 2455 \cdot 0.03 \cdot t$
$441.90 = 73.65t$
$6 = t$
$t = 6$ years

15. $I = P \cdot r \cdot t$
$663 = P \cdot 0.0425 \cdot 3$
$663 = 0.1275P$
$5{,}200 = P$
$P = \$5200$

16. $I = P \cdot r \cdot t$
$1942.50 = 18{,}500 \cdot r \cdot 3.5$
$1942.50 = 64{,}750r$
$0.03 = r$
$r = 3\%$

17. $I = P \cdot r \cdot t$
$I = 425.50 \cdot 0.05 \cdot 10$
$I = 212.75$
$I = \$212.75$

18. $I = P \cdot r \cdot t$
$2952 = P \cdot 0.06 \cdot 3$
$2952 = 0.18P$
$16{,}400 = P$
$P = \$16{,}400$

19. $I = P \cdot r \cdot t$
$4000 = 4000 \cdot 0.05 \cdot t$
$4000 = 200t$
$20 = t$
It will take 20 years to double.

20. First find the amount of interest.
$\$585.75 - \$550 = \$35.75$
$I = P \cdot r \cdot t$
$\$35.75 = \$550 \cdot r \cdot 2$
$35.75 = 1100r$
$0.0325 = r$
The interest rate was 3.25%.

21. Statement savings:
$I = P \cdot r \cdot t$
$I = 8{,}000 \cdot 0.0158 \cdot 0.5$
$I = 63.20$
Passbook savings:
$I = P \cdot r \cdot t$
$I = 8{,}000 \cdot 0.0148 \cdot 0.5$
$I = 59.20$
$\$63.20 - \$59.20 = \$4$
\$4 more interest was earned was earned with a statement savings account.

22. $I = P \cdot r \cdot t$
$I = 5000 \cdot -0.105 \cdot 1$
$I = -525$
\$525 was lost.

23. High-yield 1-year CD:
$I = P \cdot r \cdot t$
$I = 12.000 \cdot 0.0505 \cdot 1$
$I = 606$
Dow Jones industrials:
$I = P \cdot r \cdot t$
$I = 12{,}000 \cdot -0.057 \cdot 1$
$I = -684$
The difference in returns for the high-yield 1-year CD and the Dow Jones industrials was \$1290.

24. Art Instructor's set:
$I = P \cdot r \cdot t$
$I = 5{,}000 \cdot 0.04 \cdot 3$
$I = 600$
$\$5{,}000 + \$600 = \$5600$
Online set:
$\$5500 + \$295 = \$5795$
The art instructor's set will cost less. It will cost \$5,600.

25. Possible answer: How much interest was earned on \$500 in a high-yield 1-year CD that was deposited for 1 year?

26. Since $1500 \cdot 0.06 \cdot 8 = 720$ and $1500 \cdot 0.08 \cdot 6 = 720$, the simple interest is the same.

27. $I = P \cdot r \cdot t$
$I = P \cdot 0.06 \cdot 18$
$I = 1.08P$
$A = P + I$
$134{,}000 = P + 1.08P$
$134{,}000 = 2.08P$
$64{,}423.08 \approx P$
The Jackson's must invest \$64,423.08 now to cover the cost of the college education.

28. C; $I = P \cdot r \cdot t$
$I = 4{,}500 \cdot 0.03 \cdot 5$
$I = \$675$
\$675

29. $I = P \cdot r \cdot t$
$500 = 3000 \cdot 0.065 \cdot t$
$500 = 195t$
$\frac{500}{195} = \frac{195t}{195}$
$2.564 \approx t$
It will take just over $2\frac{1}{2}$ years.

30. $40 \div 1\frac{1}{3} = 30$
30 book covers

31. 154 is increased to 200
$200 - 154 = 46$
$\text{percent of change} = \frac{46}{154}$
≈ 0.2987
$\approx 29.9\%$
The percent of increase is 29.9%.

