

**Example 11 Application: Calculating the Percent of Profit**

Calculate the percent of profit for both **a.** and **b.** and tell which is the better investment.

- a.** \$300 profit on an investment of \$2400 or  
**b.** \$500 profit on an investment of \$5000

**Solution**

Set up ratios and find the corresponding percents.

$$\begin{aligned} \text{a. } \frac{\$300 \text{ profit}}{\$2400 \text{ invested}} &= \frac{\cancel{300} \cdot 1}{\cancel{300} \cdot 8} = \frac{1}{8} = 0.125 = 12.5\% && \text{percent of profit} \\ \text{b. } \frac{\$500 \text{ profit}}{\$5000 \text{ invested}} &= \frac{\cancel{500} \cdot 1}{\cancel{500} \cdot 10} = \frac{1}{10} = 0.1 = 10\% && \text{percent of profit} \end{aligned}$$

Clearly, \$500 is more than \$300, but 12.5% is greater than 10%, and investment **a.** is the better investment.

**Now work margin exercise 11.****Margin Exercise Answers**

1. **a.** 0.35% **b.** 0.40 **2. a.**  $\frac{1}{16}$  **b.** 18.75% **3.** 198 **4.** 336.8 **5.** 20% **6.** \$624 **7.** \$648.96

**8.** \$10,300 **9.** 4% **10.** 3% **11. a.** has a percent of profit of 33.3% and **b.** has a 36.4% percent of profit. Therefore, **b.** is a better investment.

## 7.1 Exercises

### Concept Check

**Fill-in-the-Blank.** Complete each sentence using information found in this section.

- To change a decimal number to a percent, move the decimal point \_\_\_\_\_ places to the \_\_\_\_\_.
- To change a percent to a decimal number, move the decimal point \_\_\_\_\_ places to the \_\_\_\_\_.
- The amount of reduction in the original selling price is called a \_\_\_\_\_. The reduced price is the \_\_\_\_\_ price.
- Sales tax is a percentage of the \_\_\_\_\_ price. This tax is added to the buyer's cost.
- The fee paid to an agent or salesperson for a service is called a \_\_\_\_\_.
- If the value of an item increases, the increase in value can be called \_\_\_\_\_.

- Calculate the percent of profit for both **a.** and **b.** and tell which is the better investment.
  - \$900 profit on an investment of \$2700
  - \$400 profit on an investment of \$1100

**True/False.** Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

7. To change a decimal number to a percent, move the decimal point two places to the left and add the % sign.
8. When using the basic formula  $R \cdot B = A$ , the word “of” means to divide.
9. If an item is selling for a 35% discount, the customer will pay 65% of the original price.
10. A car was purchased in 1965 for \$3800. It sold for \$1200 in 2011. This is an example of depreciation.

## Practice

Change each decimal number to a percent. See Example 1.

- |         |          |
|---------|----------|
| 1. 0.02 | 7. 0.128 |
| 2. 0.09 | 8. 0.368 |
| 3. 0.1  | 9. 1.12  |
| 4. 0.7  | 10. 1.75 |
| 5. 0.36 | 11. 2    |
| 6. 0.52 | 12. 25   |

Change each percent to a decimal number. See Example 1.

- |         |           |
|---------|-----------|
| 13. 2%  | 19. 125%  |
| 14. 7%  | 20. 120%  |
| 15. 18% | 21. 17.3% |
| 16. 42% | 22. 10.1% |
| 17. 60% | 23. 0.26% |
| 18. 30% | 24. 0.52% |

Change each fraction or mixed number to a percent. If necessary, round to the nearest tenth of a percent. See Example 2.

- |                      |                     |
|----------------------|---------------------|
| 25. $\frac{7}{100}$  | 28. $\frac{1}{4}$   |
| 26. $\frac{16}{100}$ | 29. $\frac{11}{20}$ |
| 27. $\frac{1}{2}$    | 30. $\frac{35}{56}$ |

31.  $\frac{1}{8}$

32.  $\frac{7}{12}$

33.  $1\frac{1}{4}$

34.  $5\frac{3}{10}$

35.  $2\frac{1}{15}$

36.  $4\frac{1}{18}$

Change each percent to a fraction or mixed number and reduce, if possible. See Example 2.

