Chapter 2

Percents

In this chapter you will learn how to solve word problems that deal with percent (%). In daily life, percents are used all the time by banks, in statistics, in advertising, in store discounts, and in many other situations.

We will start with problems involving conversions from percents to decimals and fractions, and from decimals and fractions to percents. We also want to calculate percents of numbers (for example, what is 30% of 90) and express the answer in fractions or decimals.

Then we will solve problems for situations where the percent is already included in the final number. This happens in grocery and other stores where the sales tax (which is a percentage of the sales price) is included in the total amount of money you pay. Similarly, some restaurants include a 15% tip in the total charge.

You will also learn how to calculate percent increases and decreases. For example, when the subway or bus fare is increased by 50¢ from \$1.50 to \$2.00, what is the percentage increase? Or when postage stamps are increased from 34¢ to 37¢?

We will then go on to discounts, and discounts on already discounted items.

This chapter also deals with interest calculations: interest paid by banks on your deposit in a savings account and interest charged by banks and credit card issuers on money you borrowed or charges on your credit card. The difference between simple interest and compound interest will also be made clear.

Finally, we will learn about investments in stocks and bonds and how to calculate gains or losses from these investments. We will give examples of word problems dealing with other situations of profit and loss.

Percents and Decimals

The word percent consists of two parts: per and cent. *Per* means "divide by" and *cent* means "hundred."

Example:

a) $100\% = 100 \div 100 = 1$ (that is, "the whole thing")

b) $50\% = 50 \div 100 = \frac{50}{100} = \frac{1}{2}$ or 0.5

c) $1/2\% = \frac{1}{2} \div 100 = \frac{1}{2} \times \frac{1}{100} = \frac{1}{200}$ or 0.005

d) $0.25\% = 0.0025$

When a number in decimal form is divided by 100, the decimal point is moved two steps to the left: $100.0\% = 1.00$, $50.0\% = 0.5$, $5.0\% = 0.05$, etc.

Practice Problems:

2.1 Change to a fraction: 1/3%

2.2 Change to a fraction: 4 1/2%

2.3 Change to a decimal: 0.006%

2.4 Change to a decimal: 1.7%

2.5 Change to a whole number: 400%

Often, we have to take some percent *of* a number. That means multiply the percent by the number.

Example:

Find:

a) 30% of 60

b) 24% of 300

c) $33\frac{1}{3}\%$ of 30

Solution:

a) $0.3 \times 60 = 18$

b) $0.24 \times 300 = 72$

c) $33\frac{1}{3}\% \times 30 = \frac{100}{3} \times \frac{1}{100} \times 30 = 10$

Practice Problems:

2.6 Find 50% of 600.

2.7 Find 2.5% of 7.50.

2.8 Find 3.5% of 15,000.

2.9 Find 2/3% of 60.

2.10 Find 15% of 80%.

Be careful with calculators! They are very useful, but you must know how they work. For example, in math terms,

$100 + 10\% - 10\%$ means $100 + \frac{10}{100} - \frac{10}{100} = 100$

However, many calculators "read" 10% as 10% *of* the number before it. "Of" means multiplication, so

$$100 + 10\% \text{ of } 100 = 100 + \frac{10}{100} \times 100 = 110 \text{ then}$$

$$110 - 10\% \text{ of } 110 = 110 - \frac{10}{100} \times 110 = 99.$$

Sometimes you will need to translate a number to a percent, that is, you need to insert the percent symbol. Remember that 100% equals 1. You probably also know that you can multiply any number by 1 and not change the number. We use that property to change a number to a percent.

Example:

Change the following numbers to percents:

a) 2 b) 0.7 c) 3/4

Solution:

a) $2 \times 100\% = 200\%$

b) $0.7 \times 100\% = 70\%$

c) $3/4 \times 100\% = 300/4\% = 75\%$

Practice Problems:

Change to percent:

2.11 0.0056

2.12 12

2.13 4/5

2.14 2/3 (Use common fractions or decimals to two placed rounded off.)

2.15 500

Percents and Numbers

These problems come in three forms:

1. What percent of a number is another number?
2. A known % of what number is another number?
3. A known % of a known number is what number?

Using algebra, we can write three equations where x is the unknown ("what") number and a and b are known numbers:

1. $x\% \cdot a = b$ (In math problems, multiplication is shown by a dot between the numbers that are to be multiplied.)
2. $a\% \cdot x = b$
3. $a\% \cdot b = x$

Example:

Solution:

1. What % of 60 is 15?

1. $x\% \cdot 60 = 15$

$$\frac{x}{100} \cdot 60 = 15$$

$$x = \frac{1500}{60}$$

$$x = 25$$

2. 25% of what number is 15?

