

Use problem-solving strategies to solve an application

Step 1. **Read** the problem. Make sure all the words and ideas are understood.

Step 2. **Identify** what we are looking for.

Step 3. **Name** what we are looking for. Choose a variable to represent that quantity.

Step 4. **Translate** into an equation. It may be helpful to restate the problem in one sentence with all the important information. Then, translate the English sentence into an algebraic equation.

Step 5. **Solve** the equation using good algebra techniques.

Step 6. **Check** the answer in the problem and make sure it makes sense.

Step 7. **Answer** the question with a complete sentence.

$$18\% = .18$$

$$15\% = .15$$

$$\begin{array}{r} (.10)(14.40) \\ 1.44 \\ \underline{.72} \\ 2.16 \end{array}$$

Paul and his girlfriend enjoyed a nice dinner at a restaurant and his bill was \$68.50. He wants to leave an 18% tip. If the tip will be 18% of the total bill, how much tip should he leave?

$$(68.50)(.18) = t:p \\ = \$12.33$$

Shelly had lunch at her favorite restaurant. She wants to leave 15% of the total bill as her tip. If her bill was \$14.40, how much will she leave of the tip?

$$\$14.40(.15) = t:p \\ = \$2.16$$

$$15\% = 10\% + 5\%$$

One serving of wheat square cereal has seven grams of fiber, which is 28% of the recommended daily amount. What is the total recommended daily amount of fiber?

$$28\%(\text{total recommended amount}) = 7$$

$$\frac{.28}{.28} t = \frac{7}{.28} \quad t = 25 \text{ grams}$$

The label on George's breakfast cereal said that one serving of cereal provides 85 mg of potassium, which is 2% of the recommended daily amount. What is the total recommended daily amount of potassium?

$$\frac{.02x}{.02} = \frac{85}{.02}$$

$$x = 4,250 \text{ mg}$$

Percentage

$$\left(\frac{\text{Part}}{\text{Whole}}\right) \cdot 100$$

$$\begin{array}{r} 1 \\ 23 \overline{) 4.000} \\ \underline{46} \\ 140 \\ \underline{138} \\ 20 \end{array}$$

Find the percent of increase

Tammy received some gourmet brownies as a gift. The wrapper said each brownie was 480 calories, and had 240 calories of fat. What percent of the total calories in each brownie comes from fat?

$$\frac{240}{480} = \frac{24}{48} = \frac{1}{2} = (.5)(100) = 50\%$$

Round to the nearest whole percent. Veronica is planning to make muffins from a mix. The package says each muffin will be 230 calories and 60 calories will be from fat. What percent of the total calories come from fat?

$$\frac{60}{230} = \frac{6}{23} = (.26)(100) = 26\%$$

Step 1. Find the amount of increase.

$$\text{new amount} - \text{original amount} = \text{increase}$$

Step 2. Find the percent increase.

The increase is what percent of the original amount?

In 2011, the Californian governor proposed raising community college fees from \$26 a unit to \$36 a unit. Find the percent increase. (Round to the nearest tenth of a percent.)

$$\begin{array}{l} \text{Increase} - \text{Increase} - \text{Origin} \\ 36 - 26 \\ \boxed{10} \end{array}$$

$$\frac{10}{26} = \frac{5}{13} = .385 \\ 38.5\%$$

In 2011, the IRS increased the deductible mileage cost to 55.5 cents from 51 cents. To the nearest percent, find the percent increase.

$$\text{Increase } 55.5 - 51 = 4.5$$

$$\frac{4.5}{51} = .088 = 8.8\% = 9\%$$

Find the percent increase. In 1995, the standard bus fare in Chicago was \$1.50. In 2008, the standard bus fare was \$2.25

$$2.25 - 1.50 = .75$$

$$\frac{.75}{1.50} = \frac{1}{2} = .5 = 50\%$$

Find the Percent Decrease

Step 1. Find the amount of decrease

$$\text{original amount} - \text{new amount} = \text{decrease}$$

Step 2. Find the percent of decrease.