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32. 95 is decreased to 75

$$95 - 75 = 20$$

$$\text{percent of change} = \frac{20}{95}$$

$$\approx 0.2105$$

$$\approx 21.1\%$$

The percent of decrease is 21.1%.

33. 88 is increased to 170

$$170 - 88 = 82$$

$$\text{percent of change} = \frac{82}{88}$$

$$\approx 0.9318$$

$$\approx 93.2\%$$

The percent of increase is 93.2%.

READY TO GO ON? PAGE 360

1. 37 is decreased to 17.

$$37 - 17 = 20$$

$$\text{percent of change} = \frac{20}{37}$$

$$\approx 0.5405$$

$$\approx 54.1\%$$

The percent decrease is 54.1%.

2. 121 is increased to 321.

$$321 - 121 = 200$$

$$\text{percent of change} = \frac{200}{121}$$

$$\approx 01.6528$$

$$\approx 165.3\%$$

The percent increase is 165.3%.

3. 89 is decreased to 84.

$$89 - 84 = 5$$

$$\text{percent of change} = \frac{5}{89}$$

$$\approx 0.0561$$

$$\approx 5.6\%$$

The percent decrease is 5.6%.

4. 45 is increased to 60.

$$60 - 45 = 15$$

$$\text{percent of change} = \frac{15}{45}$$

$$\approx 0.3333$$

$$\approx 33.3\%$$

The percent increase is 33.3%.

5. 61 is decreased to 33.

$$61 - 33 = 28$$

$$\text{percent of change} = \frac{28}{61}$$

$$\approx 0.4590$$

$$\approx 45.9\%$$

The percent of decrease is 45.9%.

6. 86 is increased to 95.

$$95 - 86 = 9$$

$$\text{percent of change} = \frac{9}{86}$$

$$\approx 0.1046$$

$$\approx 10.5\%$$

The percent of increase is 10.5%.

7. $99 is decreased to $39.60.

$$99 - 39.60 = 59.40$$

$$\text{percent of change} = \frac{59.40}{99}$$

$$= 0.6$$

$$= 60\%$$

60% discount

8. $149 is decreased $47.68.

$$149 - 47.68 = 101.32$$

$$\text{percent of change} = \frac{101.32}{149}$$

$$= 0.68$$

$$= 68\%$$

68% discount

9. The percent of discount increases.

10. Find 25% of 16

$$0.25 \cdot 16 = 4$$

$$16 + 4 = 20$$

The new capacity is 20 ounces.

11. $I = P \cdot r \cdot t$

$I = 750 \cdot 0.04 \cdot 3$

$I = \$90$

12. $I = P \cdot r \cdot t$

$120 = P \cdot 0.03 \cdot 5$

$120 = 0.15P$

$800 = P$

$P = \$800$

13. $I = P \cdot r \cdot t$

$180 = 1500 \cdot r \cdot 2$

$180 = 3000r$

$0.06 = r$

$r = 6\%$

14. $I = P \cdot r \cdot t$

$220 = 680 \cdot 0.08 \cdot t$

$220 = 54.4t$

$4 \approx t$

$t = 4$ years

15. $12{,}000 - 10{,}000 = 2000$

$I = P \cdot r \cdot t$

$2{,}000 = 10{,}000 \cdot 0.05 \cdot t$

$2{,}000 = 500t$

$4 = t$

It will take 4 years.

16. $410 - 345 = 65$

$I = P \cdot r \cdot t$

$65 = 345 \cdot 0.042 \cdot t$

$65 = 14.49t$

$4.48 = t$

$4.5 = t$

It takes 4.5 years.

MULTI-STEP TEST PREP, PAGE 361

1. What is 40% of $54?

$n = 0.40 \cdot 54$

$n = 21.60$

$\$54 - \$21.60 = \$32.40$

The sale price is $32.40.

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2. What is $\frac{1}{3}$ of \$32.40?

$n = \frac{1}{3} \cdot \$32.40$
$n = \$10.80$
She will save \$10.80.