2. $25\% \cdot x = 15$

$$\frac{25}{100} \cdot x = 15$$

$$x = \frac{1500}{25}$$

$$x = 60$$

3. 25% of 60 is what?

3. $0.25 \cdot 60 = 15$

Shortcut:

1. $\frac{15}{60\%} = 25$

2. $\frac{15}{25\%} = 60$

3. No shortcut is possible.

Practice Problems:

2.16 13 is what % of 52?

2.17 10% of what number is 635?

2.18 The enrollment at a local college is 3500. Of these, 30% are math majors. How many math majors are there at the college?

2.19 Suppose 120 students out of 150 passed a math course. What percent is that?

2.20 Lisa spends $175, or 25%, of her monthly take-home pay for rent. What is her monthly salary?

The Percent Is Included

Example:

What number increased by 6% is 2544?

100% + 6% = 106%

106% of what number is 2544?

$$\frac{2544}{1.06} = 2400$$

Check: 6% of 2400 = 144 and 2400 + 144 = 2544

If you prefer, you can use an equation:

$$\begin{aligned} x + 6\% \cdot x &= 2544 \\ x + 0.06x &= 2544 \\ 1.06x &= 2544 \\ x &= \frac{2544}{1.06} \\ x &= 2400 \end{aligned}$$

Example:

A merchant counted the money in his cash register and found that he had \$4320. A sales tax of 8% was included. How much money did the merchant keep and how much did he owe the government?

Let's analyze the problem:

If his money is x, the tax rate is 8%, and he counted out \$4320, we have:

$$\begin{aligned} x + 8\% \cdot x &= 4320 \\ 1.08x &= 4320 \\ x &= \frac{4320}{1.08} \\ x &= 4000 \end{aligned}$$

Therefore, the merchant keeps \$4000 and the government gets \$320.

Shortcut:

Do the division directly without using x: $\frac{4320}{1.08}$

Example:

a) Eva paid \$23 for a taxi ride with 15% tip included. How much did the trip itself cost?

b) \$5.40 has been collected for an item with 8% sales tax included. How much did the item cost before the tax was included?

Solutions:

a) $\frac{23}{1.15} = 20$ Answer: \$20.00

b) $\frac{5.40}{1.08} = 5$ Answer: \$5.00

Practice Problems:

2.21 Bailey paid the bank \$127.20 every month to repay principal on her loan plus 6% interest. How much was the principal repayment?

2.22 What number increased by 6% of itself is 371?

2.23 An item cost \$82.40 including a 3% tax. What was the cost of the item itself?

2.24 After a salary increase of 4%, Nell's salary was \$3120/month. What was her salary before the increase?

2.25 The price of a pound of prime steak was increased by 8% to \$12.42. What was the price before the increase?

Percent Increase and Decrease

Example:

In many problems we have information "before and after." For example, the price of eggs was \$1.29 for a dozen eggs last month and now it is \$1.49. What was the percent increase?

The original price of the eggs was \$1.29 and the increase was \$1.49 – \$1.29 = \$0.20. The problem can then be restated: What % of 1.29 is 0.20?

Equation: $x\% \cdot 1.29 = 0.20$

$$x = 15.5 \text{ (rounded)}$$

The price increased by 15.5%.

Example:

Let's change the problem and pretend that the eggs decreased from \$1.49 to \$1.29. What was the percent decrease?

Now the original price is \$1.49 and the decrease was \$0.20.

$x\% \cdot 1.49 = 0.20$

$$x = 13.4 \text{ (rounded)}$$

The price decreased by 13.4%.

Practice Problems:

2.26 Jill's monthly salary as a teacher increased from \$2600 to \$2675. What was the percent increase?

2.27 During one year the price of a certain stock decreased from \$75.6 a share to \$37.5. What was the percent decrease (rounded to the nearest percent)?

2.28 Ellen paid \$29,000 for a new car. After a year, she found that the value of the car was only \$24,500. Find the percent decrease.

2.29 The enrollment at a community college increased from 6783 to 7895. What was the percent increase?

2.30 The price of a house increased 6% in one year. What is the current value of the house, if it was worth \$250,000 before the increase?

Discounts

Stores often advertise a reduction of their prices with words such as "off" or "discounts."

