

## SECTION I

## 7

## THE INVOICE

**invoice** A document detailing a sales transaction that contains a list of goods shipped or services rendered with an account of all costs.

In business, merchandise is bought and sold many times as it passes from the manufacturer through wholesalers and retailers to the final consumer. A bill of sale, or an **invoice**, is a business document used to keep track of these sales and purchases. From the seller's point of view, they are sales invoices; from the buyer's point of view, they are purchase invoices or purchase orders.

Invoices are a comprehensive record of a sales transaction. They show what merchandise or services have been sold, to whom, in what quantities, at what price, and under what conditions and terms. They vary in style and format from company to company, but most contain essentially the same information. Invoices are used extensively in business, and it is important to be able to read and understand them. In this chapter, you will learn how businesses use invoices and the math applications that relate to them.

## 7-1

READING AND UNDERSTANDING  
THE PARTS OF AN INVOICE

**F.O.B. shipping point** The buyer pays all transportation charges from the vendor's location.

**F.O.B. destination** The seller pays all the shipping charges to the buyer's store or warehouse and then bills the buyer for these charges on the invoice.

**F.O.B.** Term used in quoting shipping charges meaning "free on board" or "freight on board."

Exhibit 7-1 shows a typical format used in business for an invoice. The important parts have been labeled and are explained in Exhibit 7-2. Some of the terms have page references, which direct you to the sections in this chapter that further explain those terms and their business math applications. Exhibit 7-2 also presents some of the most commonly used invoice abbreviations. These pertain to merchandise quantities and measurements.

With some practice, these terms and abbreviations will become familiar to you. Take some time to look them over before you continue reading.

## SHIPPING TERMS

Two frequently used shipping terms that you should become familiar with are **F.O.B. shipping point** and **F.O.B. destination**. **F.O.B.** means "free on board" or "freight on board." These terms define the shipping charges and when the title (ownership) of the goods is transferred from the seller to the buyer. Ownership becomes important when insurance claims must be filed due to problems in shipment.

**F.O.B. Shipping Point** When the terms are F.O.B. shipping point, the buyer pays the shipping company directly. The merchandise title is transferred to the buyer at the manufacturer's factory or at a shipping point such as a railroad freight yard or air freight terminal. From this point, the buyer is responsible for the merchandise.

**F.O.B. Destination** When the shipping terms are F.O.B. destination, the seller is responsible for prepaying the shipping charges to the destination. The destination is usually the buyer's store or warehouse. Unless prices are quoted as "delivered," the seller then bills the buyer on the invoice for the shipping charges.

Sometimes the freight terms are stated as F.O.B. with the name of a city. For example, if the seller is in Fort Worth and the buyer is in New York, F.O.B. Fort Worth means the title is transferred in Fort Worth and the buyer pays the shipping charges from Fort Worth to New York. If the terms are F.O.B. New York, the seller pays the shipping charges to New York and then bills the buyer for those charges on the invoice. Exhibit 7-3, Shipping Terms, on page 195, illustrates these transactions.



istockphoto.com/vendopack

When companies ship and receive merchandise, invoices and purchase orders are used to record the details of the transaction.







## INVOICE

FotoFair Distributors  
3900 Crescent Way  
Knoxville, TN 37996



No. 44929

INVOICE DATE November 27, 20XX  
CUSTOMER'S ORDER NO. 09022

## SOLD TO:

SHUTTERBUG CAMERA SHOPS  
1518 N.W. 123rd Street  
Chicago, Illinois 60613

## SHIP TO:

Warehouse  
1864 N.W. 123rd Street  
Chicago, Illinois 60613

## SALESMAN

J. Herman

## SHIPPED VIA

Federal Express

## TERMS

Net - 30 Days

## F.O.B.

Knoxville, TN

QTY. ORDERED	QTY. SHIPPED	DESCRIPTION	UNIT	AMOUNT
12	12	Pocket Pro 55—digital camera	260.00	3,120 00
6	6	Pocket Pro 75—digital camera	345.00	2,070 00
15	15	Compact flash memory cards	24.40	366 00
8	8	Tripods	9.60	76 80

Invoice Subtotal 5,632.80

Shipping Charges 125.00

Invoice Total \$5,757.80

## EXTENDING AND TOTALING AN INVOICE

Extending an invoice is the process of computing the value in the Total or Amount column for each line of the invoice. This number represents the total dollar amount of each type of merchandise or service being purchased. The **invoice subtotal** is the amount of all items on the invoice before shipping and handling charges; insurance; and other adjustments such as discounts, returns, and credits. The **invoice total** is the final amount due from the buyer to the seller.