3. What is 40% of \$48?
$n = 0.40 \cdot 48$
$n = 19.20$
$\$48 - \$19.20 = \$28.80$
What is $\frac{1}{3}$ of \$28.80?
$\frac{1}{3} \cdot \$28.80 = \$9.60$
$\$28.80 - \$9.60 = \$19.20$
Mary's helmet would cost \$19.20.

4. What is 70% of \$54?
$n = 0.70 \cdot 54$
$n = \$37.50$
Mary; A 70% discount on Shannon's helmet would be \$37.80, but her combined discount from the sales is \$32.40, which is less.

GAME TIME, PAGE 362

1. The table shows the percent of time each bulb is lit, assuming each number is lit for the same amount of time.

Bulb	Percent
a	80%
b	60%
c	80%
d	70%
e	40%
f	90%
g	70%

Bulb *f* is most likely to burn out first.

STUDY GUIDE: REVIEW, PAGE 364

1. Interest, simple interest, principal

2. Percent of increase

3. Percent of decrease

4. Percent

5. $78\% = \frac{78}{100} = \frac{39}{50}$, 0.78

6. $40\% = \frac{40}{100} = \frac{2}{5}$, 0.40

7. $5\% = \frac{5}{100} = \frac{1}{20}$, 0.05

8. $16\% = \frac{16}{100} = \frac{4}{25}$, 0.16

9. $65\% = \frac{65}{100} = \frac{13}{20}$, 0.65

10. $89\% = \frac{89}{100}$, 0.89

11. $\frac{3}{5} = 3 \div 5 = 0.6 = 60\%$

12. $\frac{1}{6} = 1 \div 6 \approx 0.167 \approx 16.7\%$

13. $0.06 = \frac{6}{100} = 6\%$

14. $0.8 = \frac{80}{100} = 80\%$

15. $\frac{2}{3} = 2 \div 3 \approx 0.667 \approx 66.7\%$

16. $0.0056 = \frac{56}{10{,}000} = 0.56\%$

17. Possible answer:
$22\% \text{ of } 44 \approx \frac{1}{5} \cdot 44 \approx 8$

18. Possible answer:
$74\% \text{ of } 120 \approx \frac{3}{4} \cdot 120 \approx 90$

19. Possible answer:
$43\% \text{ of } 64 \approx \frac{2}{5} \cdot 60 \approx 24$

20. Possible answer:
$31\% \text{ of } 97 \approx \frac{1}{3} \cdot 96 \approx 32$

21. Possible answer:
$49\% \text{ of } 82 \approx \frac{1}{2} \cdot 80 \approx 40$

22. Possible answer:
$6\% \text{ of } 53 \approx \frac{1}{15} \cdot 45 \approx 3$

23. Possible answer:
15% of \$18.23 ≈ 10% of \$20 + 5% of \$20
≈ \$2 + \$1 ≈ \$3

24. 16% of 425
$\frac{16}{100} = \frac{n}{425}$
$6800 = 100n$
$68 = n$
16% of 435 is 68.

25. 48% of 50
$\frac{48}{100} = \frac{n}{50}$
$2400 = 100n$
$24 = n$
48% of 50 is 24.

26. 75 of 63
$\frac{7}{100} = \frac{n}{63}$
$441 = 100n$
$44.1 = n$
7% of 63 is 4.41.

27. 96% of 125
$\frac{96}{100} = \frac{n}{125}$
$12{,}000 = 100n$
$120 = n$
96% of 125 is 120.

28. 130 of 21
$\frac{130}{100} = \frac{n}{21}$
$2730 = 100n$
$27.3 = n$
130% of 21 is 27.3.

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29. 72% of 75

$$\frac{72}{100} = \frac{n}{75}$$

$5400 = 100n$

$54 = n$

72% of 75 is 54.

30. What is 38% of 1,247?

$$\frac{38}{100} = \frac{n}{1{,}247}$$

$47{,}386 = 100n$

$473.8 = n$

About 474 seventh-graders attend Canyon Middle School.

31. 20% of what number is 25?

$0.20 \cdot n = 25$

$n = 125$

20% of 125 is 25.

32. 4 is what percent of 50?