Example:

The price of a dress was reduced from $200 to $180. What was the percent of discount?

The discount was $20 and the original price $200. The problem can be rewritten as "What percent of 200 is 20?"

$$x\% \times 200 = 20$$
$$x = 10$$

The percent of discount is 10%.

Practice Problems:

2.31 A bookstore gives a 10% discount for students. What does a student pay for a book that originally cost $35?

2.32 In a certain store, a customer is given a $12.80 discount for a total order of $256. What is the percent of discount?

2.33 A customer is getting a discount of $13.80 for a purchase of $276. What is the percent of the discount?

2.34 A jacket that used to cost $150 is for sale with a discount of 15%. How much is the jacket now?

2.35 A price club gave a 15% discount on all items on a certain day. What do you pay for an item that usually costs $236?

Example:

Jane was offered a 10% discount on a purchase and pays $22.50. How much did the item cost before the discount?

$100\% - 10\% = 90\%$

Jane paid 90% of the original price.

$$90\%x = 22.50$$
$$x = \frac{22.50}{90\%}$$
$$x = 25$$

Answer: $25.00

Shortcut: Do the problem without using x (that is, divide 22.5 by 0.9).

Example:

a) The price of an elegant winter coat with a 20% end-of-the-season markdown is $840. What was the price before the markdown?

b) A discount of 20% gives a sale price of $94. What was the original price?

c) Gwen bought a dress on sale for $62.50. It was on sale for 75% off. What was the original price?

Solutions:

a) $\frac{840}{80\%} = 1050$ Answer: $1050

b) $\frac{94}{.8} = 117.5$ Answer: $117.50

c) $\frac{62.5}{25\%} = 250$ Answer: $250

Practice Problems:

2.36 A pair of shoes was discounted with 16% and sold for $84. What did the shoes cost originally?

2.37 A lady bought a coat marked 20% off for $144. How much had the coat cost originally?

2.38 The price of a sweater was lowered from $75 to $63.50. What was the discount in percent?

2.39 Certain movie theaters give discounts of 15% to senior citizens. If Joe paid $5.10 for his ticket, how much did he save?

2.40 Millie was thinking of buying a microwave oven. She saw an ad: Discount 35% (you save $70). Another ad stated: Discount 45%, (you save $90). Which oven is cheaper?

Discounts on Discounts

Stores sometimes offer discounts on already discounted items. For example, an item is offered at a 15% discount, and then is advertised with an additional 40% discount. Do you get a discount of 55%?

Let's analyze the problem:

The 15% discount lets you pay 100% – 15% = 85% of the price. Then you get a discount of 40% of 85% of the price, which is 0.4 × 85% = 34% of the price. The total discount is 15% + 34% = 49%.

An alternative to solving this problem is: The first discount lets you pay 85% of the original price. The second discount lets you pay 100 – 40% = 60% of the new price. That is 60% of 85%, which is 51% of the original price. If you pay 51%, you get a 49% discount.

Example:

Macy's offered a super sales day with 40% off certain already discounted items. What is your actual discount rate if the item already had a discount of *a*) 10%, *b*) 25%, *c*) 34%?

Solutions:

a) The first discount is 10%. Then the price of the item is 90% of the original price. You get a 40% discount of that price, which is 40% of 90% or 36% of the original price.
The total percent discount is 10% + 36% = 46%.

Alternate solution:

(100% – 10%) = 90%
The new price is 90% of the original price.

(100% – 40%)90% = 60%(90%) = 54%
The price is 60% of 90% of the original price. You pay 54% after two discounts.

100% – 54% = 46% The discount is 46%.

b) The original discount was 25%. The new price was 75% of the original price. The second discount was 40% of 75% = 30%.
The total discount is 25% + 30% = 55%.

Alternate solution:

(100% – 25%) = 75%
The new price is 75% of the original price.

(60%)(75%) = 45%
You pay 45% after the second discount.

100% – 45% = 55% The total discount is 55%.

c) The original discount was 34%. The new price is 66% of the original price. The second discount is 40% of 66% = 26.4%.
The total discount is 34% + 26.4% = 60.4%.

Alternate solution:

$(100\% - 34\%) = 66\%$

The new price is 66% of the original price.

$(60\%)(66\%) = 39.6\%$

You pay 39.6% after two discounts.

$100\% - 39.6\% = 60.4\%$ The total discount is 60.4%.

