

**Completion Example Answers**

7. 100%; 3.60, 360%

**Margin Example Answers**

1. a. 9% b. 1.25% c. 125% d. 62% e. 0% 2. a. 0.35% b. 217% c. 87.1% d. 10%

3. a. 0.40 b. 2.11 c. 0.006 d. 0.2937 e. 1.02 4. 81.25% 5. 54% 6. 150%

7. 280% 8. 27.3% 9. 93.3% 10.  $\frac{4}{5}$  11.  $2\frac{7}{20}$ 

## 5.1 Exercises

### Concept Check

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

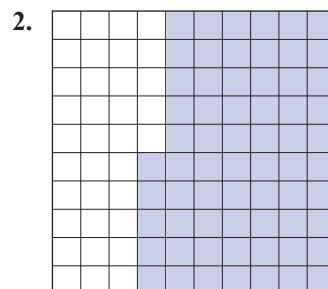
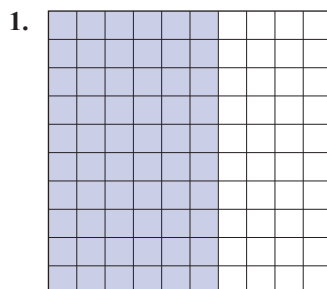
- Percent is the ratio of a number to \_\_\_\_\_.
- To change a decimal number to a percent, move the decimal point \_\_\_\_\_ places to the \_\_\_\_\_.
- To change a percent to a decimal number, move the decimal point \_\_\_\_\_ places to the \_\_\_\_\_.
- If a fraction does not have a denominator that is a factor of 100, it can still be changed to a percent by finding its equivalent \_\_\_\_\_ number form.
- Anytime a percent is converted to a fraction, the fraction should be \_\_\_\_\_ if possible.
- To change a percent to a fraction, begin by removing the percent sign and writing the percent as a numerator over \_\_\_\_\_.

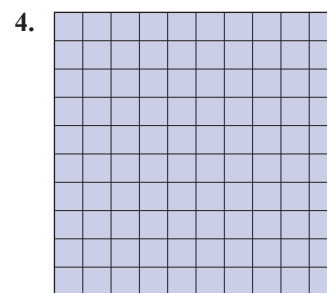
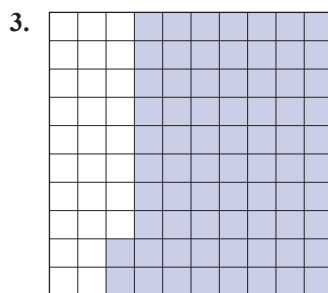
**True/False.** Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

- It is not possible to have a percent greater than 100%.
- A decimal number that is between 0.01 and 0.10 is between 10% and 100%.
- To change from a percent to a decimal, simply omit the percent sign.
- Fractions that have denominators other than 100 cannot be changed to a percent.

### Practice

Find the percent of each square that is shaded.





Change each fraction to a percent. See Example 1.

5.  $\frac{20}{100}$

7.  $\frac{125}{100}$

9.  $\frac{0.5}{100}$

11.  $\frac{2.14}{100}$

6.  $\frac{80}{100}$

8.  $\frac{336}{100}$

10.  $\frac{0.2}{100}$

12.  $\frac{1.62}{100}$

Change each decimal number to a percent. See Example 2.

13. 0.02

16. 0.7

19. 0.128

22. 1.75

14. 0.09

17. 0.36

20. 0.368

23. 2

15. 0.1

18. 0.52

21. 1.12

24. 25

Change each percent to a decimal number. See Example 3.

25. 2%

28. 42%

31. 125%

34. 10.1%

26. 7%

29. 60%

32. 120%

35. 0.26%

27. 18%

30. 30%

33. 17.3%

36. 0.52%

Change each fraction or mixed number to a percent. If necessary, round to the nearest tenth of a percent. See Examples 4 through 8.

37.  $\frac{7}{100}$

41.  $\frac{11}{20}$

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

49.  $2\frac{1}{10}$

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

42.  $\frac{4}{5}$

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

50.  $5\frac{3}{10}$

39.  $\frac{1}{2}$

43.  $\frac{56}{64}$

47.  $1\frac{1}{4}$

51.  $2\frac{1}{15}$

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

44.  $\frac{35}{56}$

48.  $1\frac{1}{20}$

52.  $4\frac{1}{18}$

Change each percent to a fraction or mixed number and reduce, if possible. See Examples 10 and 11.

53. 4%

58. 300%

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

66.  $37\frac{1}{2}\%$

54. 15%

59. 150%

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

67.  $16\frac{2}{3}\%$

55. 25%

60. 125%

65.  $12\frac{1}{2}\%$

68.  $83\frac{1}{3}\%$

57. 100%

62. 0.2%

Find the missing forms of each number.