37. 4%

38. 15%

39. 25%

40. 66%

41. 300%

42. 125%

43. 0.75%

44. 0.2%

45.  $\frac{1}{2}\%$

46.  $\frac{1}{4}\%$

47.  $12\frac{1}{2}\%$

48.  $16\frac{2}{3}\%$

Use the equation  $R \cdot B = A$  to find each unknown quantity. Round percents to the nearest tenth of a percent. All other answers should be rounded to the nearest hundredth, if necessary. See Examples 3 through 5.

49. 10% of 70 is what number?

50. 6% of 75 is what number?

51. Find 75% of 12.

52. Find 60% of 35.

53. 150% of \_\_\_\_ is 63.

54. 110% of \_\_\_\_ is 330.

55. \_\_\_\_% of 60 is 90.

56. \_\_\_\_% of 60 is 150.

57. What percent of 75 is 15?

58. What percent of 120 is 90?

59. 3 is 2% of what number?

60. 17 is 20% of what number?

61. \_\_\_\_% of 34 is 17.

62. \_\_\_\_% of 30 is 6.

63. 100% of 36 is \_\_\_\_.

64. 1% of 148 is \_\_\_\_.

65. What percent of 48 is 16?

66. What percent of 100 is 35?

67. 82% of 50 is \_\_\_\_.

68. 22 is 20% of \_\_\_\_.

69. 18 is what percent of 10?

70. 15 is what percent of 10?

71. 92.1 is 15% of what number?

72. 119.6 is 23% of what number?

73. 9.5 is 25% of \_\_\_\_.

74. 29.2 is 40% of \_\_\_\_.

75. 100 is 125% of \_\_\_\_.

76. 30 is 120% of \_\_\_\_.

77. 36 is \_\_\_\_% of 18.







78. 60 is \_\_\_\_% of 40.

## Applications

Solve.

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79. A new briefcase was priced at \$275. If it were to be marked down 30%:
- What would be the amount of the discount?
  - What would be the new price?
80. A store owner received a 3% discount from the manufacturer when she bought \$15,500 worth of dresses.
- What was the amount of the discount?
  - What did she pay for the dresses?
81. Sheets are marked \$22.50 and pillowcases \$7.50. What is the sale price of each item if each item is discounted 25% off the marked price?
82. Towels were on sale at a discount of 30%. If the sale price was \$3.01, what was the original price?
83. Headphones were on sale for \$49.00. What was the original price if the sale price represents a discount of 20%?
84. If the sales tax rate is 6.5%, what is the tax on an \$800 purchase?
85. If the sales tax in a certain state is figured at 6%:
- How much tax is there on a purchase of \$30.20?
  - What is the total amount paid for the purchase?
86. If sales tax is figured at 6%:
- How much tax would be paid on the purchase of three textbooks priced at \$55.00, \$25.50, and \$43.95?
  - What would be the total cost of all three books?
87. If sales tax is figured at 7.25%, how much tax will be added to the total purchase price of three textbooks priced at \$25.00, \$35.00, and \$52.00?
88. A real estate agent works on 6% commission. What is his commission on a house he sold for \$195,000?
89. A car saleswoman earns a commission of 7% on each car she sells. How much did she earn on the sale of a car for \$12,500?
90. A real estate agent works on 6% commission. What is his commission on a house he sold for \$125,000?
91. If a salesman works on a 10% commission (no monthly salary), how much merchandise will he have to sell to earn \$2800 in one month?

