MATD 0370 (ELEMENTARY ALGEBRA)
EXERCISE SET 2.3

The Basic Percent Problem

One way to solve problems involving percents is to translate to an equation of the form

$$P \cdot B = A$$

where P represents the percent (written in decimal form), B represents the base or the original quantity (what you are taking a percent "of") and A represents the amount which results from taking the percent of the base.

Example 1:

What percent of $50 is $16?

To solve this problem, we substitute $50 for B and $16 for A. Since the percent, P, is unknown we leave that as a variable and write:

$$P \cdot 50 = 16$$

Solving this equation for P gives P = 0.32 which is the decimal form for 32%.

Percent Increase/Decrease

Many percent applications deal with increasing or decreasing an original quantity by a percent to determine a new quantity. Sales tax, tips, markup, and population growth are just some examples of percent increase applications. In percent increase problems the original quantity is less than the new quantity. One way to solve percent increase problems is to use the method of the basic percent problem above where

P represents: 100% + the percent of increase
B represents: the original quantity
A represents: the new (greater) quantity

Percent decrease applications include discounts and other reductions. In these applications the original quantity is more than the new quantity. One way to solve percent decrease problems is to use the method of the basic percent problem above where

P represents: 100% – the percent of decrease
B represents: the original quantity
A represents: the new (smaller) quantity

Example 2:

A receipt indicates the total amount paid for a purchase (including tax), was $31.50. If the sales tax rate is 5%, what was the original cost before taxes were applied?

To solve this percent increase problem, substitute 1.05 (100% + 5%, in decimal form) for P, substitute $31.50 for A, and solve for B (the original quantity, before taxes). We write:

$$1.05 \cdot B = 31.50$$

Solving this equation gives us B = 30. Thus, the original cost was $30.

In addition to the problems assigned from your Personal Academic Notebook for lesson 2.3, solve the following problems:

1. A student buys a used book for $19.50. This is a 15% reduction from the original price of the book. How much did the book originally cost? Round your answer to the nearest cent.

2. Kyle's salary was $32,000 last year. If he receives a 5% raise for the next year, what will his new salary be?

3. To find the selling price of a vehicle, a dealer uses a 20% markup. That is, the selling price is 20% more than his cost. If the selling price of a vehicle is $8640, what was his cost for the vehicle?

4. A tax-exempt church group received a bill of $905.25 for office supplies. This incorrectly included sales tax of 6.5%. How much should the church group pay?

5. Joe paid $38.50 for groceries. He figured that by using coupons he had saved 30%. How much would he have paid if he had not used the coupons?

ANSWERS:

1. $22.94

2. $33,600

3. $7200

4. $850

5. $55