$4 = n \cdot 50$

$0.08 = n$

4 is 8% of 50.

33. 30 is 250% of what number?

$30 = 2.5 \cdot n$

$12 = n$

30 is 250% of 12.

34. What percent of 96 is 36?

$n \cdot 96 = 36$

$n = 0.375$

37.5% of 96 is 36.

35. 6 is 75% of what number?

$6 = 0.75 \cdot n$

$8 = n$

6 is 75% of 8.

36. 200 is what percent of 720?

$200 = n \cdot 720$

$0.2\overline{7} = n$

200 is about 27.8% of 720.

37. \$1.99 is what percent of \$25?

$1.99 = n \cdot 25$

$0.0796 = n$

The sales tax rate is 7.96%.

38. 54 is increased to 81.

$81 - 54 = 27$

$$\frac{27}{54} = 0.5$$

The percent of increase is 50%.

39. 14 is decreased to 12.

$14 - 12 = 2$

$$\frac{2}{14} \approx 0.143$$

The percent of decrease is about 14.3%.

40. 110 is increases to 143.

$143 - 110 = 33$

$$\frac{33}{110} = 0.3$$

The percent of increase is 30%.

41. 90 is decreases to 15.2.

$90 - 15.2 = 74.8$

$$\frac{74.8}{90} = 0.83\overline{1}$$

The percent of decrease is about 83.1%.

42. 26 is increased to 32.

$32 - 26 = 6$

$$\frac{6}{32} \approx 0.231$$

The percent of increase is about 23.1%.

43. 84 is decreased to 21.

$84 - 21 = 63$

$$\frac{63}{84} = 0.75$$

The percent of increase is 75%.

44. 15% of $245 = 0.15 \cdot 245 = 36.75$

The discount is \$36.75.

$245 - 36.75 = 208.25$

The sale price is \$208.25.

45. 140% of $3.25 = 1.40 \cdot 3.25 = 4.55$

The increase is \$4.55.

$3.25 + 4.55 = 7.80$

The price of each bracelet is \$7.80.

46. $I = P \cdot r \cdot t$

$I = 1{,}000 \cdot 0.03 \cdot 0.5$

$I = 15$

The simple interest is \$15.

47. $I = P \cdot r \cdot t$

$452.16 = 1{,}256 \cdot 0.12 \cdot t$

$452.16 = 150.72t$

$3 = t$

The time is 3 years.

48. $I = P \cdot r \cdot t$

$I = 675 \cdot 0.045 \cdot 8$

$I = 243$

The simple interest is \$243.

49. $I = P \cdot r \cdot t$

$555.75 = 950 \cdot r \cdot 15$

$555.75 = 14{,}250r$

$0.039 = r$

The rate is 3.9%.

50. $I = P \cdot r \cdot t$

$172.50 = P \cdot 0.05 \cdot 1.5$

$172.50 = 0.075P$

$2{,}300 = P$

The principal is \$2,300.

51. $A = P + I$

$1350 = 1000 + I$

$350 = I$

$I = P \cdot r \cdot t$

$350 = 1000 \cdot 0.05 \cdot t$

$350 = 50t$

$7 = t$

It will take 7 years.

52. $1{,}050 - 755 = 295$

$I = P \cdot r \cdot t$

$295 = 755 \cdot 0.042 \cdot t$

$295 = 31.71t$

$9.3 = t$

It will take 9 years and 3 months.

