Chapter 9 Markup and Markdown

Learning Outcomes

9-1 Markup Based on Cost

1. Find the cost, markup, or selling price when any two of the three are known.
2. Find the cost, markup, selling price, or percent of markup when the percent of markup is based on the cost.

9-2 Markup Based on Selling Price and Markup Comparisons

1. Find the cost, markup, selling price, or percent of markup when the percent of markup is based on the selling price.
2. Compare the markup based on the cost with the markup based on the selling price.

9-3 Markdown, Series of Markdowns, and Perishables

1. Find the amount of markdown, the reduced (new) price, and the percent of markdown.
2. Find the final selling price for a series of markups and markdowns.
3. Find the selling price for a desired profit on perishable and seasonal goods.

Hip Hop Clothing

Kendra and Mikala are excited about opening their own hip hop clothing store, 'Nue Rhythm. 'Nue is short for Avenue, and they want their clothing to capture the "rhythm of the street." They know that the urban clothing market is one of the most exciting and fastest growing markets for today's consumers. Urban wear has increased in popularity as the number of new, musical hip hop artists has increased. This style of baggy pants, baseball caps worn backwards (NBA, NFL, or successful university teams), oversized rugby or polo shirts, and expensive tennis shoes, although still very popular, is being replaced in some areas with a trend toward tighter hipster-inspired items such as polo shirts, sports coats, large ornamental belt buckles, and tighter jeans. But what really concerns Kendra and Mikala is pricing their new hip hop clothing lines. While typical markups on clothing and accessories can be 30–85%, they know from research that the markup for hip hop clothing is often 100–200% or more.

Pricing a new clothing line can be especially difficult for new business owners, and depends on a number of factors. Among the considerations for Kendra and Mikala were material costs, typically provided by suppliers; a study of labor rates in the area; industry manufacturers' prices; and perhaps most important, research on competitors' prices. Armed with this information, Kendra and Mikala had a well-educated "guess" on which to base their pricing.

For now, 'Nue Rhythm is strictly a retail operation; however, the owners have hopes of introducing their own retail line, "Hip Hop Tops," in the future. Kendra and Mikala feel they are on the right track and decide to take a seasonal approach to pricing. For the peak shopping months during the summer and leading up to Christmas, they will institute markups of 150% across the board on all lines. In order to draw customers into the store, a specific designer or line will be marked down as much as 50% off the normal price and will still be profitable for them. During the rest of the year, 10–50% markdowns will be taken to generate interest among shoppers or to move obsolete inventory. With this approach their focus will be creating competitive prices for truly unique hip hop clothing pieces that hopefully, their customers will not be able to resist.

Chapter 8 introduced the mathematics associated with buying for a small business. This chapter will focus on the mathematics of selling. Any successful business must keep prices low enough to attract customers, yet high enough to pay expenses and make a profit.

The price at which a retail business purchases merchandise is called the **cost** . The merchandise is then sold at a higher price called the **selling price** or the **retail price**. The difference between the selling price and the cost is the **markup** . The markup is also called the **gross margin** . The gross margin includes operating expenses and the overhead. The difference between the gross margin and the expenses and overhead is the **net profit** . In **Chapter 20** we will look at these concepts. For now, we will only consider the gross margin or markup.

Cost:
price at which a business purchases merchandise.

Selling price (retail price):
price at which a business sells merchandise.

Markup (gross margin):
difference between the selling price and the cost.

Net profit:
difference between gross margin and operating expenses and overhead.

Markdown:
amount the original selling price is reduced.

Merchandise may also be reduced from the original selling price. The amount the original selling price is reduced is the **markdown** .

9-1 Markup Based on Cost

Learning Outcomes

1. Find the cost, markup, or selling price when any two of the three are known.
2. Find the cost, markup, selling price, or percent of markup when the percent of markup is based on the cost.

In business situations it is common to need to find missing information. The cost, markup, and selling price are related so that when any two amounts are known, the third amount can be found.

