

7. Jack works at a nature preserve observing the bald eagle population. Over the last 5 years, the population has been growing at a rate of 4% each year (each year the population is 104% of the previous year). Last year, the nature preserve was home to 50 pairs of bald eagles. How many pairs of bald eagles can Jack expect to observe this year?

Example 7 Application: Finding the Amount

Marcus feels he needs to get 80% of the questions in his homework assignment correct to be confident that he has mastered the material. If today's assignment contains 15 questions, how many questions does Marcus need to answer correctly to feel he has achieved mastery of this material?

Solution

For this problem, $R = 80\% = 0.80$ and $B = 15$. To find the amount, substitute into the equation and solve for A .

$$\begin{aligned} R \cdot B &= A \\ 0.80 \cdot 15 &= A \\ 12 &= A \end{aligned}$$

Marcus needs to answer **12** questions correctly to feel he has mastered the material.

Now work margin exercise 7.

Margin Exercise Answers

1. 13.7 2. 25 3. 120% 4. 90 5. 16 6. 290 drinks 7. 52 pairs

5.3 Exercises

Concept Check

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

- In the equation $R \cdot B = A$, B represents the _____.
- In the equation $R \cdot B = A$, R is written in _____ form.
- The word "of" implies _____.
- In the problem: "63% of what number is 792?" the number being sought is the _____.
- The basic equation can be written in the form $A = R \cdot B$. This form is most convenient when the unknown value is the _____.

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.)

- In order to solve the equation $0.56 \cdot B = 12$ for the base B one would multiply 12 by 0.56.
- In the problem "126% of 720 is what number?" the missing number is the amount.
- The solution to the problem "50% of what number is 352?" could be found by solving the equation $50 \cdot B = 352$.
- If the base is 120 and the rate is greater than 100%, then the amount will be greater than 120.

Practice

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 1 through 5.

- 10% of 70 is what number?
- 20% of 90 is what number?
- 5% of 62 is what number?
- 6% of 75 is what number?
- Find 75% of 12.
- Find 60% of 35.
- 150% of ____ is 63.
- 110% of ____ is 330.
- ____% of 60 is 90.
- ____% of 60 is 150.
- What percent of 75 is 15?
- What percent of 120 is 90?
- 3 is 2% of what number?
- 17 is 20% of what number?
- ____% of 34 is 17.
- ____% of 30 is 6.
- 21 is 30% of what number?
- 75 is 100% of what number?
- 100% of 36 is ____.
- 1% of 148 is ____.
- What percent of 48 is 16?
- What percent of 88 is 55?
- What percent of 100 is 35?
- What percent of 100 is 67?
- What number is 50% of 25?
- What number is 31% of 70?
- 25% of 72 is ____.
- 82% of 50 is ____.
- 22 is 20% of ____.
- 86 is 100% of ____.
- 18 is what percent of 10?
- 15 is what percent of 10?
- 92.1 is 15% of what number?
- 119.6 is 23% of what number?
- 9.5 is 25% of ____.
- 29.2 is 40% of ____.
- 100 is 125% of ____.
- 30 is 120% of ____.
- 36 is ____% of 18.
- 60 is ____% of 40.
- 45 is 60% of what number?
- 12% of ____ is 15.
- ____ is 96% of 17.
- ____ is 84% of 32.
- 18% of 325 is what number?
- 28% of 460 is what number?
- Find 15.2% of 75.
- Find 67.5% of 140.
- 87.5% of what number is 21?
- 37.5% of what number is 12?
- Find 120% of 60.
- Find 150% of 126.
- What percent of 32 is 30.4?
- What percent of 240 is 76.8?
- 17.4 is ____% of 60.
- 64.8 is ____% of 180.



57. ____% of 4 is 7.
58. ____% of 20 is 28.
59. 24 is $33\frac{1}{3}\%$ of what number?
60. 60 is $66\frac{2}{3}\%$ of what number?

Use fractions to solve each percent problem. See Examples 4 and 5.

61. Find 50% of 32.
62. 25% of 150 is what number?
63. What is $12\frac{1}{2}\%$ of 80?
64. What is $62\frac{1}{2}\%$ of 16?
65. $33\frac{1}{3}\%$ of 75 is what number?
66. Find $66\frac{2}{3}\%$ of 60.
67. 75% of what number is 21?
68. 50% of what number is 35?
69. $37\frac{1}{2}\%$ of what number is 62.1?
70. $12\frac{1}{2}\%$ of what number is 76.3?