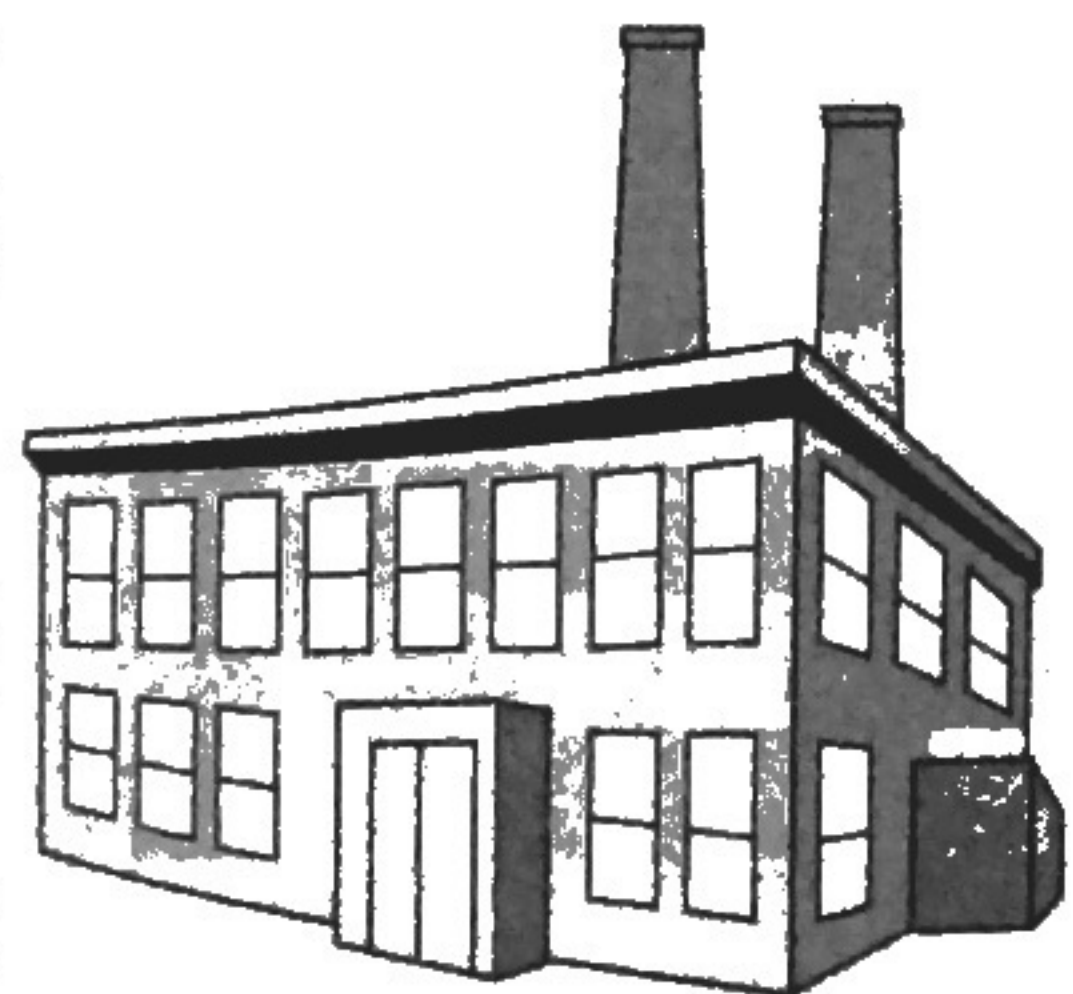
7-2

**invoice subtotal** The amount of all merchandise or services on the invoice before adjustments.

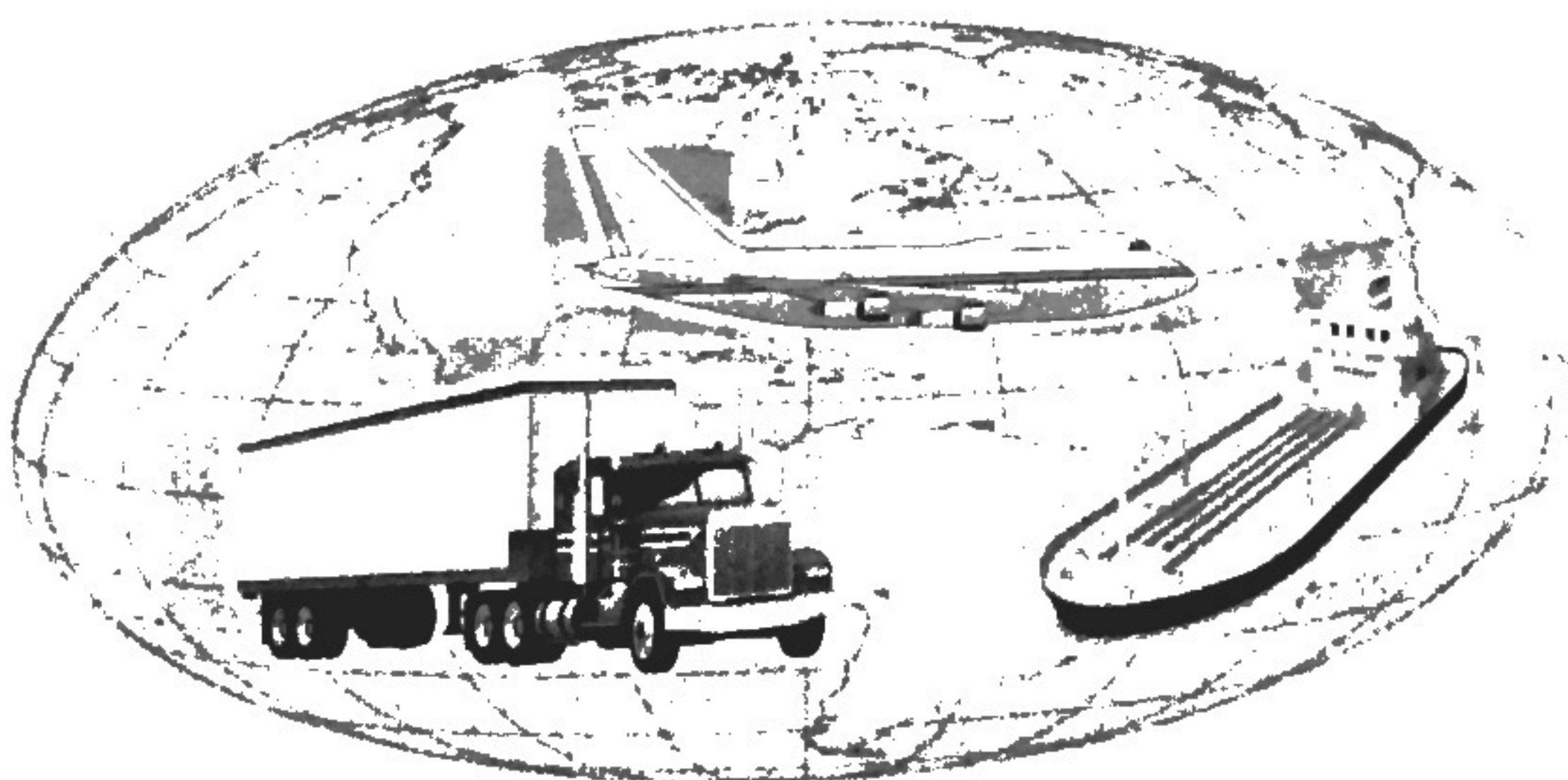
**invoice total** The final amount due from the buyer to the seller.