Practice Problems:

2.41 How much do you pay for an item that originally cost $100, if you get two discounts, one of 30% and one of 40%? Does it matter which discount you use first?

2.42 An item cost $240. The price was lowered twice, first with 15% and later with 25%. What was the final price?

2.43 A radio cost $120. The price was lowered first by 15% and later by 12%. How much was it then?

2.44 A washing machine cost $860. The price was first lowered by 35% and later by $68. With how many percent was the price lowered the second time?

2.45 A company has 540 employees. How many employees will the company have after 2 years if the number of employees increases by 10% each year?

Interest

When you have a savings account in a bank, you earn interest. If you borrow money, you pay interest.

Interest can be *simple* or *compound*. With simple interest we multiply the *principal* (the money we deposit or borrow) by the interest *rate* and the *time* the money is in the bank or used by us. The interest rate is the percentage per year and the time is in years. Unfortunately, for our calculations, simple interest is not often used, but it is a starting point for understanding the procedure of calculating interest.

Simple Interest

Formula:

I(nterest) = P(rincipal) × r(ate) × t(ime) or $I = Prt$

Example:

Find the interest if \$1000 is deposited in the bank at 3% simple interest for five years.

$I = 1000 \times 3\% \times 5 = 1000 \times 0.03 \times 5 = 150$

The interest is \$150.

Example:

Find the interest rate if \$1000 is kept in the bank for five years and gives a simple interest of \$150.

Use the formula $I = Prt$: $150 = 1000\,r(5)$.

This is an equation; to solve for r, divide both sides by 5000.

$$\frac{150}{5000} = r \quad \text{or} \quad r = 0.03 = 3\%$$

Practice Problems:

2.46 Use the interest formula $I = Prt$ to find:

a) r when $P = \$7500, I = \$600$, and $t = 4$ years.

b) t when $P = \$4000, I = \$400$, and $r = 5\%$.

2.47 If you borrow \$600 for a year and repay the whole loan at the end of the year with \$636 including simple interest, what rate of interest are you paying?

2.48 Ed opens an insured money market account with $500. How much money will he have after 6 months if the interest rate is 0.75% per year?

2.49 If Ed invests his $500 in a CD (Certificate of Deposit) account instead, which pays 1.14% per year, how much money will he have after 6 months?

2.50 Fred borrowed $20,000 for 5 months at a 16% annual interest rate in order to buy a new car. How much money will he have to pay back?

Credit Cards

You receive a credit card when a lending institution, such as a bank, offers to lend you money. Department stores, gasoline companies, and other institutions also offer credit cards. When you make a purchase using a credit card, the lender pays the seller for the item you bought less a small commission (2–3%) and then sends you a bill at the end of the month. The bill usually lists the date of payment to the seller, the name of the seller, and the amount. You usually have a choice to pay the entire bill by a certain listed date or to pay a minimum amount and carry over the balance owed to your next monthly bill. The statement from the credit card company also shows how they determine your finance charge. This is the interest you owe your lender for the money they have loaned to you by paying the seller for the item you purchased with your credit card.

Example:

On March 4, you bought books at a bookstore for $21.60. You also had the *New York Times* delivered to your home 5 days a week for $19 billed directly to your credit card on March 9. Total charges from February 21 to March 21 (statement closing date) were $40.60. This is the new balance on your credit card. If you pay by the payment due date of April 15, there will be no finance charge (that is, no interest to be paid to the lender).

The statement also lists a minimum payment due of \$10 to be paid by the payment due date. If the lender charges you interest at an annual percentage rate (APR) of 10.15%, what will be the finance charge on the remaining balance of \$40.60 – \$10 = \$30.60 on your next bill of April 21, assuming you purchased no additional items before April 21?

Solution: An annual percentage rate of
10.15% / 365 days = a daily rate of 0.02781%.

The lender lent you
\$21.60 from March 4 to March 21 = 18 days
and \$19 from March 9 to March 21 = 14 days.

$\$21.60 \times 18 \times 0.02781/100 = \$0.1081$ or 10.81¢

$\$19 \times 14 \times 0.02781/100 = \$0.07397$ or 7.4¢

Total finance charge = 18¢.

Note: If you purchased additional items between the last closing statement (March 21) and the next one (April 21) then interest will be charged on the average daily balance, which includes the additional items.

Practice Problem:

2.51 You have purchased a computer for \$1000 on March 10. The minimum balance was \$50 due on March 21. The APR is 9.5%. What will be the finance charges for the remaining balance on your next statement on April 21, assuming you made no other purchases until then?