92. A real estate agent works on a 5% commission. How much would she need to sell a house for in order to earn \$24,250 in commission?
93. A sales clerk receives a monthly salary of \$500 plus a commission of 6% on all sales over \$3500. What did the clerk earn the month she sold \$8000 in merchandise?
94. Central Valley Community College had 48 teams compete at their 3rd annual corn hole tournament. The following year they had 54 teams compete. What was the percent increase in competing teams?
95. Due to the increasing cost of breakfast cereals, more and more people are buying private-label brands rather than national brands. In a recent year, the sale of private-label cereals rose from 170 million boxes to 180 million boxes. What was the percent increase in sales (to the nearest tenth of a percent)?
96.  The average attendance to a Yankees game in 2009 was 45,364 fans. In 2010 the average attendance grew to 46,491 fans. Find the percent increase in attendance. Round your answer to the nearest thousandth.
97.  In 1966 the student enrollment at California Polytechnic State University in San Luis Obispo, CA, was 7740. In 1977 the university had 15,502 students. Since that time the enrollment growth has slowed. What was the percent increase of student enrollment during that eleven year period? Round your answer to the nearest tenth of a percent.<sup>1</sup>
98.  Conroe City, Texas, had the largest population growth among large cities according to the Census Bureau. In 2015, the population of Conroe City was 76,332. The percent increase between 2015 and 2016 was 7.8%. What was the population of Conroe City in 2016 (to the nearest whole number)?
99.  The 2010 population of Wheeling, WV, was 43,002 while the 2015 population dropped to 42,573. What was the percent decrease of population in that five year period? Round your answer to the nearest tenth of a percent.<sup>2</sup>
100.  The circulation of the Washington Post newspaper was approximately 633,100 in 2009, and it dropped to 395,234 in 2015. What was the percent decrease in circulation? Round your answer to the nearest percent.<sup>3</sup>
101.  The Dow Jones Industrial Index had a peak of 13,930 in October of 2007, but dropped to a minimum of 7,063 in February 2009. Fortunately this dip was short lived, and the market started increasing again. What was the percent decrease in the stock market drop according to the Dow Jones Industrial Index during this sixteen month interval? Round your answer to the nearest tenth of a percent.<sup>4</sup>

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1 Source: <http://lib.calpoly.edu/universityarchives/history/timeline/>

2 Source: <http://www.city-data.com/zips/26003.html>

3 Source: <http://www.capitolcommunicator.com/washington-post-circulation-drops-37-percent-since-2009-states-dcrtv/>

4 Source: <http://stockcharts.com/charts/historical/djia2000.html>

- 102.** A company manufactures and sells plastic boxes that cost \$21 each to produce, and that sell for \$28 each.
- How much profit does the company make on each box?
  - What is the percent of profit based on cost?
  - What is the percent of profit based on selling price?
- 103.** Men's suits were on sale for \$300. Each one cost the store owner \$250.
- What was the profit for the store?
  - What was the store's percent profit based on cost?
  - What was the store's percent profit based on selling price?
- 104.** The cost of a 20-inch television set to a store owner was \$450, and she sold the set for \$630.
- What was her profit?
  - What was her percent of profit based on cost?
  - What was her percent of profit based on selling price?
- 105.** An art gallery sells paintings by a well-known artist for \$2500 each. The gallery owner has agreed to pay the artist \$2000 for each painting of a certain size.
- What is the profit on each painting?
  - What is the percent of profit based on cost?
  - What is the percent of profit based on selling price?
- 106.** The Golf Pro Shop had a set of 10 golf clubs that were marked on sale for \$860. This was a discount of 20% off the original selling price.
- What was the original selling price?
  - If the clubs cost the Golf Pro Shop \$602, what was its profit?
  - What was the shop's percent of profit based on the original selling price?
  - What was the percent of profit based on the sale price?

## Writing & Thinking

- 107.** Determine how to calculate sales tax when eating out and relate this process to either a proportion and/or using the amount/base/rate equation. Give an example.
- 108.** A man weighed 200 pounds. He lost 20 pounds in 3 months. Then he gained back 20 pounds 2 months later.
- What percent of his weight did he lose in the first 3 months?
  - What percent of his weight did he gain back?
  - The loss and gain are the same, but the two percentages are different. Explain why.

- 109.** Explain the process to determine how to find percent of profit based on
- cost.
  - selling price.

## Collaborative Learning

With the class separated into teams of two to four students, each team is to analyze the following problem and decide how to answer the related questions. Then each team leader is to present the team's answers and related ideas to the class for general discussion.

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- 110.** Jerry works in a bookstore and gets a salary of \$500 per month plus a commission of 3% on whatever he sells. Wilma works in the same store, but she decided to work on a straight 8% commission.
- At what amount of sales will Jerry and Wilma make the same amount of money?
  - Up to that point, who will be making more?
  - After that point, who would be making more? Explain briefly. (If you were offered a job at this bookstore, which method of payment would you choose?)