## EXHIBIT 7-3 Shipping Terms

F.O.B. Shipping Point  
F.O.B. Fort Worth

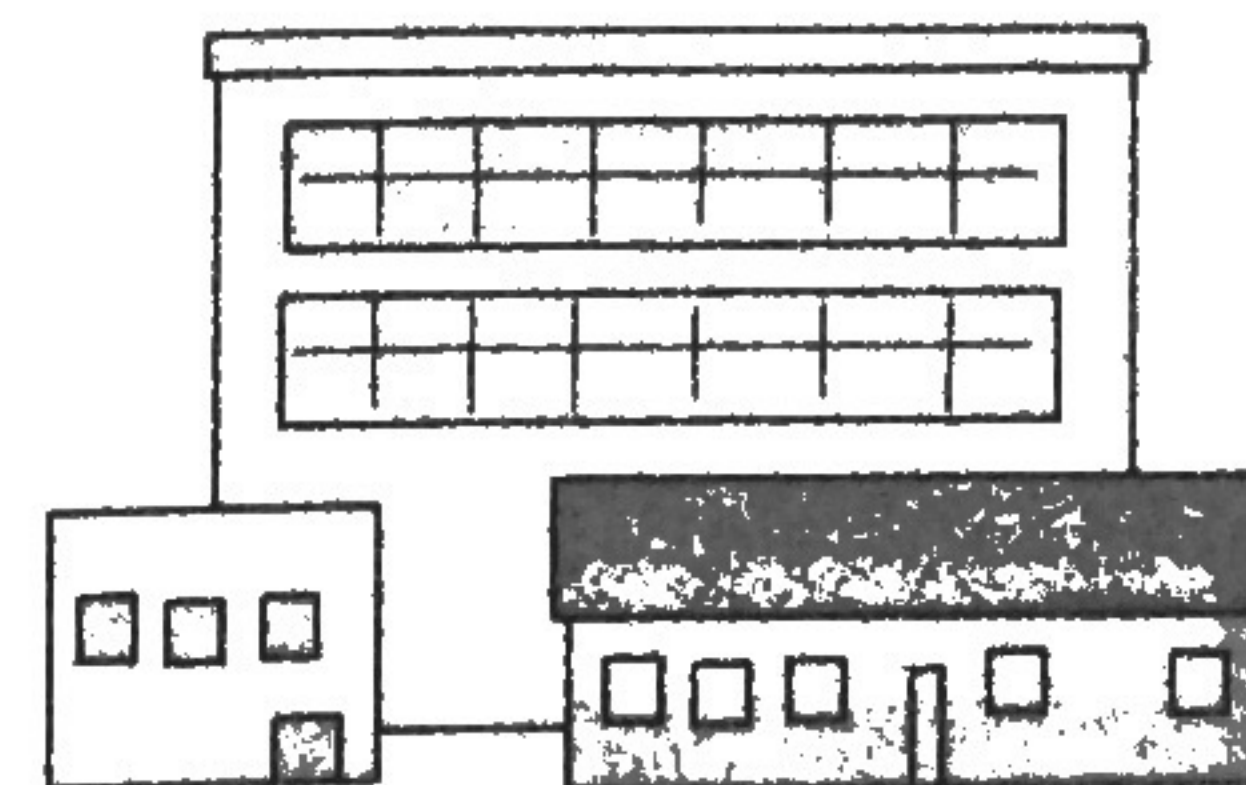


Seller's  
Factory



Shipping Terms

F.O.B. Destination  
F.O.B. New York



Buyer's  
Warehouse

Title Transfers at the  
Buyer's Warehouse

Title Transfers at the  
Seller's Factory



## STEPS TO EXTEND AND TOTAL AN INVOICE

**STEP 1.** For each line of the invoice, multiply the number of items by the cost per item.

$$\text{Extended total} = \text{Number of items} \times \text{Cost per item}$$

**STEP 2.** Add all extended totals to get the invoice subtotal.

**STEP 3.** Calculate the invoice total by adding the freight charges, insurance, and any other charges to the subtotal.

### EXAMPLE 2 EXTENDING AND TOTALING AN INVOICE

From the following invoice for Computer Mart, extend each line to the Total column and calculate the invoice subtotal and total.

Stock #	Quantity	Unit	Merchandise Description	Unit Price	Total
4334	17	ea.	13" Monitors	\$244.00	
1217	8	ea.	17" Monitors	525.80	
2192	2	doz.	USB Cables	24.50	
5606	1	bx.	Blu-ray discs	365.90	
Invoice Subtotal					
Shipping Charges					\$244.75
Invoice Total					

### SOLUTION STRATEGY

						Total
13" Monitors	17	×	\$244.00	=		\$4,148.00
17" Monitors	8	×	525.80	=		4,206.40
USB Cables	2	×	24.50	=		49.00
Blu-ray discs	1	×	365.90	=		365.90
Invoice Subtotal						\$8,769.30
Shipping Charges						+ 244.75
Invoice Total						<u>\$9,014.05</u>

### TRY IT EXERCISE 2

From the following invoice for The Kitchen Connection, extend each line to the Total column and calculate the invoice subtotal and total.

Stock #	Quantity	Unit	Merchandise Description	Unit Price	Total
R443	125	ea.	Food Processors	\$89.00	
B776	24	ea.	Microwave Ovens	225.40	
Z133	6	doz.	12" Mixers	54.12	
Z163	1	bx.	Mixer Covers	166.30	
Invoice Subtotal					
Shipping Charges					\$194.20
Invoice Total					

CHECK YOUR ANSWERS WITH THE SOLUTIONS ON PAGE 225.



