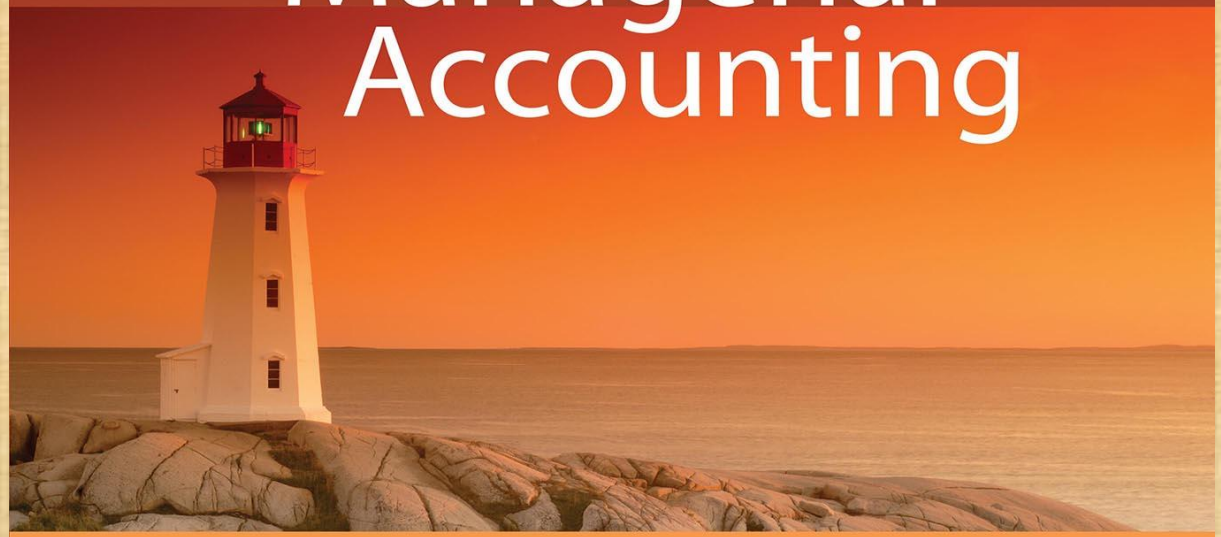
SECOND EDITION

Managerial Accounting



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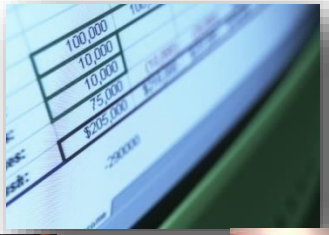
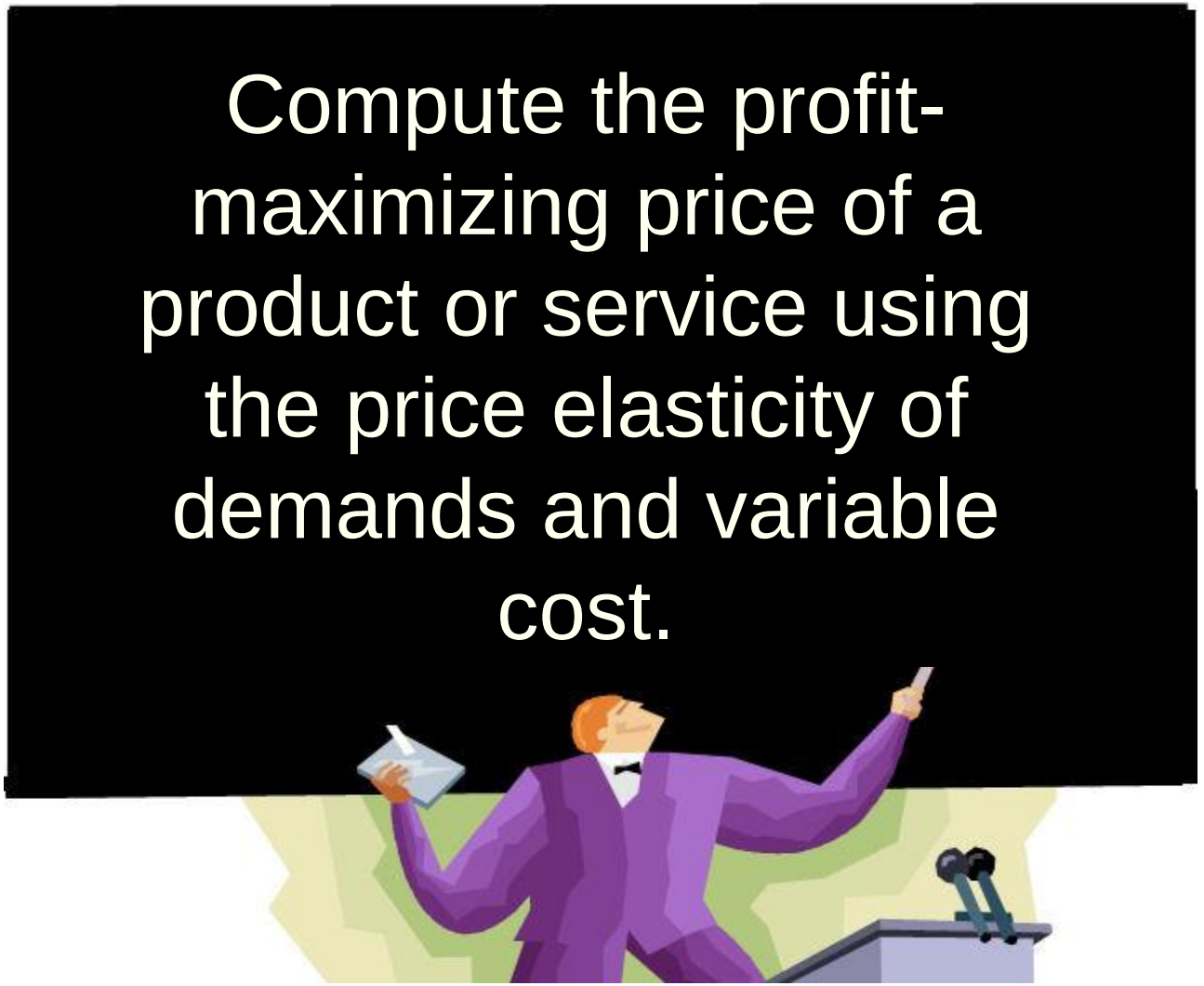
ASIA GLOBAL EDITION



Pricing Products and Services

Appendix A

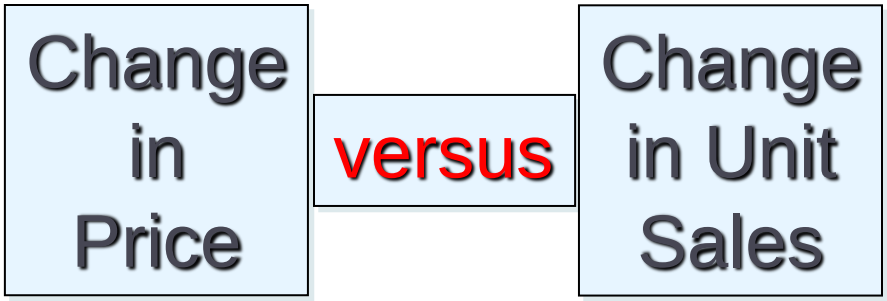
Learning Objective 1



The Economist's Approach to Pricing

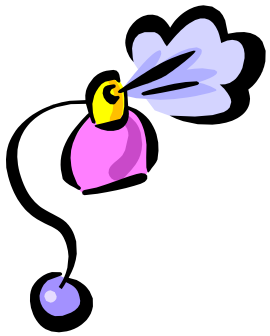
Elasticity of Demand

The price elasticity of demand measures the degree to which the unit sales of a product or service are affected by a change in unit price.



Price Elasticity of Demand

Demand for a product is *inelastic* if a change in price has little effect on the number of units sold.

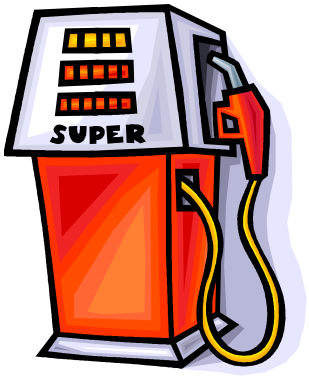


Example

The demand for designer perfumes sold at cosmetic counters in department stores is relatively inelastic.

