PERCENT PROBLEMS USING DIAGRAMS  

A variety of percent problems described in words involve the relationship between “the percent,” “the part” and “the whole.” When this is represented using a number line, solutions may be found using logical reasoning or equivalent fractions (proportions). These linear models might look like the diagram at right.

For additional information, see the Math Notes box in Lesson 5.1.2 of the Core Connections, Course 2 text.

Example 1

Sam’s Discount Tires advertises a tire that originally cost $50 on sale for $35. What is the percent discount?

A possible diagram for this situation is shown at right:

In this situation it is easy to reason that since the percent number total (100%) is twice the cost number total ($50), the percent number saved is twice the cost number saved and is therefore a 30% discount. The problem could also be solved using a proportion $\frac{15}{50} = \frac{x}{100}$.

Example 2

Martin received 808 votes for mayor of Smallville. If this was 32% of the total votes cast, how many people voted for mayor of Smallville?

A possible diagram for this situation is shown at right:

In this case it is better to write a pair of equivalent fractions as a proportion: $\frac{808}{32} = \frac{x}{100}$. If using the Giant One, the multiplier is $\frac{100}{32} = 3.125$ so $\frac{808}{32} \cdot 3.125 = \frac{2525}{100}$.

A total of 2525 people voted for mayor of Smallville.

Note that the proportion in this problem could also be solved using cross-multiplication.
Problems
Use a diagram to solve each of the problems below.

1. Sarah’s English test had 90 questions and she got 18 questions wrong. What percent of the questions did she get correct?

2. Cargo pants that regularly sell for $36 are now on sale for 30% off. How much is the discount?

3. The bill for a stay in a hotel was $188 including $15 tax. What percent of the bill was the tax?

4. Alicia got 60 questions correct on her science test. If she received a score of 75%, how many questions were on the test?

5. Basketball shoes are on sale for 22% off. What is the regular price if the sale price is $42?

6. Sergio got 80% on his math test. If he answered 24 questions correctly, how many questions were on the test?

7. A $65 coat is now on sale for $52. What percent discount is given?

8. Ellen bought soccer shorts on sale for $6 off the regular price of $40. What percent did she save?

9. According to school rules, Carol has to convince 60% of her classmates to vote for her in order to be elected class president. There are 32 students in her class. How many students must she convince?

10. A sweater that regularly sold for $52 is now on sale at 30% off. What is the sale price?

11. Jody found an $88 pair of sandals marked 20% off. What is the dollar value of the discount?

12. Ly scored 90% on a test. If he answered 135 questions correctly, how many questions were on the test?

13. By the end of wrestling season, Mighty Max had lost seven pounds and now weighs 128 pounds. What was the percent decrease from his starting weight?

14. George has 245 cards in his baseball card collection. Of these, 85 of the cards are pitchers. What percent of the cards are pitchers?

15. Julio bought soccer shoes at a 35% off sale and saved $42. What was the regular price of the shoes?

Answers

1. 80%
2. $10.80
3. about 8%
4. 80 questions
5. $53.85
6. 30 questions
7. 20%
8. 15%
9. 20 students
10. $36.40
11. $17.60
12. 150 questions
13. about 5%
14. about 35%
15. $120