Compound Interest

Banks usually use compound interest to calculate the earnings on our money. For example, if you deposit \$100 at a yearly rate of 2% and it is compounded (interest is added to the principal) once a year, you have:

After 1 year: \$100 + 2% of \$100 = \$102

After 2 years: \$102 + 2% of \$102 = \$104.04

After 3 years: \$104.04 + 2% of \$104.04 = \$106.12

If your money is compounded daily, it is too cumbersome to calculate the interest step by step. We need a formula!

The accumulated value A is the principal plus interest $P + Prt$, where P is the principal, r the rate per year, and t the time (in years) for one compounding period, so

After 1 year, the accumulated value is:

$$P + Prt = P(1 + rt)$$

After 2 years, the accumulated value is:

$$\begin{aligned} P(1 + rt) + P(1 + rt)rt &= P(1 + rt)(1 + rt) \\ &= P(1 + rt)^2 \end{aligned}$$

After 3 years, the accumulated value is: $P(1 + rt)^3$

The general formula is $\boldsymbol{A = P(1 + rt)^n}$, where n is the number of compounding periods. In our case $P = 100$, $r = 2\%$ and $t = 1$, and n = 3, so $A = 100(1 + 2\% \cdot 1)^3 = 100(1.02)^3 =$ (Use your calculator!) 106.12.

In order to calculate the power with a calculator, do the following:

1.02, y^x, $\times$, 100 =

Example:

If \$1000 were compounded monthly for 3 months at an annual interest of 10%, how much interest would there be?

Formula: $A = P(1 + rt)^n$,
where $P = \$1000$, $r = 10\% \div 12$, $t = 1$, and $n = 3$

$$\begin{aligned} A &= 1000(1 + 10\% \div 12)^3 = 1000(1.00833)^3 \\ &= 1{,}025.21 \text{ (rounded)} \end{aligned}$$

$I = 1.025.21 - 1000 = 25.21$

The interest would be \$25.21.

The simple interest would have been:
$1000 \times 10\%/12 \times 3 = 25$ or $25

Practice Problems:

2.52 Redo the example without the formula.

2.53 Calculate the interest on $500 for one year at 2% compounded monthly.

2.54 Find the new principal if $700 gets a 1.5% interest compounded daily for one year. Use 365 for the number of times the money is compounded per year.

2.55 Barbara borrows $12,000 with an interest of 12% compounded yearly. How much interest does she owe after 4 years?

2.56 Viviane bought treasury notes for $6800. They are supposed to be worth $10,000 after five years. What is the percent interest if the money is compounded every year? Is it 6%, 7%, 8%, or 9%?

Hint: Use your calculator to test the different percents.

Bank Deposits

Example:

Leslie deposits part of $3000 in a certificate of deposit (COD) that pays simple annual interest of 2.71% and the rest in a passbook savings account that pays 0.75% compounded annually. If she earns $34.26 in interest in one year totally, how much did she deposit in her savings account?

Assume she deposited x dollars in her savings account. Then she must deposit $3000 - x$ dollars in her CD.

Table:

	Investment	Percent	Interest
	x	0.75%	$0.0075x$
	$3000-x$	2.71%	$(3000-x)0.0271$
Total	3000		34.26

$$0.0075x + (3000-x)0.0271 = 34.26$$
$$0.0075x + 81.3 - 0.0271x = 34.26$$
$$81.3 - 34.26 = 0.0271x - 0.0075x$$
$$47.04 = 0.0196x$$
$$x = 2400$$

Leslie deposited $2400 in her savings account.

Practice Problem:

2.57 One bank pays 0.50% on day-to-day savings compounded once a year while the credit union pays 2.72% compounded quarterly. If you had $1500 to invest for three years, how much more would you earn if you put your money in the credit union?

Investments

Whether you put money in the bank, in the stock market, or in bonds, you *invest* your money. What you earn on your investments differs. With CDs, as well as with a savings account, you know your interest rate. With stocks and bonds dividends can vary. However, the calculations we can make about our accounts are all similar.

Stocks

Stocks are shares in a corporation. The price of each share will vary according to the perceived value of the share by investors. When many investors want to buy shares of a certain company, the price per share goes up. When many investors want to sell shares of a company, the price per share goes down. In order to reward shareholders of profitable companies, the company will declare a dividend, usually on a quarterly basis.