Price Elasticity of Demand

Demand for a product is *elastic* if a change in price has a substantial effect on the number of units sold.



Example

The demand for gasoline is relatively elastic because if a gas station raises its price, unit sales will drop as customers seek lower prices elsewhere.

Price Elasticity of Demand

As a manager, you should set *higher* (*lower*) markups over cost when demand is *inelastic* (*elastic*)

Price Elasticity of Demand

$$\epsilon_d = \frac{\ln(1 + \%\text{ change in quantity sold})}{\ln(1 + \%\text{ change in price})}$$

Price elasticity of demand

Natural log function

I can estimate the price elasticity of demand for a product or service using the above formula.

Price Elasticity of Demand

Suppose the managers of Nature's Garden believe that every *10 percent increase* in the selling price of its apple-almond shampoo will result in a *15 percent decrease* in the number of bottles of shampoo sold. Let's calculate the price elasticity of demand.

For its strawberry glycerin soap, managers of Nature's Garden believe that the company will experience a *20 percent decrease* in unit sales if its price is *increased by 10 percent*.

Price Elasticity of Demand

For Nature's Garden apple-almond shampoo.

$$\epsilon_d = \frac{\ln(1 + \%\text{ change in quantity sold})}{\ln(1 + \%\text{ change in price})}$$

$$\epsilon_d = \frac{\ln(1 + (-0.15))}{\ln(1 + (0.10))}$$

$$\epsilon_d = \frac{\ln(0.85)}{\ln(1.10)} = -1.71$$

Price Elasticity of Demand

For Nature's Garden strawberry glycerin soap.

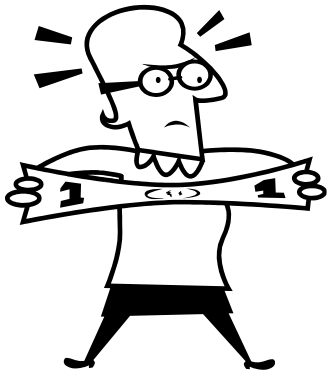
$$\epsilon_d = \frac{\ln(1 + \%\text{ change in quantity sold})}{\ln(1 + \%\text{ change in price})}$$

$$\epsilon_d = \frac{\ln(1 + (-0.20))}{\ln(1 + (0.10))}$$

$$\epsilon_d = \frac{\ln(0.80)}{\ln(1.10)} = -2.34$$

Price Elasticity of Demand

The price elasticity of demand for the strawberry glycerin soap is *larger*, in absolute value, than the apple-almond shampoo. This indicates that the demand for strawberry glycerin soap is *more elastic* than the demand for apple-almond shampoo.



The Profit-Maximizing Price

Under certain conditions, the profit-maximizing price can be determined using the following formula:

$$\text{Profit-maximizing } \textit{markup} \text{ on variable cost} = \left[\frac{-1}{1 + \epsilon_d}\right] \text{ or } \left\{\left[\frac{\epsilon_d}{1 + \epsilon_d}\right] - 1\right\}$$

Using the above markup, the selling price would be set using the formula:

$$\text{Profit-maximizing price} = 1 + \left[\frac{-1}{1 + \epsilon_d}\right] \times \text{Variable cost per unit}$$

The Profit-Maximizing Price

Let's determine the profit-maximizing price for the *apple-almond shampoo* sold by Nature's Garden. The shampoo has a variable cost per unit of $2.00.

Price elasticity of demand = -1.71

$$\text{Profit-maximizing markup on variable cost} = \left[\frac{-1}{1 + (-1.71)}\right] = 1.41 \text{ or } 141\%$$

Variable cost per unit	**$**	**2.00**
Markup ($2.00 × 141%)		**2.82**
Profit-maximizing price	**$**	**4.82**

The Profit-Maximizing Price

Now let's turn to the profit-maximizing price for the *strawberry glycerin soap* sold by Nature's Garden. The soap has a variable cost per unit of $0.40.