Selling price = Cost + markup

$S = C + M$

1 Find the cost, markup, or selling price when any two of the three are known.

Visualize the relationships among the cost, markup, and the selling price. The basic relationship can be written as the formula

$$\begin{array}{ccccc} \text{Selling price} & = & \text{Cost} & + & \text{markup} \\ S & = & C & + & M \end{array}$$

Relate this to the concept that two parts add together to get a sum or total. Then we can develop variations of the formula using the concept that the sum or total minus one part gives the other part.

$$\begin{array}{ccccc} \text{Cost} & = & \text{selling price} & + & \text{markup} \\ S & = & C & + & M \\ \text{Markup} & = & \text{Selling price} & - & \text{cost} \\ M & - & S & - & C \end{array}$$

How To Find the cost, markup, or selling price when any two of the three are known

1. Identify the two known amounts.
2. Identify the missing amount.
3. Select the appropriate formula.
4. Substitute the known amounts into the formula.
5. Evaluate the formula.

Example 1

What is the selling price of a media charging station if the cost is $28.35 and the markup is $5.64?

Cost = 28.35 Selling Price = cost + markup

S = C + M Subsitute known values

S = 28.35 + 5.64 Add

S = $33.99

Solution

Conclusion

The selling price of the media charging station is $33.99.

Try Stop & Check 1.

Example 2

Mapco buys travel mugs for $2.45 and sells them for $5.88. What is the markup? Cost = $2.45
Selling price = $5.88

Solution M = $5.88 - $2.45
M = 3.43

Conclusion

The markup is $3.43.

Try Stop & Check 2 and 3.

Example 3

Kroger is selling 2-liter Coke at $1.29. If the markup is $0.35, what is the cost?

Selling price = $1.29
markup = 0.35

Solution

$C = S - M$ $C = 1.29 - 0.35$

Conclusion $C = 0.94$

The cost of the 2-liter Coke is $0.94.

Try Stop & Check 4.

Did You Know?

You don't need all those formulas. Knowing the basic formula is all that is necessary.

Selling price = cost + markup $S = C + M$

When you substitute the two known values into the equations, you can solve for the unknown value. Look at **Examples 2** and **3** again.

Stop & Check

See **Example 1** .

1. Charlie Cook bought a light fixture that cost $32 and marked it up $40. Find the selling price.

See **Example 2** .

2. Margaret Davis sells the markup.a key fob for $12.95 and it costs $7. Find the markup.
3. Berlin Jones introduced a new veggie sandwich at Subway, the sandwich shop. He determines that each sandwich costs $3 and plans to sell each sandwich for $5.25, which is 175% of the cost. Find the markup.

See **Example 3** .

4. Sylvia Knight bought a printer cartridge and marked it up $18 and set the selling price at $34.95. Find the cost.

2 Find the cost, markup, selling price, or percent of markup when the percent of markup is based on the cost.

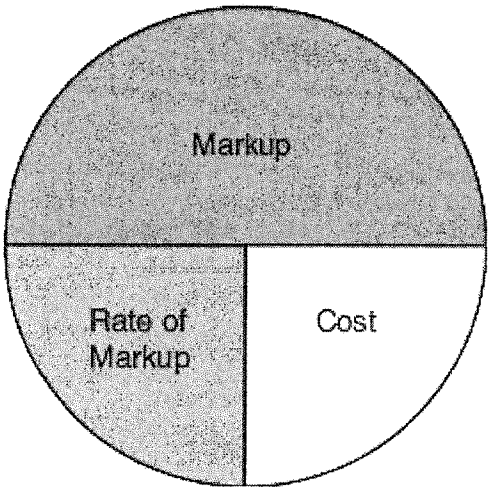


Figure 9-1 Markup Based on Cost

When the markup is based on cost, the cost is the base in the basic percentage formula shown in **Figure 9-1** .

$P = RB$

We can apply the percentage formula to markup to get the formula

Markup = rate of markup × cost or $M = M\%(C)$

Then, we can find variations of the formula by solving the equation for each variable.

Did You Know?