Example:

Joe buys 100 shares of Company A at a price of \$10/share on January 2. The stock pays a quarterly dividend of \$1.50. Joe sells his shares on January 2 of the next year at a price of \$12/share. What is his total return on his investment *a*) in cash and *b*) in percent?

Joe paid $100 \times \$10 = \$1000$.
He received $100 \times \$12 = \$1200$.

Profit = \$200, but in addition he received 4 quarterly dividends of \$1.50 = \$6. So, his total return on his investment of \$1000 was \$206 or 20.6%.

Practice Problem:

2.58 Jim bought 100 shares of Company B at a price of \$10/share on January 2. The stock pays a quarterly dividend of \$1.25 and sold on January 2 the next year for \$12.05/share. What was Jim's total profit?

Bonds

Bonds are promissory notes issued by a corporation, by the federal government, by a city, or any other entity in order to raise money to pay its expenses or debts.

Bonds are bought and sold in multiples of 10.

Bonds have a "maturity date," that is, the year and date when the issuer of the bond has to pay the bond holder the "face value" of the bond. The face value of a bond is \$100, but its actual price will vary according to its quality or "rating," that is, to what extent bond analysts trust in the ability of the bond issuer to repay the buyer the face value at maturity, as well as the interest the issuer pays to the bond holder. An important quantity to consider when buying or selling a bond is its "yield," which is the interest divided by the current price of the bond. The yield will increase when the price decreases and the yield will decrease when the price increases. The investor must also consider whether to buy a tax-free municipal bond or some company bond from which the interest is not tax-free. There are also junk bonds, which are high-risk (not very safe!) bonds but, accordingly, pay the buyer a higher interest.

Example:

On January 2, 2003, Mary bought 10 bonds maturing in 2010 and paying 5% interest. She paid \$95 for each bond, for a total of \$950. She also bought 10 bonds maturing in 2020 paying 6% interest for \$90 each, a total of \$900. If she keeps all 20 bonds to maturity:

a) How much cash will she receive for the bonds?

b) How much will she have earned in interest by the end of 2010 and by the end of 2020?

c) What is the yield of the 2010 bonds in 2003 and in 2010? What is the yield of the 2020 bonds in 2003 and in 2020?

Solutions:

a) If she keeps all bonds to maturity, she will receive the face value for all of them. In 2010 she will receive $10 \times \$100 = \$1000$, in 2020 she will receive $10 \times \$100 = \$1000$.

b) For the 2010 bonds, by the end of 2010, Mary will have earned 8 (years) × 10 (bonds) × \$5 (interest per bond per year) = \$400.

For the 2020 bonds, by the end of 2010, she will have received 8 × 10 × \$6 = \$480, and by the end of 2020 she will have received an additional 10 × 10 × \$6 = \$600. So by the end of 2010 she will have earned \$880 and by the end of 2020 she will have earned a total of \$1480.

c) The yield of the 2010 bonds in 2003 is 5% divided by \$95 = 5.2%; in 2020 the yield will be down to 5% because the price of the bond will be \$100 (face value). For the 2020 bonds in 2003, the yield is 6% divided by \$90 = 6.6% and in 2020 it will be down to 6% because the price of these bonds is now \$100 (face value).

Practice Problem:

2.59 Jane took a risk on January 2, 2003, and bought 10 "junk bonds" paying interest at 15% and maturing in 2010, at a price of \$50.

a) Assuming that the bond issuer is still in business by 2010, how much interest will Jane have collected from 2003 to 2010?

b) How much will Jane collect from the bond issuer when she cashes in her bonds on maturity?

c) What was the yield of these bonds at the time Jane bought them?

Profit and Loss

We have already discussed profit when it comes to stocks. But store owners often use a formula to calculate their profit or loss on different items. A loss would be a negative profit.

Example:

A grocery store owner sold milk for 99¢/quart. Each quart cost him 80¢ and his operation costs were 15% of the cost price. What was his profit or loss on the milk?

15% of 80 cents = 12¢

99¢ – 80¢ – 12¢ = 7¢

His profit was 7¢ per quart.

If instead his operation costs were 25% of the cost price, his profit would be:

99¢ – 80¢ – 25%(80)¢ = (99 – 80 – 20)¢ = –1¢

He would have a loss of 1¢ per quart.

Practice Problems:

2.60 A glass vase cost the owner of a store \$50. The markup was 40%. How much profit did the owner get if the vase was sold at 15% off the advertised selling price?

2.61 If an item is sold for \$60, there is a profit of 20%. If the same item is sold at a loss of 20%, what is the selling price?