Price elasticity of demand = -2.34

$$\text{Profit-maximizing markup on variable cost} = \left[\frac{-1}{1 + (-2.34)}\right] = 0.75 \text{ or } 75\%$$

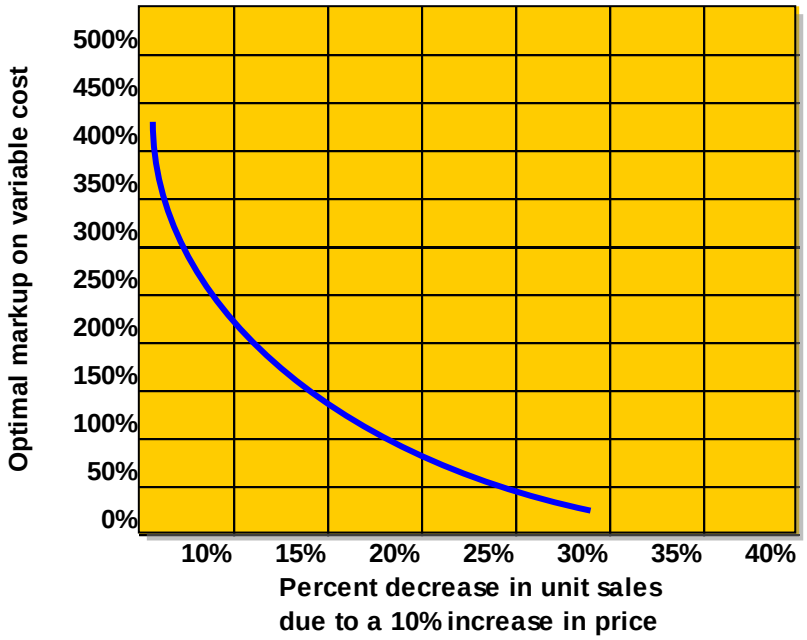
Variable cost per unit	**$0.40**
Markup ($0.40 × 75%)	**0.30**
Profit-maximizing price	**$ 0.70**

The Profit-Maximizing Price

The 75 percent markup for the strawberry glycerin soap is *lower* than the 141 percent markup for the apple-almond shampoo. This is because the demand for strawberry glycerin soap is *more elastic* than the demand for apple-almond shampoo.

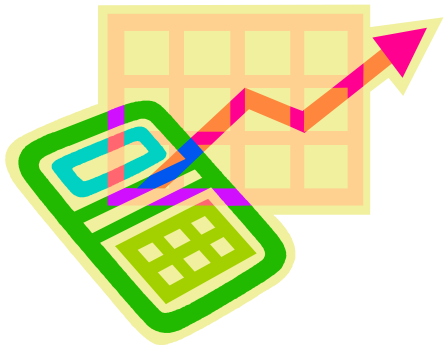
The Profit-Maximizing Price

This graph depicts how the profit-maximizing markup is generally affected by how sensitive unit sales are to price.



The Profit-Maximizing Price

Nature's Garden is currently selling 200,000 bars of strawberry glycerin soap per year at the price of $0.60 a bar. If the change in price has no effect on the company's fixed costs or on other products, let's determine the effect on contribution margin of increasing the price by 10 percent.