What word is represented by each of the following abbreviations?

1. bx.      Box      2. pt      3. drn.      4. kg  
 5. gro.      Gross      6. oz      7. M.      8. cwt

Using the Panorama Products invoice below, extend each line to the Amount column and calculate the subtotal and total. Then answer Questions 9–22. (Note: Although 26 boxes of 2-inch reflective tape were ordered, only 11 boxes were shipped. Charge only for the boxes shipped.)

9. Seller      Panorama Products

11. Invoice date      \_\_\_\_\_

13. Buyer      \_\_\_\_\_

15. Shipping address      \_\_\_\_\_

17. Shipped via      \_\_\_\_\_

19. Shipping charges      \_\_\_\_\_

21. Invoice subtotal      \_\_\_\_\_

10. Invoice number      R-7431

12. Cust. order #      \_\_\_\_\_

14. Terms of sale      \_\_\_\_\_

16. Salesperson      \_\_\_\_\_

18. Insurance      \_\_\_\_\_

20. Unit price—2" Tape      \_\_\_\_\_

22. Invoice total      \_\_\_\_\_

JUMP  
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WWW

EXCEL2

INVOICE				
<b>Panorama Products</b> 486 5th Avenue Eureka, CA 95501			<b>No.</b> R-7431 <b>INVOICE DATE</b> June 16, 20XX <b>CUSTOMER'S ORDER NO.</b> 12144	
<b>SOLD TO:</b> J. M. Hardware Supply 2051 West Adams Blvd Lansing, MI 48901			<b>SHIP TO:</b> SAME	
<b>SALESMAN</b> H. Marshall	<b>SHIPPED VIA</b> Gilbert Trucking	<b>TERMS</b> Net 30 Days	<b>F.O.B.</b> Effingham, IL	
QTY. ORDERED	QTY. SHIPPED	DESCRIPTION	UNIT	AMOUNT
16 cases	16 cases	Masking Tape 1/2" Standard	21.90	
12 cases	12 cases	Masking Tape 1 1/2" Standard	26.79	
26 boxes	11 boxes	2" Reflective Tape	88.56	
37 cases	37 cases	Sandpaper Assorted	74.84	
			<b>INVOICE SUBTOTAL</b>	
			<b>SHIPPING CHARGES</b>	61.45
			<b>INVOICE TOTAL</b>	

## IN THE BUSINESS WORLD

Frequently, merchandise that is ordered from vendors is "out of stock" and goes into back-order status. As a general rule, companies charge only for the merchandise that is shipped.





## BUSINESS DECISION: MANAGING MERCHANDISE

23. You are the store manager for The Bedding Warehouse. The invoice below is due for payment to one of your vendors, Hamilton Mills.
- Check the invoice for errors and correct any you find.
  - Your warehouse manager reports that there were three king-size sheets and five queen-size sheets returned, along with four packages of queen pillow cases. Calculate the revised total due.
  - The vendor has offered a 4% early payment discount that applies only to the merchandise, not the shipping or insurance. What is the amount of the discount?
  - What is the new balance due after the discount?



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Store managers manage stores that specialize in selling a specific line of merchandise, such as groceries, meat, clothing, apparel, furniture, automobile parts, electronic items, or household appliances.

### INVOICE

**Hamilton Mills**  
115 Rock Creek Road  
Charlotte, North Carolina 28235

**No.** 49485

**INVOICE DATE** July 9, 20XX  
**CUSTOMER'S ORDER NO.** 49485

**SOLD TO:**

The Bedding Warehouse  
406 Maple Road  
Franklin, VA 23851

**SHIP TO:**

SAME

**SALESMAN**

**SHIPPED VIA**  
Federal Express

**TERMS**  
Net 30 Days

**F.O.B.**  
Charlotte, N.C.

QTY. ORDERED	QTY. SHIPPED	DESCRIPTION	UNIT	AMOUNT
42	ea.	Sheets, king	\$45.10	\$1,894 20
65	ea.	Sheets, queen	\$37.60	\$2,444 00
26	pkg.	Pillow Cases, queen	\$17.85	\$464 10
55	pkg.	Pillow Cases, std.	\$14.35	\$789 25
8	ea.	Shams	\$33.25	\$366 00

**INVOICE SUBTOTAL** \$5,957.55  
**SHIPPING CHARGES** \$132.50  
**INSURANCE** \$21.15  
**INVOICE TOTAL** \$6,111.20





The path merchandise travels as it moves from the manufacturer through wholesalers and retailers to the ultimate consumer is known as a channel of distribution or trade channel. The businesses that form these channels are said to be "in the trade." In today's complex economy, a number of different trade channels are used to move goods and services efficiently.

**Trade discounts** are reductions from the manufacturer's suggested **list price**. They are given to businesses at various levels of the trade channel for the performance of marketing functions. These functions may include activities such as selling, advertising, storage, service, and display.

Manufacturers print catalogs showcasing their merchandise. Often these catalogs contain the manufacturer's suggested list or retail prices. Businesses in the trade receive price sheets from the manufacturer listing the trade discounts in percent form associated with each item in the catalog. By issuing updated price sheets of trade discounts, manufacturers have the flexibility of changing the prices of their merchandise without the expense of reprinting the entire catalog.

Trade discounts are sometimes quoted as a single discount and sometimes as a series or chain of discounts. The number of discounts is dependent on the extent of the marketing services performed by the channel member.

**trade discounts** Reductions from the manufacturer's list price given to businesses that are "in the trade" for performance of marketing functions.

**list price** Suggested retail selling price of an item set by the manufacturer or supplier. The original price from which discounts are taken.