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CHAPTER TEST, PAGE 367

1. $95\% = \frac{95}{100} = \frac{19}{20} = 0.95$

2. $37.5\% = \frac{37.5}{100} = \frac{375}{1000} = \frac{3}{8} = 0.375$

3. $4\% = \frac{4}{100} = \frac{1}{25} = 0.04$

4. $0.01\% = \frac{0.01}{100} = \frac{1}{10{,}000} = 0.0001$

5. $0.75 = 75\%$

6. $0.06 = 6\%$

7. $0.80 = 80\%$

8. $0.0039 = 0.39\%$

9. $\frac{3}{10} = 3 \div 10 = 0.3 = 30\%$

10. $\frac{9}{20} = 9 \div 20 = 0.45 = 45\%$

11. $\frac{5}{16} = 5 \div 16 = 0.3125 = 31.3\%$

12. $\frac{7}{21} = 7 \div 21 = 0.3\overline{3} = 33.3\overline{3}\% = 33.3\%$

13. Possible answer:

$48\% \text{ of } 8 \approx \frac{1}{2} \cdot 8 \approx 4$

14. Possible answer:

$3\% \text{ of } 199 \approx 3\% \cdot 120$
$1\% \text{ of } 120 = 1.2$
$3\% \text{ of } 120 = 3 \cdot 1.2 \cdot 3.6$
$3\% \text{ of } 119 \approx 3.6$

15. Possible answer:

$26\% \text{ of } 32 \approx \frac{1}{4} \cdot 32 \approx 8$

16. Possible answer:

$76\% \text{ of } 280 \approx \frac{3}{4} \cdot 280 \approx 210$

17. $15\% = 10\% + 55$
$10\% \text{ of } \$47.89 \approx 10\% \text{ of } \$48 \approx \$4.80$
$5\% \text{ of } \$48 = \$4.80 \div 2 = \$2.40$
$\$4.80 + \$2.40 = \$7.20.$
The should leave about $7.20 for a 15% tip.

18. 90% of 200

$\frac{90}{100} = \frac{n}{200}$
$18{,}000 = 100n$
$180 = n$
90% of 200 is 180.

19. 35% of 210

$\frac{35}{100} = \frac{n}{210}$
$7350 = 100n$
$73.5 = n$
35% of 210 is 73.5.

20. 16% of 85

$\frac{16}{100} = \frac{n}{85}$
$1360 = 100n$
$13.6 = n$
16% of 85 is 13.6.

21. 250% of 30

$\frac{250}{100} = \frac{n}{30}$
$7500 = 100n$
$75 = n$
250% of 30 is 75.

22. 38% of 11

$\frac{38}{100} = \frac{n}{11}$
$4.18 = n$
$418 = 100n$
38% of 11 is 4.18.

23. 5% of 145

$\frac{5}{100} = \frac{n}{45}$
$725 = 100n$
$7.25 = n$
5% of 145 is 7.25.

24. 36 is what percent of 150?

$36 = n \cdot 150$
$0.24 = n$
36 is 24% of 150.

25. What percent of 145 is 29?

$n \cdot 145 = 29$
$n = 0.2$
29 is 20% of 145.

26. 51 is what percent of 340?

$51 = n \cdot 340$
$0.15 = n$
51 is 15% of 340.

27. 36 is 40% of what number?

$36 = 0.40 \cdot n$
$90 = n$
36 is 405 of 90.

28. 70 is 145 of what number?

$70 = 0.14 \cdot n$
$500 = n$
70 is 14% of 500.

29. 25 is 20% of what number?

$25 = 0.20 \cdot n$
$125 = n$
25 is 20% of 125.

30. 40% of what number is 376?

$0.40 \cdot n = 376$
$n = 940$
940 students are expected to enroll.

31. 30 is increased to 45.

$45 - 30 = 15$
$\frac{15}{30} = 0.5$
The percent of increase is 50%.

32. 115 is decreased to 46.

$115 - 46 = 69$
$\frac{69}{115} = 0.6$
The percent of decrease is 60%.

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33. 116 is increased to 145.

$145 - 116 = 29$

$\frac{29}{116} = 0.25$

The percent of increase is 25%.

34. 129 is decreased to 32

$129 - 32 = 97$

$\frac{97}{129} = 0.7519$

The percent of decrease is 75.2%.

35. 34% of $8500 = 0.34 \cdot 8500 = 2890$

$8500 + 2890 = 11{,}390$

The theater sold 11,390 tickets during its tenth year.

36. $I = P \cdot r \cdot t$

$I = 500 \cdot 0.05 \cdot 1$

$I = 25$

The simple interest is $25.