The Profit-Maximizing Price

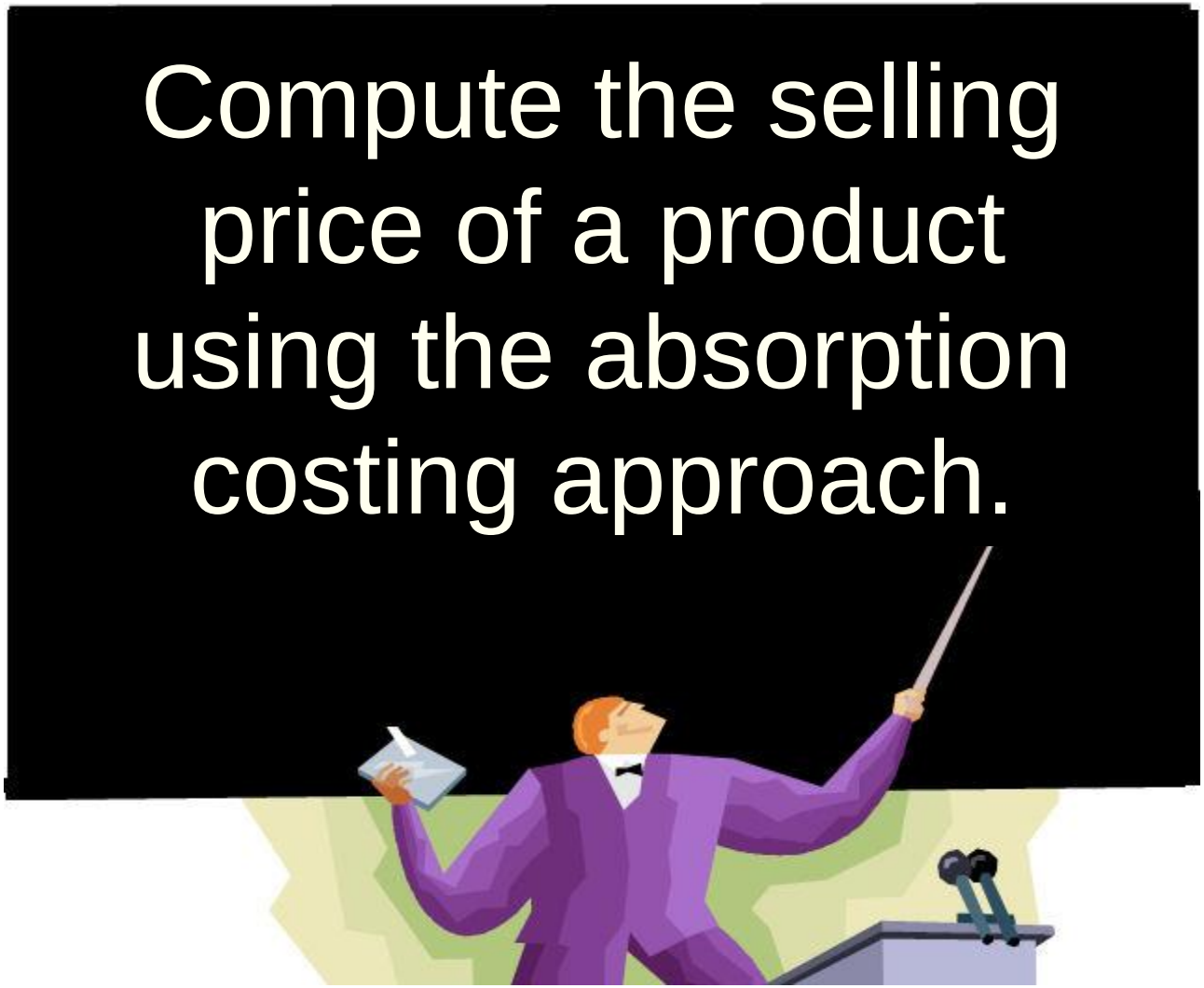
Contribution margin will increase by $1,600.

	Present Price	Higher Price	
Sales price	$ 0.60	$ 0.66	†
Units sales	200,000	160,000	‡
Sales	$ 120,000	$ 105,600	
Variable cost	80,000	64,000	
Contribution margin	$ 40,000	$ 41,600	

† $0.60 + (0.10 × $0.60) = $0.66

‡ 200,000 - (0.20 × 200,000) = 160,000

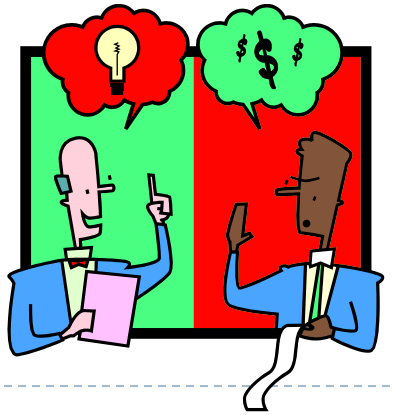
Learning Objective 2



The Cost Base

Under the absorption approach to cost-plus pricing, the cost base is the *absorption costing unit product cost* rather than the variable cost.

The cost base includes direct materials, direct labor, and variable and fixed manufacturing overhead.



Setting a Target Selling Price

Here is information provided by the management of Ritter Company.