## CALCULATING THE AMOUNT OF A SINGLE TRADE DISCOUNT

7-3

The amount of a single trade discount is calculated by multiplying the list price by the trade discount rate.

$$\text{Trade discount} = \text{List price} \times \text{Trade discount rate}$$

### EXAMPLE 3 CALCULATING THE AMOUNT OF A SINGLE TRADE DISCOUNT

What is the amount of the trade discount on merchandise with a list price of \$2,800 and a trade discount rate of 45%?

### SOLUTION STRATEGY

$$\text{Trade discount} = \text{List price} \times \text{Trade discount rate}$$

$$\text{Trade discount} = 2,800 \times .45 = \underline{\$1,260}$$

### TRY IT EXERCISE 3

Gifts Galore, a retail gift shop, buys merchandise with a list price of \$7,600 from a wholesaler of novelty items and toys. The wholesaler extends a 30% trade discount rate to the retailer. What is the amount of the trade discount?

CHECK YOUR ANSWER WITH THE SOLUTION ON PAGE 225.

## CALCULATING NET PRICE BY USING THE NET PRICE FACTOR, COMPLEMENT METHOD

7-4

The **net price** is the amount a business actually pays for the merchandise after the discount has been deducted. It may be calculated by subtracting the amount of the trade discount from the list price.

**net price** The amount a business actually pays for the merchandise after the discount has been deducted.

$$\text{Net price} = \text{List price} - \text{Trade discount}$$



**net price factor** The percent of the list price a business pays for merchandise. It is the multiplier used to calculate the net price.

Frequently, merchants are more interested in knowing the net price of an item than the amount of the trade discount. In that case, the net price can be calculated directly from the list price without first finding the amount of the discount.

The list price of an item is considered to be 100%. If, for example, the trade discount on an item is 40% of the list price, the net price will be 60% because the two must equal 100%. This 60%, the complement of the trade discount rate (100% - 40%), is the portion of the list price that is paid. Known as the **net price factor**, it is usually written in decimal form.

## STEPS TO CALCULATE NET PRICE BY USING THE NET PRICE FACTOR

**STEP 1.** Calculate the net price factor, complement of the trade discount rate.

$$\text{Net price factor} = 100\% - \text{Trade discount rate}$$

**STEP 2.** Calculate the net price.

$$\text{Net price} = \text{List price} \times \text{Net price factor}$$

*Note:* This procedure can be combined into one step by the formula.

$$\text{Net price} = \text{List price}(100\% - \text{Trade discount rate})$$

### LEARNING TIP

Complements are two numbers that add up to 100%. The trade discount rate and the net price factor are complements of each other. This means that if we know one of them, the other can be found by subtracting from 100%.

## EXAMPLE 4 CALCULATING THE NET PRICE

Calculate the net price of merchandise at Astana Imports listing for \$900 less a trade discount rate of 45%.

### SOLUTION STRATEGY

$$\text{Net price} = \text{List price}(100\% - \text{Trade discount rate})$$

$$\text{Net price} = 900(100\% - 45\%)$$

$$\text{Net price} = 900(.55) = \underline{\underline{\$495}}$$

### TRY IT EXERCISE 4

Central Hardware Store bought paint supplies listing for \$2,100 with a single trade discount rate of 35%. What is the net price of the order?

CHECK YOUR ANSWER WITH THE SOLUTION ON PAGE 225.

## 7-5

### CALCULATING TRADE DISCOUNT RATE WHEN LIST PRICE AND NET PRICE ARE KNOWN

The trade discount rate can be calculated by using the now-familiar percentage formula  $\text{Rate} = \text{Portion} \div \text{Base}$ . For this application, the amount of the trade discount is the portion, or numerator, and the list price is the base, or denominator.

$$\text{Trade discount rate} = \frac{\text{Trade discount}}{\text{List price}}$$



## STEPS FOR CALCULATING TRADE DISCOUNT RATE

**STEP 1.** Calculate the amount of the trade discount.

$$\text{Trade discount} = \text{List price} - \text{Net price}$$

**STEP 2.** Calculate the trade discount rate.

$$\text{Trade discount rate} = \frac{\text{Trade discount}}{\text{List price}}$$

### EXAMPLE 5 CALCULATING THE SINGLE TRADE DISCOUNT AND RATE

Sterling Manufacturing sells tools to American Garden Supply. In a recent transaction, the list price of an order was \$47,750 and the net price of the order was \$32,100. Calculate the amount of the trade discount. What was the trade discount rate? Round your answer to the nearest tenth percent.

### SOLUTION STRATEGY

$$\text{Trade discount} = \text{List price} - \text{Net price}$$

$$\text{Trade discount} = 47,750 - 32,100 = \underline{\$15,650}$$

$$\text{Trade discount rate} = \frac{\text{Trade discount}}{\text{List price}}$$

$$\text{Trade discount rate} = \frac{15,650}{47,750} = .3277 = \underline{\underline{32.8\%}}$$

### TRY IT EXERCISE 5

Wilson Sporting Goods recently sold tennis rackets listing for \$109,500 to The Sports Authority. The net price of the order was \$63,300. What was the amount of the trade discount? What was the trade discount rate? Round your answer to the nearest tenth percent.

CHECK YOUR ANSWERS WITH THE SOLUTION ON PAGE 225.

## REVIEW EXERCISES

## SECTION II

Calculate the following trade discounts. Round all answers to the nearest cent.

List Price	Trade Discount Rate	Trade Discount
1. \$860.00	30%	<u>\$258.00</u>
Trade discount = $860.00 \times .30 = \underline{\underline{\$258.00}}$		
2. 125.50	12%	_____
3. 41.75	19%	_____
4. 499.00	8%	_____
5. 88.25	50%	_____



Calculate the following trade discounts and net prices to the nearest cent.

	List Price	Trade Discount Rate	Trade Discount	Net Price
6.	\$286.00	25%	\$71.50	\$214.50
7.	134.79	40%	_____	_____
8.	21.29	18%	_____	_____
9.	959.00	55%	_____	_____

JUMP  
START  
WWW

Calculate the following net price factors and net prices by using the complement method. Round all answers to the nearest cent.