	Fraction form	Decimal form	Percent form
69.	$\frac{5}{8}$	_____	_____
70.	$\frac{11}{20}$	_____	_____
71.	_____	0.09	_____
72.	_____	1.75	_____
73.	_____	_____	36%
74.	_____	_____	10.5%

## Applications

Solve.

75. To calculate what your maximum house payment should be, a banker multiplied your income by 0.28. Change 0.28 to a percent.
76. The discount you earn by paying cash is found by multiplying the amount of your purchase by 0.02. Change 0.02 to a percent.
77. A savings account is offering an interest rate of 0.04 for the first year after opening the account. Change 0.04 to a percent.
78. Suppose the state license fee is figured by multiplying the cost of your car by 0.065. Change 0.065 to a percent.
79. The sales commission for the clerk at a retail store is figured at 8.5%. Change 8.5% to a decimal.
80. Suppose that sales tax is figured at 7.25%. Change 7.25% to a decimal.
81. At Mr. Jones' sporting goods store, the rate of profit based on sales price is 45%. Change 45% to a decimal.
82. The discount during a special sale on dresses is 30%. Change 30% to a decimal.
83. According to the last US Census, per capita property taxes in New Jersey were 523% higher than those in Alabama. Write 523% as a decimal.
84. According to the Aluminum Association, the percentage of aluminum cans recycled in 2015 was 64.3%, and this percentage fell to 63.6% in 2018. Write 64.3% and 63.6% as decimals.
85. A department store offers a 30% discount during a special sale on men's suits. Change 30% to a fraction reduced to lowest terms.

86. Betty pays income tax of 24% on her pay from working as a labor and delivery nurse. Express 24% as a fraction reduced to lowest terms.
87. The portfolio of an investor increased by 385%. Express this as a mixed number reduced to lowest terms.
88. A certain very precise voltmeter will measure the voltage with no greater than 0.035% error. This means that the difference between the actual voltage and the indicated voltage is no greater than 0.035% of the measured voltage; this is expressed as  $\pm 0.035\%$ . Express this maximum error as a fraction reduced to lowest terms.
89. Consider each measurement.
- There are 12 inches in a foot. What percent of a foot is an inch?
  - There are 4 quarts in a gallon. What percent of a gallon is a quart?
  - There are 16 ounces in a pound. What percent of a pound is an ounce?
90. In a sophomore class of 250 students, 10 students represent the sophomore class on the student council. What percent of the class is on the student council?
91. Out of a possible total of 240 points on an exam, David received 204 points. What percent of the exam did David get correct?
92. Three gallons of fluoride are in a 4,000,000 gallon supply of drinking water. What percent of the drinking water is fluoride?
93. According to the laws in the United States, a person can be arrested for driving under the influence of alcohol if the blood alcohol concentration (BAC) is 0.08% or greater, where BAC in decimal form is defined as the number of grams of alcohol in 1 milliliter of blood.<sup>1</sup>
- Assume that 2 milliliters of blood has 0.0022 grams of alcohol, what is the BAC in decimal units? (**Hint:** Divide the amount of alcohol by the amount of blood.)
  - Express this as a percent.
  - Does this exceed the legal limit of 0.08%?
94. In 2020, approximately 88,000,000 Americans were between the ages of 25 and 44. If the total US population was approximately 329,000,000 people, what percentage (to the nearest percent) of the population is between the ages of 25 and 44?<sup>2</sup>
95. A recipe to create self-rising flour says to mix 120 grams of all-purpose flour with 5 grams of salt and 8 grams of baking powder. The salt and baking powder mixture make up what percent of the self-rising flour? Round your answer to the nearest tenth of a percent.

1 Source: [dui.drivinglaws.org/drink-table.php](http://dui.drivinglaws.org/drink-table.php)

2 [www.statista.com/statistics/241488/population-of-the-us-by-sex-and-age/](https://www.statista.com/statistics/241488/population-of-the-us-by-sex-and-age/)

96. A sample of perfume is made with 21 drops of peach oil, 35 drops of rosemary oil, and 14 drops of sandalwood oil. The oil mixture is then diluted with 100 drops of perfumer's alcohol. Round your answers to the nearest tenth of a percent. (**Hint:** The denominator is equal to the total number of drops that make up the perfume.)
- What percent of the perfume sample does the rosemary make up?
  - The perfumer's alcohol makes up what percent of the perfume sample?
  - The oil mixture makes up what percent of the perfume sample?

## Writing & Thinking

97. Describe a situation where more than 100% is possible. Describe a situation where it is impossible to have more than 100%.
98. Compare and contrast the process for converting percents to decimal numbers and changing decimal numbers to percents.
99. Justify why mixed numbers are a larger percentage than proper fractions alone. (Consider the value of 100%.)