In using the abbreviated formula such as $M = M\%(C)$, $M\%$ represents the rate of markup and is expressed as a percent or decimal equivalent of the percent, as appropriate.

How To Find the rate of markup based on the cost, the cost, or the markup when any two of the three are known

1. Identify the known and unknown amounts.
2. Select the formula variation that has the unknown on the left of the equation.
3. Substitute the known amounts into the formula.
4. Solve for the missing amount.

Example 4

Duke's Photography pays $9 for a 5 in.-by-7 in. photograph. If the photograph is sold for $15, what is the percent of markup based on cost? Round to the nearest tenth of a percent.

Tip

When a decimal is rounded to the nearest thousandth, the percent equivalent will be to the nearest tenth of a percent.

Solution

Find the amount of markup:

Find the rate of markup based on cost:

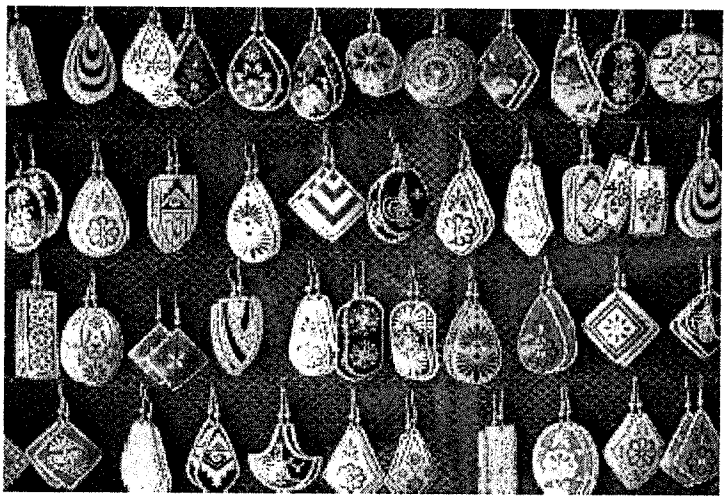
Conclusion

The percent of markup based on cost of the photograph is 66.7%.

Try Stop & Check 1–6.

Example 5

A boutique pays $68 a pair for handmade earrings and sells them at an 80% markup rate based on cost. Find the selling price of the earrings.



Solution

Find the amount of markup.

Find the selling price.

Conclusion

The selling price of the earrings is $122.40.

Try Stop & Check 7–12.

Example 6

A DVD movie was marked up $6.50, which was a 40% markup based on cost. What was the cost of the DVD? What was the selling price?

Solution

Find the cost:

Find the selling price:

Conclusion

The cost of the DVD movie was $16.25 and the selling price was $22.75.

Try Stop & Check 13–18.

Global Marketplace Purchasing Goods from Other Countries

Many retailers do business in a global market. Companies that purchase goods made in other countries, such as Canada, and sell the goods in the United States must have systems in place to convert the other country's currency, Canadian dollars, to U.S. dollars. Some companies make the currency conversion by using the monthly average value of the Canadian dollar against the U.S. dollar. Other companies use the daily spot exchange rate of the Canadian dollar to the U.S. dollar. Retailers do not vary the retail price based on the fluctuation of the other country's currency. The change in value of the other country's currency impacts the markup, which is more often called *margin*.

If the markup is based on cost, the cost percent is 100% and the selling price percent is 100% + the markup percent.

How To Find the cost when the selling price and the percent of markup based on the cost are known