	List Price	Trade Discount Rate	Net Price Factor	Net Price
10.	\$3,499.00	37%	63%	\$2,204.37
11.	565.33	24%	_____	_____
12.	1,244.25	45.8%	_____	_____
13.	4.60	$12\frac{3}{4}\%$	_____	_____

JUMP  
START  
WWW

Calculate the following trade discounts and trade discount rates. Round answers to the nearest tenth of a percent.

	List Price	Trade Discount	Trade Discount Rate	Net Price
14.	\$4,500.00	\$935.00	20.8%	\$3,565.00
15.	345.50	_____	_____	225.00
16.	2.89	_____	_____	2.15

JUMP  
START  
WWW

EXCEL

17. Find the amount of a trade discount of 30% on a television set that has a list price of \$799.95.

18. Find the amount of a trade discount of 55% on a set of fine china that lists for \$345.70.

19. What is the amount of a trade discount of 25% offered to a shoe store for merchandise purchased at a total list price of \$7,800?

20. Whole Foods Market ordered 12 cases of organic vegetable soup with a list price of \$18.90 per case and 8 cases of organic baked beans with a list price of \$33.50 per case. The wholesaler offered Whole Foods a 39% trade discount.

a. What is the total extended list price of the order?

b. What is the total amount of the trade discount on this order?

c. What is the total net amount Whole Foods owes the wholesaler for the order?

21. La Bella, a chain of clothing boutiques, purchased merchandise with a total list price of \$25,450 from Sandy Sport, a manufacturer. The order has a trade discount of 34%.

a. What is the amount of the trade discount?

b. What is the net amount LaBella owes Sandy Sport for the merchandise?

22. An item with a trade discount of 41% has a list price of \$289.50. What is the net price?

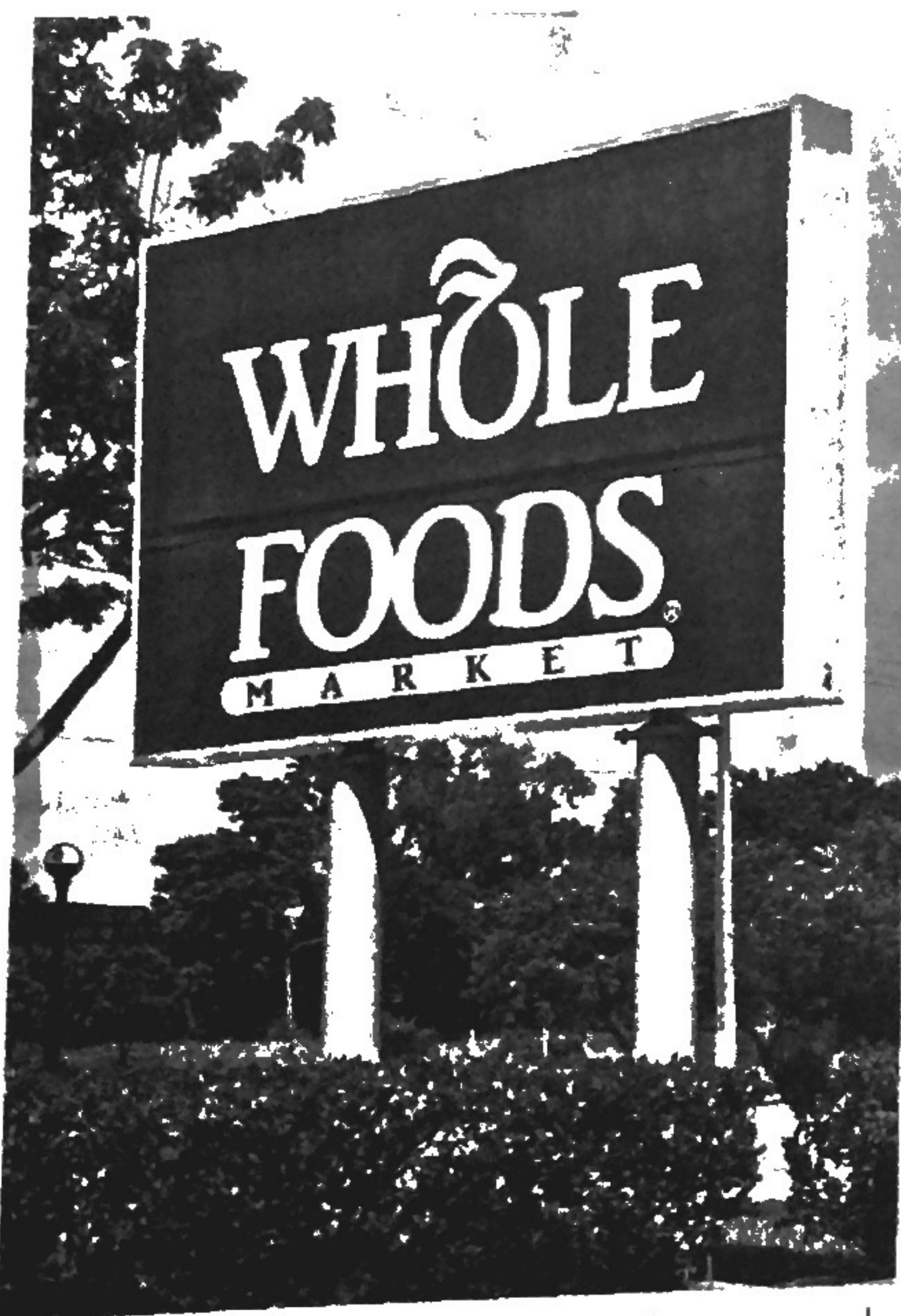


Photo by Robert Brechner

**Whole Foods Market**, with 284 stores and 52,500 employees, is the world's leading supermarket emphasizing natural and organic foods and America's first national "Certified Organic" grocer. In 2009, sales were \$8.03 billion.