Decrease is what percent of the original amount?

The average price of a gallon of gas in one city in June 2014 was \$3.71. The average price in that city in July was \$3.64. Find the percent of decrease.

$$3.71 - 3.64 = .07$$

$$\frac{.07}{3.71} = .0188$$
$$= 1.88\% = 1.9\%$$

Find the percent decrease. Last year, Sheila's salary was \$42,000. Because of furlough days, this year, her salary was \$37,800.

$$42,000 - 37,800 = 4,200$$

$$\frac{4,200}{42,000} = \frac{42}{420} = \frac{1}{10} = .1 = 10\%$$

Simple Interest

$$I = Prt$$

I = Amount

P = Principle (Starting)

r = % rate (Decimal)

t = time (years)

$$I = 660$$

$$P = 3000$$

$$r = ?$$

$$t = 4$$

Nathan deposited \$12,500 in his bank account where it will earn 4% interest.

How much will Nathan earn in 5 years?

$$I = (12,500)(.04)(5)$$
$$(12,500)(.2)$$
$$= 2500$$

$$P = 12,500$$

$$r = 4\% = .04$$

$$t = 5$$

Mary invested a principle of \$950 in her bank account with interest at 3%.

How much interest did she earn in 5 years?

$$I = Prt$$
$$(950)(.03)(5)$$
$$(950)(.15) = 142.50$$

$$P = 950$$

$$r = .03$$

$$t = 5$$

Loren loaned his brother \$3,000 to help him buy a car. In 4 years his brother paid him back the \$3,000 plus \$660 in interest. What was the rate

% interest?

$$I = Prt$$
$$660 = 3000 r(4)$$

$$\frac{660}{12000} = \frac{12000 r}{12,000}$$

$$\frac{660}{12,000} = r$$

$$\frac{66}{1200} = r$$

$$r = .055$$

5.5%

$$I = 900$$

$$P = 5000$$

$$r = ?$$

$$t = 3$$

Jim loaned \$5,000 to his sister to ^{help} her buy a house. In 3 years, she paid him \$5,000, plus \$900 in interest. What was the rate of interest?

$$900 = 5000r(3)$$

$$900 = 15,000r$$

$$r = \frac{900}{15000} = \frac{9}{150} = .06 = 6\%$$

Eduardo noticed that his new car loan papers stated that with a 7.5% interest rate, he would pay \$6,596.25 in interest over 5 years. How much did he borrow to pay for his car?

$$6,596.25 = P(.075)(5)$$

$$\frac{6,596.25}{.375} = \frac{.375P}{.375}$$

$$P = \$17,590$$

Solve application with discount or mark up

Amount of discount = (discount Rate)(original price)
 Sale price = original price - amount of discount

Elise bought a dress that was discounted 35% off of the original price of \$140. What was A) the amount of discount and B) the sale price of the dress?

$$A) (.35)(140) = \$49$$

$$B) 140 - 49 = \$91$$

Find A) the amount of discount and B) the sale price: Sergio bought a belt that was discounted 40% from an original price of \$29.

$$A) 29(.4) = \$11.60$$

$$B) 29 - \$11.60 = \$17.40$$

Jeannette bought a swimsuit at a sale price of \$13.95. The original price of the swimsuit was \$31. Find the amount of discount and B) the discount rate.

Mark-up

Amount of mark-up = (mark-up)(original cost)

List price = original cost + amount of mark up

Adam's art gallery bought a photograph at original cost \$250. Adam marked the price up 40%. Find the amount of mark up and the list price of the photograph

$$A) (250)(.40) = \$100$$

$$B) 250 + 100 = \$350$$

Find the amount of mark-up and the list price. Jim's music store bought a guitar at original cost \$1,200. Jim marked the price up 30%.

Find the amount of mark-up and the list price. The Auto Resale bought Palbo's Toyota for \$8,500. The marked the price up 35%.

Jarod bought a shirt for \$18. He had to pay 6.5% in sales tax. What was the total price of the shirt?