37. $I = P \cdot r \cdot t$

$702 = 1200 \cdot 0.039 \cdot t$

$702 = 46.8t$

$15 = t$

The time is 15 years.

38. $I = P \cdot r \cdot t$

$468 = 900 \cdot r \cdot 8$

$468 = 7200r$

$0.065 = r$

The rate is 6.5%.

39. $I = P \cdot r \cdot t$

$37.50 = P \cdot 0.10 \cdot 0.5$

$37.50 = 0.05P$

$750 = P$

The principal is $750.

40. $I = P \cdot r \cdot t$

$3500 = 3500 \cdot 0.05 \cdot t$

$3500 = 175t$

$20 = t$

It will take 20 years to double.

PROBLEM SOLVING ON LOCATION, PAGES 370-371

See Appendix.

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CHAPTER 6, PAGES 370-371

The First Assembly Line

1. *Use logical reasoning* is a possible strategy to solve this problem.

$$\frac{4}{1} = \frac{x}{x - 15}$$
$$4x - 60 = x$$
$$3x = 60$$
$$\frac{3x}{3} = \frac{60}{3}$$
$$x = 20$$

It took 20 minutes to build the magneto before the introduction of the assembly line.

2. *Work backward* is a possible strategy to solve this problem.

1925 price ÷ 59% = 1914 price
260 ÷ 0.59 ≈ 440
The 1914 price was about $440.
1914 price ÷ 53% = 1908 price
440 ÷ 0.53 ≈ 831
The price of a Model T in 1908 was about $831.

3. *Find a pattern* is a possible strategy to solve this problem.

Find the difference between each year to find a pattern.
372,000 − 248,000 = 124,000 is the difference between 1915 and 1914.
558,000 − 372,000 = 186,000 is the difference between 1916 and 1915.
837,000 − 558,000 = 279,000 is the difference between 1917 and 1916.
The pattern is to take the previous year's difference and multiply it by 1.5. Add that value to the previous year's manufactured quantity to predict the number manufactured in 1918.
279,000 · 1.5 = 418,500
837,000 + 418,500 = 1,255,500
The predicted number of Model T's that were manufactured in 1918 was 1,255,500.

Michigan State University

1. *Use logical reasoning* is a possible strategy to solve this problem.

Let x represent the number of graduate students.
$$x + 3.5x = 45{,}000$$
$$4.5x = 45{,}000$$
$$\frac{4.5x}{4.5} = \frac{45{,}000}{4.5}$$
$$x = 10{,}000$$

There are 10,000 graduate students.
45,000 − 10,000 = 35,000
There are 35,000 undergraduate students.

2. *Make a table* is a possible strategy to solve this problem.

Year	Room and Board	6%
2004	$5458	$327
2005	$5785	$347
2006	$6132	$368
2007	$6500	$390
2008	$6890	$413
2009	$7303	$438
2010	$7741	

In 2010 room and board will cost about $7741.

3. *Make a table* is a possible strategy to solve this problem.

Year	Tuition	8%
2004	$6188	$495
2005	$6683	$535
2006	$7218	$577
2007	$7795	$624
2008	$8419	$674
2009	$9093	$727
2010	$9820	$786
2011	$10,606	

In 2011 the tuition will be $10,606.

4. *Make an organized list* is a possible strategy to solve this problem.

Find each student's percentage amount to determine whether they are a Michigan resident.
The total annual expenses for a Michigan resident are about $12,502.
The total annual expenses for a non-Michigan resident are about $23,347.
Jamal:
$812 is 6% of what number.
812 ÷ 0.06 = 13,533
$13,533 is close to $12,502, so Jamal is a Michigan resident.
Kyle:
$5458 is 23% of what number.
5458 ÷ 0.23 = 23,730
$23,730 is close to $23,347, so Kyle is not a Michigan resident.
Lisa:
$6188 is 49% of what number.
6188 ÷ 0.49 = 12,628
$12,628 is close to $12,502, so Lisa is a Michigan resident.
Kyle is not a Michigan resident.

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