	Per Unit	Total
Direct materials	$ 6	
Direct labor	4	
Variable manufacturing overhead	3	
Fixed manufacturing overhead		$ 70,000
Variable S & A expenses	2	
Fixed S & A expenses		60,000

Assuming Ritter will produce and sell 10,000 units of the new product, and that Ritter typically uses a 50% markup percentage, let's determine the unit product cost.

Setting a Target Selling Price

The first step in the absorption costing approach to cost-plus pricing is to compute the unit product cost.

	Per Unit
Direct materials	**$ 6**
Direct labor	**4**
Variable manufacturing overhead	**3**
Fixed manufacturing overhead	**7**
Unit product cost	**$ 20**

($70,000 ÷ 10,000 units = $7 per unit)

Ritter has a policy of marking up unit product costs by *50%*. Let's calculate the target selling price.

Setting a Target Selling Price

The second step is to calculate the target selling price ($30) by assigning the appropriate markup ($10) to the unit product cost ($20).

	Per Unit
Direct materials	$ 6
Direct labor	4
Variable manufacturing overhead	3
Fixed manufacturing overhead	7
Unit product cost	$ 20
50% markup	10
Target selling price	$ 30

Determining the Markup Percentage

A markup percentage can be based on an industry "rule of thumb," company tradition, or it can be explicitly calculated.

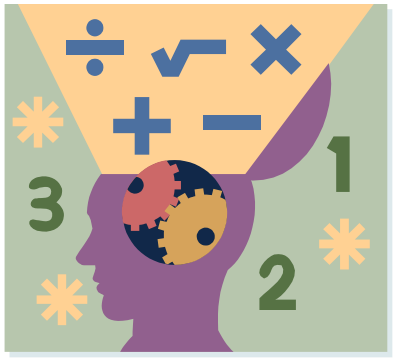
The equation for calculating the markup percentage on absorption cost is shown below.

$$\text{Markup \% on absorption cost} = \frac{(\text{Required ROI} \times \text{Investment}) + \text{S \& A expenses}}{\text{Unit sales} \times \text{Unit product cost}}$$

The markup must be high enough to cover S & A expenses, and to provide an adequate return on investment.

Determining the Markup Percentage

Let's assume that Ritter must invest $100,000 in the product, and market 10,000 units of product each year. The company requires a 20% ROI on all investments. Let's determine Ritter's markup percentage on absorption cost.



Determining the Markup Percentage

$$\text{Markup \% on absorption cost} = \frac{(20\% \times \$100{,}000) + (\$2 \times 10{,}000 + \$60{,}000)}{10{,}000 \times \$20}$$

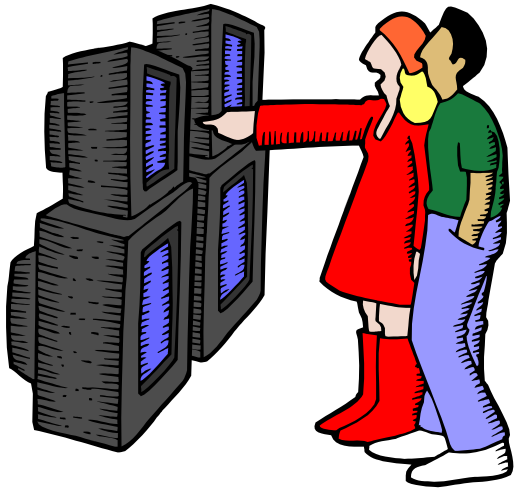
Variable S & A per unit

Total fixed S & A

$$\text{Markup \% on absorption cost} = \frac{(\$20{,}000 + \$80{,}000)}{\$200{,}000} = 50\%$$

Problems with the Absorption Costing Approach

The absorption costing approach essentially *assumes* that customers *need* the forecasted *unit sales* and will pay *whatever price* the company decides to charge. This is flawed logic simply because customers have a choice.



Problems with the Absorption Costing Approach

Let's assume that Ritter sells only 7,000 units at $30 per unit, instead of the forecasted 10,000 units. Here is the income statement.