Applications

Solve.

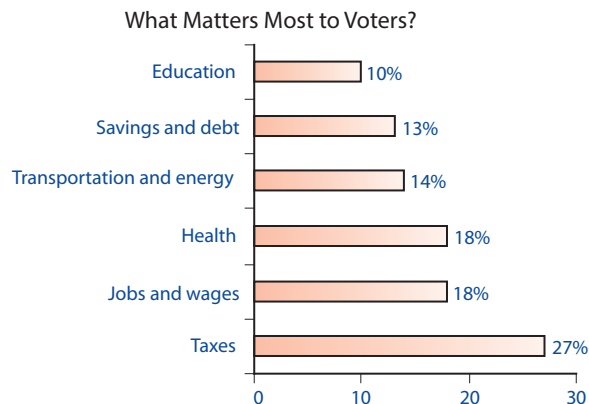
71. Only 27% of American deaths in the Revolutionary War occurred in battle. All other mortalities were the result of things such as exposure, disease, and starvation. Of the estimated 25,300 deaths, how many men died in battle (to the nearest hundred)?
72. In 2016, Expedia paid its CEO \$94.6 million in compensation (salary, bonus, and stock options). This was 2252% of his total compensation in 2020. What was his total compensation package in 2020? (Round to the nearest tenth of a million.)
73. During his presidency, from 1945 to 1953, Harry S. Truman vetoed 250 congressional bills, and 12 of those vetoes were overridden. What percent of Truman's vetoes were overridden?
74. William O. Douglas served as an associate justice on the Supreme Court for 36 years, from 1939 to 1975, the longest tenure of any Supreme Court justice in history. He lived to be 82. What percent of his life (to the nearest one percent) did he spend on the Supreme Court?
75.  14 karat gold is an alloy which consists of 58.33% gold by weight, while the remainder is alloy material. If a goldsmith starts with 20 grams of pure gold, how much will the 14 karat gold alloy weigh? Round your answer to the nearest hundredth of a gram
76. The minimum down payment to obtain the best financing rate on a house is 20%. Assuming that John has set aside \$35,000 and wants to take advantage of the best financing rate, what is the most expensive house he can purchase?
77. A student missed 6 problems on a mathematics test and received a grade of 85%. If all the problems were of equal value, how many problems were on the test?
78.  Magazine publishers will often give significant discounts to subscribers. The cover price of *TV Guide* is \$145.01 for 12 months, but a 12 month subscription costs only \$20.00! What is the percent savings (to the nearest tenth) for someone who subscribes to *TV Guide*?

79. In 2021, the final standings of the top two teams in each division of the American and National Leagues in baseball were as listed here. With this information, find the percentage (Pct.) of wins for each team on this list (accurate to three decimal places).

American League				National League			
	Won	Lost	Pct.		Won	Lost	Pct.
East				East			
Tampa Bay	100	62	a.	Atlanta	88	73	g.
Boston	92	70	b.	Philadelphia	82	80	h.
Central				Central			
Chicago White Sox	93	69	c.	Milwaukee	95	67	i.
Cleveland	80	82	d.	St. Louis	90	72	j.
West				West			
Houston	95	67	e.	San Francisco	107	55	k.
Seattle	90	72	f.	LA Dodgers	106	56	l.

Source: www.mlb.com/standings/2021

80. A political candidate hired a survey company to ask 15,000 constituents what issues matter the most to them for the upcoming election. The bar graph shows the results broken down into six main issues. Find the number of constituents that say each issue matters the most.



Writing & Thinking

81. List the three parts of the equation $R \cdot B = A$ and define each one in your own words.
82. Explain the connection between the proportion $\frac{P}{100} = \frac{A}{B}$ and the equation $R \cdot B = A$.
83. Explain how to determine which number is the rate (percent), which one is the amount, and which one is the base.
84. Discuss when, in your opinion, it might be better to use the proportion $\frac{P}{100} = \frac{A}{B}$ and when it might be better to use the equation $R \cdot B = A$ in solving a percent problem.