According to the Food Marketing Institute, in 2009, the 35,612 U.S. **supermarkets** generated sales of \$557 billion. In addition, there were approximately 85,200 grocery stores, of which 25,900 were convenience stores.

Source: [www.supermarketnews.com](http://www.supermarketnews.com) and [www.wholefoodsmarket.com](http://www.wholefoodsmarket.com)



23. Nathan and David Beauty Salon places an order for beauty supplies from a wholesaler. The list price of the order is \$2,800. If the vendor offers a trade discount of 46%, what is the net price of the order?
24. A watch has a list price of \$889 and can be bought by Sterling Jewelers for a net price of \$545.75.
- What is the amount of the trade discount?
  - What is the trade discount rate?
25. Nutrition Central pays \$11.90 net price for a bottle of 60 multivitamins. The price represents a 30% trade discount from the manufacturer. What is the list price of the vitamins?
26. You are the buyer for the housewares department of the Galleria Department Store. A number of vendors in your area carry similar lines of merchandise. On sets of microwavable serving bowls, Kitchen Magic offers a list price of \$400 per dozen less a 38% trade discount. Pro-Chef offers a similar set for a list price of \$425 less a 45% trade discount.
- Which vendor is offering the lower net price?
  - If you order 500 dozen sets of the bowls, how much money will be saved by using the lower-priced vendor?



Photo by Robert Brechner

**General Nutrition Centers, Inc.**, a wholly owned subsidiary of GNC Corporation, consists of a worldwide network of over 6,600 locations and the [www.gnc.com](http://www.gnc.com) website. GNC, Inc., is the largest global specialty retailer of health and wellness products, including vitamins, minerals and herbal supplements, sports nutrition products, and diet products. As of December 31, 2009, GNC had a total of 5,271 full-time and 7,522 part-time employees. Revenues during this period were \$1.7 billion.

The GNC website, [www.gnc.com](http://www.gnc.com), provides an online library where consumers may research health-related topics.

## BUSINESS DECISION: QUANTITY DISCOUNT

27. You are the purchasing manager for Tiger Electronics, a company that manufactures scanners and other computer peripherals. Your vendor for scanner motors, Enfield Industries, is now offering "quantity discounts" in the form of instant rebates and lower shipping charges as follows:

Quantity	Net Price	Rebate	Shipping
1–500 motors	\$16	none	\$1.30
501–1,000 motors	16	\$1.20	.90
1,001–2,000 motors	16	1.80	.60

- Calculate the cost of the motors, including shipping charges, for each category.
- If you usually purchase 400 motors per month, what percent would be saved per motor by ordering 800 every two months? Round to the nearest tenth of a percent.
- What percent would be saved per motor by ordering 1,200 every three months? Round to the nearest tenth of a percent.



**Chain or series trade discounts** Term used when a vendor offers a buyer more than one trade discount.

Trade discounts are frequently offered by manufacturers to wholesalers and retailers in a series of two or more, known as **chain or series trade discounts**. For example, a series of 25% and 10% is verbally stated as “25 and 10.” It is written 25/10. A three-discount series is written 25/10/5. Multiple discounts are given for many reasons. Some of the more common ones follow.

**Position or Level in the Channel of Distribution** A manufacturer might sell to a retailer at a 30% trade discount, whereas a wholesaler in the same channel might be quoted a 30% and a 15% trade discount.

**Volume Buying** Many manufacturers and wholesalers grant an extra discount for buying a large volume of merchandise. For example, any purchase more than 5,000 units at one time may earn an extra 7% trade discount. Retailers with many stores or those with large storage capacity can enjoy a considerable savings (additional trade discounts) by purchasing in large quantities.

**Advertising and Display** Additional discounts are often given to retailers and wholesalers who heavily advertise and aggressively promote a manufacturer’s line of merchandise.

**Competition** Competitive pressures often cause extra trade discounts to be offered. In certain industries such as household products and consumer electronics, price wars are not an uncommon occurrence.

## LEARNING TIP

Remember, when calculating the net price by using a series of trade discounts, you cannot simply add the trade discounts together. Each discount must be applied to a successively lower base.

## 7-6

## DOLLARS AND SENSE

An industry trade group, also known as a **trade association**, is an organization founded and funded by businesses that operate in a specific industry. An industry trade association participates in public relations activities such as advertising, education, political donations, lobbying, and publishing, but its main focus is collaboration between companies, or standardization.

Associations may offer other services, such as sponsoring conferences, providing networking, hosting charitable events, or offering classes or educational materials.

A directory of trade associations may be found at [http://dir.yahoo.com/Business\\_and\\_Economy/organizations/trade\\_associations](http://dir.yahoo.com/Business_and_Economy/organizations/trade_associations)

## CALCULATING NET PRICE AND THE AMOUNT OF A TRADE DISCOUNT BY USING A SERIES OF TRADE DISCOUNTS

Finding net price with a series of trade discounts is accomplished by taking each trade discount, one at a time, from the previous net price until all discounts have been deducted. Note that you *cannot* simply add the trade discounts together. They must be calculated individually unless the net price factor method—a handy shortcut—is used. Trade discounts can be taken in any order, although they are usually listed and calculated in descending order.

For illustrative purposes, let’s begin with an example of how to calculate a series of trade discounts one at a time; then we will try the shortcut method.

### EXAMPLE 6 CALCULATING NET PRICE AND THE AMOUNT OF A TRADE DISCOUNT

Calculate the net price and trade discount for merchandise with a list price of \$2,000 less trade discounts of 30/20/15.

