

## Percents and Ratios

1. If a discount of 25% off the retail price of a desk saves Mark \$45, how much did he pay for the desk?

\$135

\$160

\$180

\$210

\$215

2. A customer pays \$1,100 in state taxes on a newly purchased car. What is the value of the car if state taxes are 8.9% of the value?

\$9,765.45

\$10,876.90

\$12,359.55

\$14,345.48

\$15,745.45

3. How many years does Steven need to invest his \$3,000 at 7% to earn \$210 in simple interest?

1 year

2 years

3 years

4 years

5 years

4. Sabrina's boss states that she will increase Sabrina's salary from \$12,000 to \$14,000 per year if she enrolls in business courses at a local community college. What percent increase in salary will result from Sabrina taking the business courses?

15%

16.7%

17.2%

85%

117%

5. 35% of what number is 70?

100

110

150

175

200

6. What number is 5% of 2000?

50

100

150

200

250

7. What percent of 90 is 27?

15%

20%

30%

33%

41%

8. Jim works for \$15.50 per hour for a health care facility. He is supposed to get a 75 cent per hour raise at one year of service. What will his percent increase in hourly pay be?

2.7%

3.3%

133%

4.8%

105%

9. If 45 is 120% of a number, what is 80% of the same number?

30

32

36

38

41

10. How long will Lucy have to wait before her \$2,500 invested at 6% earns \$600 in simple interest?

2 years

3 years

4 years

5 years

6 years

11. What is 35% of a number if 12 is 15% of a number?

5

12

28

33

62

12. A computer is on sale for \$1600, which is a 20% discount off the regular price. What is the regular price?

\$1800

\$1900

\$2000

\$2100

\$2200

13. A car dealer sells a SUV for \$39,000, which represents a 25% markup over the dealer's cost. What was the cost of the SUV to the dealer?

\$29,250

\$31,200

\$32,500

\$33,800

\$33,999

14. After having to pay increased income taxes this year, Edmond has to sell his BMW. Edmond bought the car for \$49,000, but he sold it for a 20% loss. What did Edmond sell the car for?

\$24,200

\$28,900

\$35,600

\$37,300

\$39,200

15. At a company fish fry,  $\frac{1}{2}$  in attendance are employees. Employees' spouses are  $\frac{1}{3}$  of the attendance. What is the percentage of the people in attendance who are not employees or employee spouses?

10.5%

16.7%

25%

32.3%

38%

16. If 6 is 24% of a number, what is 40% of the same number

8

10

15

20

25

17. 25% of 400 =

100

200

800

10,000

12,000

18. 22% of \$900 =

90

198

250

325

375

19. Which of the following percentages is equal to 0.45?

0.045%

0.45%

4.5%

45%

0.0045%

20. Which of these percentages equals 1.25?

0.125%

12.5%

125%

1250%

1250.5%

Answers & Explanations

1. A: The original price of the desk may be found by solving the equation,  $0.25x = 45$ . Thus,  $x = 180$ . However, this is the original price of the desk. Since he saves \$45, he pays \$45 less, or \$135.

2. C: The following equation may be used to find the value of the car:  $1,100 = 0.089x$ . Solving for  $x$  gives  $x \approx 12,359.55$ . Thus, the value of the car is \$12,359.55.

3. A: The formula,  $I = Prt$ , represents the amount of interest earned, for a particular principal, interest rate, and amount of time. Substituting 210 for  $I$ , 3000 for  $P$  and 0.07 for  $r$  gives:  $210 = 3000(0.07)t$ . Solving for  $t$  gives  $t = 1$ . Thus, he will earn \$210 in interest, after 1 year.

4. B: The percent increase may be modeled by the expression,  $(14,000-12,000)/12,000$ , which equals 16.7%.

5. E: The equation,  $0.35x = 70$ , may be used to solve the problem. Dividing both sides of the equation by 0.35 gives  $x = 200$ .

6. B: The problem may be modeled as  $x = 0.05(2000)$ . Thus, 100 is 5% of 2000.

7. C: The problem may be modeled as  $90x = 27$ . Dividing both sides of the equation by 90 gives  $x = 0.3$  or 30%.

8. D: The percent increase may be modeled by the expression,  $0.75/15.50$ , which is approximately 0.048, or 4.8%.

9. A: The first part of the problem may be modeled with the equation,  $45 = 1.2x$ . Solving for  $x$  gives  $x = 37.5$ . 80% of 37.5 may be written as  $0.80(37.5)$ , which equals 30.

10. C: The formula,  $I = Prt$ , represents the amount of interest earned, for a particular principal, interest rate, and amount of time. Substituting 600 for  $I$ , 2500 for  $P$  and 0.06 for  $r$  gives:  $600 = 2500(0.06)t$ . Solving for  $t$  gives  $t = 4$ . Thus, she will have to wait 4 years to earn \$600 in interest.

11. C: The second part of the problem may be modeled with the equation,  $12 = 0.15x$ . Solving for  $x$  gives  $x = 80$ . Thus, the number is 80. 35% of 80 may be written as  $0.35(80)$ , which equals 28.

