

Solving Problems involving Sales Tax, Commission, Discount and Interest

Sales Tax: **Sales Tax** = Sales tax rate (as a decimal) \times Purchase price
 Total price = Purchase price + sales tax

Examples: Solve the following problems.

1. How much sales tax is charged on an item that costs \$250 if the sales tax rate is 6%? What is the total price of the item?

Solution: We will multiply the sales tax rate as a decimal and the purchase price in order to calculate the amount of sales tax.

$$\text{Sales tax} = .06 * \$250 = \$15.00 \text{ or } \$15$$

Thus, the amount of sales tax is \$15.

To compute the total price of the item, we will add the purchase price and the amount of sales tax together.

$$\text{Total price} = \$250 + \$15 = \$265$$

Thus, the total price of the item is \$265.

2. The sales tax is \$140 on the purchase of a new dining room set which cost \$1,750. What is the sales tax rate?

Solution: Since we are looking for the sales tax rate, we will solve the following proportion.

$$\frac{p}{100} = \frac{140}{1750}$$

$$1750p = 14000$$

$$\frac{1750p}{1750} = \frac{14000}{1750}$$

$$p = 8$$

Thus, the sales tax rate is 8%.

Commission: When you work for a **salary**, you receive the same amount of money each week or month. When you work for **commission**, you are paid a percentage of the total sales you complete.

$$\text{Commission} = \text{Commission rate} \times \text{Sales}$$

Example: Joshua's sales commission rate is 6%. What is the commission from the sale of \$65,750 worth of new car sales?

Solution:

$$\text{Commission} = \text{Commission rate} \times \text{Sales}$$

$$C = 6\% \times 65,750$$

$$C = 0.06 \times 65,750$$

$$C = 3,945.00$$

The commission is \$3,945.00.

Discount:

Suppose that the regular price of an item is \$80, and the item is on sale at 25% off. Since 25% of 80 is \$20, the sale price is \$80 - \$20, or \$60. We call \$80 the **original**, or **marked price**, 25% the **rate of discount**, \$20 the **discount**, and \$60 the **sale price**.

$$\text{Discount} = \text{Rate of discount} \times \text{Original price}$$

$$\text{Sale Price} = \text{Original price} - \text{Discount}$$

Example:

A sofa marked \$800 is on sale at 20% off. What is the discount? What is the sale price?

Solution:

$$\text{a) } \text{Discount} = \text{Rate of discount} \times \text{Original price}$$

$$D = 20\% \times 800$$

$$D = 0.20 \times 800$$

$$D = 160.00$$

$$\text{b) } \text{Sale price} = \text{Original price} - \text{Discount}$$

$$= \$800 - \$160$$

$$= \$640$$

The discount is \$160 and the sale price is \$640.

Simple Interest:

Suppose you put \$1,000 into an investment for 1 year. The \$1,000 is called the **principal**. If the **interest rate** is 8%, in addition to the principal, you get back 8% of the principal which is

8% of \$1000 or $0.08 \times \$1,000$ or \$80.00.

The \$80.00 is called the **interest**, or more precisely, the **simple interest**. It is, in effect the price that a financial institution pays for the use of the money over time.

Simple Interest Formula: The **simple interest** I on the principal P , invested for t years at interest rate r , is given by

$$I = P \times r \times t$$

Example:

What is the simple interest on a principal of \$6,500 invested at an interest rate of 9% for six months?

Solution: We use the formula $I = P \times r \times t$:

$$I = P \times r \times t = \$6,500 \times 0.09 \times 0.5$$

$$I = \$292.50$$

The simple interest for six months is \$292.50.