RITTER COMPANY Income Statement For the Year Ended December 31, 2008	
Sales (7,000 units × $30)	$ 210,000
Cost of goods sold (7,000 units × $23)	161,000
Gross margin	49,000
SG&A expenses	74,000
Net operating loss	$ (25,000)

$$\text{ROI} = \frac{\$\ (25{,}000)}{\$\ 100{,}000} = -25\%$$

Problems with the Absorption Costing Approach

Let's assume that Ritter sells only 7,000 units at $30 per unit, instead of the forecasted 10,000 units. Here is the income statement.

Absorption costing approach to pricing is a safe approach only if customers choose to buy at least as many units as managers forecasted they would buy.

Gross margin	**49,000**
SG&A expenses	**74,000**
Net operating loss	**$ (25,000)**

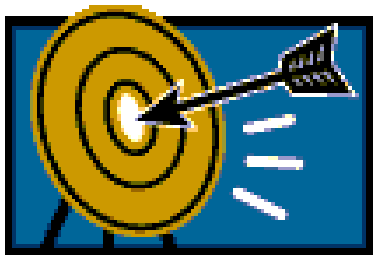
$$\text{ROI} = \frac{\$\ (25{,}000)}{\$\ 100{,}000} = -25\%$$

Learning Objective 3

Target Costing

Target costing is the process of determining the *maximum allowable cost* for a new product and then developing a prototype that can be made for that maximum target cost figure. The equation for determining a target price is shown below:

Target cost = Anticipated selling price – Desired profit

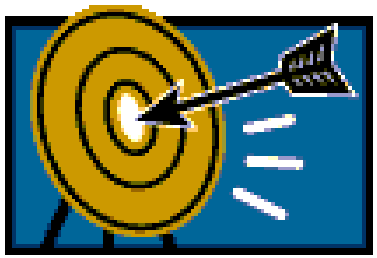


Once the target cost is determined, the product development team is given the responsibility of designing the product so that it can be made for no more than the target cost.

Reasons for Using Target Costing

Two characteristics of prices and product costs include:

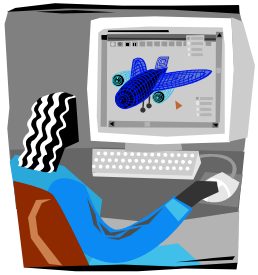
1. The market (i.e., supply and demand) determines price.
2. Most of the cost of a product is determined in the design stage.



Reasons for Using Target Costing

Target costing was developed in recognition of the two characteristics summarized on the previous screen.

Target costing begins the product development process by recognizing and responding to *existing market prices.* Other approaches allow engineers to design products without considering market prices.



Reasons for Using Target Costing

Target costing focuses a company's cost reduction efforts in the *product design* stage of production.

Other approaches attempt to squeeze costs out of the manufacturing process after they come to the realization that the cost of a manufactured product does not bear a profitable relationship to the existing market price.

Target Costing

Handy Appliance feels there is a niche for a hand mixer with special features. The marketing department believes that a price of $30 would be about right and that about 40,000 mixers could be sold. An investment of $2 million is required to gear up for production. The company requires a 15% ROI on invested funds.

Let's see how we determine the target cost.

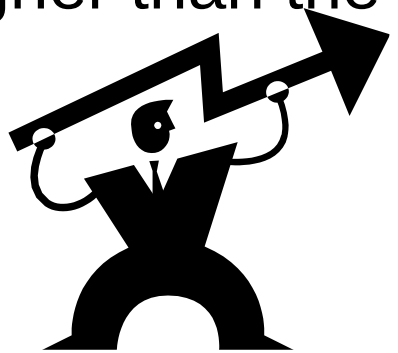
Target Costing

Projected sales (40,000 units × $30)	$ 1,200,000
Desired profit ($2,000,000 × 15%)	300,000
Target cost for 40,000 mixers	$ 900,000
Target cost per mixer ($900,000 ÷ 40,000)	$ 22.50

Each functional area within Handy Appliance would be responsible for keeping its actual costs within the target established for that area.

Value-based Pricing: Another popular pricing technique

- Set price based on value perceived or estimated to the target customer group.
- Could be based on market research whereby customers are asked what they would be willing to pay for new product or service before setting the price.
- Often customers are willing to pay higher than the original target price!



End of Appendix A