### SOLUTION STRATEGY

$$\begin{array}{rclclclcl}
 \$2,000 & & \$2,000 & & \$1,400 & & \$1,400 & & \$1,120 & & \$1,120 \\
 \times .30 & \nearrow & - 600 & \nearrow & \times .20 & \nearrow & - 280 & \nearrow & \times .15 & \nearrow & - 168 \\
 \hline \$600 & & \$1,400 & & \$280 & & \$1,120 & & \$168 & & \underline{\underline{\$952}} = \text{Net price}
 \end{array}$$



## TRY IT EXERCISE 6

Northwest Publishers sold an order of books to The Bookworm, Inc., a chain of bookstores. The list price of the order was \$25,000. The Bookworm buys in volume from Northwest. The Bookworm also prominently displays and heavily advertises Northwest's books. Northwest, in turn, gives The Bookworm a series of trade discounts amounting to 35/20/10. Calculate the net price of the order and the amount of the trade discount.

CHECK YOUR ANSWERS WITH THE SOLUTIONS ON PAGE 225

### CALCULATING THE NET PRICE OF A SERIES OF TRADE DISCOUNTS BY USING THE NET PRICE FACTOR, COMPLEMENT METHOD

As a shortcut, the net price can be calculated directly from the list price, bypassing the trade discount, by using the net price factor as before. Remember, the net price factor is the complement of the trade discount rate. With a series of discounts, we must find the complement of each trade discount to calculate the net price factor of the series.

The net price factor indicates to buyers what percent of the list price they actually *do* pay. For example, if the net price factor of a series of discounts is calculated to be .665, this means that the buyer is paying 66.5% of the list price.

### STEPS FOR CALCULATING NET PRICE BY USING THE NET PRICE FACTOR

- STEP 1.** Find the complement of the trade discount rates in the series by subtracting each from 100% and converting them to decimal form.
- STEP 2.** Calculate the net price factor of the series by multiplying all the decimals together.
- STEP 3.** Calculate the net price by multiplying the list price by the net price factor.

$$\text{Net price} = \text{List price} \times \text{Net price factor}$$

### EXAMPLE 7 CALCULATING NET PRICE FACTOR AND NET PRICE

The Crystal Gallery purchased merchandise from a manufacturer in Italy. The merchandise had a list price of \$37,000 less trade discounts of 40/25/10. Calculate the net price factor and the net price of the order.

### SOLUTION STRATEGY

- Step 1.** Subtract each trade discount from 100% and convert to decimals.

$\begin{array}{r} 100\% \\ - 40\% \\ \hline 60\% = .6 \end{array}$	$\begin{array}{r} 100\% \\ - 25\% \\ \hline 75\% = .75 \end{array}$	$\begin{array}{r} 100\% \\ - 10\% \\ \hline 90\% = .9 \end{array}$
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- Step 2.** Multiply all the complements together to get the net price factor.

$$\text{Net price factor} = .6 \times .75 \times .9$$

$$\text{Net price factor} = \underline{\underline{.405}}$$

- Step 3.**

$$\text{Net price} = \text{List price} \times \text{Net price factor}$$

$$\text{Net price} = 37,000 \times .405$$

$$\text{Net price} = \underline{\underline{\$14,985}}$$



## TRY IT EXERCISE 7

Something's Fishy, a pet shop, always gets a 30/20/12 series of trade discounts from the Clearview Fish Tank Company. In June, the shop ordered merchandise with a list price of \$3,500. In September, the shop placed an additional order listing for \$5,800.

- What is the net price factor for the series of trade discounts?
- What is the net price of the merchandise purchased in June?
- What is the net price of the merchandise purchased in September?

CHECK YOUR ANSWERS WITH THE SOLUTIONS ON PAGE 225

7-8

**single equivalent discount** A single trade discount that equates to all the discounts in a series or chain.

## CALCULATING THE AMOUNT OF A TRADE DISCOUNT BY USING A SINGLE EQUIVALENT DISCOUNT

Sometimes retailers and wholesalers want to know the one single discount rate that equates to a series of trade discounts. This is known as the **single equivalent discount**. We have already learned that the trade discounts *cannot* simply be added together.

Here is the logic: The list price of the merchandise is 100%. If the net price factor is the part of the list price that is paid, then 100% minus the net price factor is the part of the list price that is the trade discount. The single equivalent discount, therefore, is the complement of the net price factor (100% – Net price factor percent).

## STEPS TO CALCULATE THE SINGLE EQUIVALENT DISCOUNT AND THE AMOUNT OF A TRADE DISCOUNT

- STEP 1.** Calculate the net price factor as before by subtracting each trade discount from 100% and multiplying them all together in decimal form.
- STEP 2.** Calculate the single equivalent discount by subtracting the net price factor in decimal form from 1.

$$\text{Single equivalent discount} = 1 - \text{Net price factor}$$

- STEP 3.** Find the amount of the trade discount by multiplying the list price by the single equivalent discount.

$$\text{Trade discount} = \text{List price} \times \text{Single equivalent discount}$$

## IN THE BUSINESS WORLD

Among other indicators, economists use wholesale prices as an important barometer of inflation as well as other economic trends. Rising wholesale prices inevitably lead to higher consumer prices and consequently inflation.

The **Producer Price Index (PPI)** is a weighted index of prices measured at the wholesale, or producer, level. A monthly release from the Bureau of Labor Statistics (BLS), the PPI shows trends in the wholesale markets manufacturing industries and commodities markets. All of the physical goods-producing industries that make up the U.S. economy are included, but imports are not. The PPI was once called the Wholesale Price Index.

Source: [www.investopedia.com](http://www.investopedia.com)

## EXAMPLE 8 CALCULATING THE SINGLE EQUIVALENT DISCOUNT AND THE AMOUNT OF A TRADE DISCOUNT

Calculate the single equivalent discount and amount of the trade discount on merchandise listing for \$10,000 less trade discounts of 30/10/5.

## SOLUTION STRATEGY

- Step 1.** Calculate the net price factor.

$$\begin{array}{r} 100\% \\ - 30\% \\ \hline .70 \end{array} \times \begin{array}{r} 100\% \\ - 10\% \\ \hline .90 \end{array} \times \begin{array}{r} 100\% \\ - 5\% \\ \hline .95 \end{array} = .5985 = \text{Net price factor}$$