12. C: The sale price of the computer is 80% of the regular price. Thus, the following equation may be used to solve the problem:  $1600 = 0.80x$ . Solving for  $x$  gives  $x = 2000$ . Thus, the regular price of the computer is \$2000.

13. B: The following equation may be used to solve the problem:  $0.25 = (39,000 - x)/x$ . Multiplying both sides of the equation by  $x$  gives  $0.25x = 39,000 - x$ . Adding  $x$  to both sides of the equation gives  $1.25x = 39,000$ , where  $x = 31,200$ . Thus, the cost of the SUV to the dealer was \$31,200.

14. E: The problem may be modeled by the expression,  $49,000 - (0.20(49,000))$ , which equals 39,200. Thus, he had to sell the car for \$39,200.

15. B: The attendance of employees and spouses may be modeled as  $1/2 + 1/3$ , or  $5/6$ . Thus,  $1/6$  of those, in attendance, who are not employees or spouses, is approximately 16.7%.

16. B: The first part of the problem may be modeled with the equation,  $6 = 0.24x$ . Solving for  $x$  gives  $x = 25$ . Thus, the number is 25. 40% of this number may be written as  $0.40(25)$ , which equals 10.

17. A: The problem may be modeled as  $0.25(400)$ , which equals 100.

18. B: The problem may be modeled as  $0.22(900)$ , which equals 198.

19. D: The percentage may be obtained by multiplying 0.45 by 100. Doing so gives 45%.

20. C: The percentage may be obtained by multiplying 1.25 by 100. Doing so gives 125%.



## Additional Percent and Ratio

1. Express fourteen hundredths as a percent.

0.14%

14%

0.014%

1.4%

2. 3 is what percent of 50?

3%

4%

5%

6%

3. The ratio of 2:10 is the same as what percentage?

2%

5%

10%

20%

4. Lauren had \$80 in her savings account. When she received her paycheck, she made a deposit which brought the balance up to \$120. By what percentage did the total amount in her account increase as a result of this deposit?

50%

40%

35%

80%

5. Round to the nearest whole number: What is  $17/68$ , as a percent?

17%

25%

40%

68%

6. Round to the nearest whole number: Gerald made 13 out of the 22 shots he took in the basketball game. What was his shooting percentage?

13%

22%

59%

67%

7. Change the following fraction to the simplest possible ratio:  $8/14$

4:3

4:6

4:7

3:4

8. If 5 people buy 3 pens each and 3 people buy 7 pencils each, what is the ratio of the total number of pens to the total number of pencils?

15 :21

3:7

5:3

1:1

9. In a town, the ratio of men to women is 2:1. If the number of women in the town is doubled, what will be the new ratio of men to women?

1:2

1:1

2:1

3:1

10. A man's lawn grass is 3 inches high. He mows the lawn and cuts off 30% of its height. How tall will the grass be after the lawn is mowed?

0.9 inches

2.1 inches

2.7 inches

2.9 inches

Answers and Explanations

1. B: "Fourteen hundredths" can be written as 0.14. To convert to a percent, move the decimal point two places to the right and add the percent sign.

2. D: Divide 3 by 50 to get 0.06 or 6%.

3. D: Divide 2 by 10 (not 10 by 2) to get 0.2 or 20%.

4. A: The rate of increase equals the change in the account balance divided by the original amount, \$80. Multiply that decimal by 100 to yield the percentage of increase. To determine the change in the balance, subtract the original amount from the new balance:

Change in account balance =  $\$120 - \$80 = \$40$ .

Now, determine the percentage of increase as described above:  $\text{Percent} = \frac{\$40}{\$80} * 100 = 50\%$

5. B: The answer is 25%. This problem requires you to understand how to convert fractions into percentages. One way to make this conversion is to divide 17 by 68 using long division, which will create a decimal quotient, and then convert this decimal into a percentage.  $17/68 = 0.25 = 25\%$

6. C: The answer is 59%. To solve this problem, you must know how to convert a fraction into a percentage. Gerald made 13 out of 22 shots, a performance that can also be expressed by the fraction  $13/22$ .  $13/22 = 0.5909 = 59\%$

7. A: To solve this problem, you must know how to convert fractions into ratios. A ratio expresses the relationship between two numbers. For instance, the ratio 2:3 suggests that for every 2 of one thing, there will be 3 of another. This equates to a fraction of  $2/5$  because there are 5 things total. If we applied this ratio to the length and width of a rectangle, for instance, we could say that for every 2 units of width, the rectangle must have 3 units of length. We could also say that  $2/5$  of the perimeter is from the width and  $3/5$  is from the length. The fraction  $8/14$  is equivalent to the ratio 8:6. To simplify the ratio, divide both sides by the greatest common factor, 2. The simplest form of this ratio is 4:3.

8. A: First, find the total number of pens:  $5 * 3 = 15$

Then, find the total number of pencils:  $3 * 7 = 21$

Finally, express it as a ratio: 15:21

9. B: Currently, there are two men for every woman. If the number of women is doubled (1 2 = 2), then the new ratio is 2:2. This is equivalent to 1:1.

10. B: First, calculate 30% of 3 inches:  $3 \times 0.30 = 0.9$  inches.

Then, subtract this value from the original length:  $3 - 0.9 = 2.1$