1. Find the rate of selling price.
   Rate of selling price = rate of cost + rate of markup based on cost

   $S\% = 100\% + M\%$

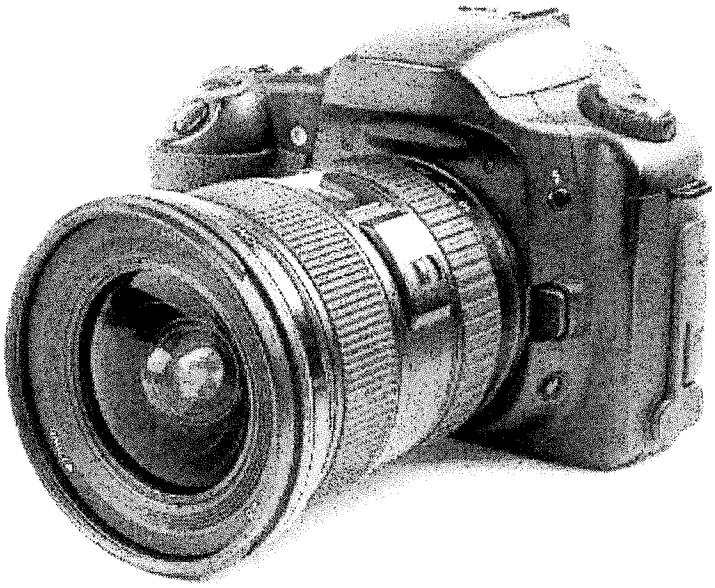
2. Find the cost using the formula

$$\text{Cost} = \frac{\text{selling price}}{\text{rate of selling price based on cost}} \qquad C = \frac{S}{S\%}$$

3. Change the rate of selling price to a numerical equivalent and divide.

Example 7

A camera sells for $439. The markup rate is 60% of the cost. Find the cost of the camera and the markup. Round to the nearest cent.



Solution

Find the selling price rate:

Find the cost:

Find the markup:

Conclusion

The cost of the camera is $274.38 and the markup is $164.62.

Try Stop & Check 19–24

Stop & Check

Round to the nearest tenth of a percent or to the nearest cent as appropriate.
See **Example 4** .

1. Find the percent of markup based on cost for a table that costs $220 and sells for $599.
2. A file cabinet costs $145 and sells for $197.20. Find the percent of markup based on cost.
3. A bicycle costs $245 and sells for $395. Find the percent of markup based on cost.
4. A motorcycle costs $690 and sells for $1,420. Find the percent of markup based on cost.
5. A patio lounger costs $89 and is sold for $249. What is the percent of markup based on cost?
6. Lowe's can purchase a KitchenAid Energy Star dishwasher for $738. Find the percent of markup based on cost if the dishwasher sells for $1,048.00.

See **Example 5** .

7. Ed's Camera Shop pays $218 for a camera and sells it at a 78% markup based on cost. What is the selling price of the camera?
8. Holly's Leather Shop pays $87.50 for a Coach bag and sells it at a 95% markup based on cost. What is the selling price of the bag?
9. Wimberly Computers buys computers for $465 and sells them at an 80% markup based on cost. What will the computers sell for?
10. The National Parks Conservation Association purchases calendars for $0.86 and sells them at a 365% markup based on cost. What will the calendars sell for?
11. A 4-oz bottle of Vanilla Bean Panache lotion is purchased for $0.45 and sells at a 110% markup based on cost. What is the selling price of the lotion?
12. J. C. Penney buys Casio watches for $58.82 and sells them at a 70% markup based on cost. Find the selling price of the watches.

See **Example 6** .

13. A pair of New Balance running shoes is marked up $38, which is a 62% markup based on cost. Find the cost of the shoes.
14. Bradley's Sound Shop marks up a music system $650 and sells it at a 92% markup based on cost. What is the cost of the system?
15. Wiggins Clock Shop marked up an order of marble clocks $358 each and sells them at a 65% markup based on cost. What is the cost of each clock?
16. EnviroTote can purchase laundry bags in large quantities and mark them up $4.14 each. What is the cost of each bag if it is marked up 125% of cost?
17. EnviroTote can purchase a 10-oz Organic Barrel Bag with 250 handles and mark it up $7.82. What is the cost of each bag if it is marked up 80% of cost?
18. Kroger marks up Armour chili $0.24 and sells it at a 32% markup based on cost. What is the cost of each can of chili?

See **Example 7** .

19. A paper cutter sells for $39. The markup rate is 60% of the cost. Find the cost of the paper cutter and find the markup.
20. A leather jacket sells for $149. The markup rate is 110% of the cost. Find the cost of the jacket and find the markup.
21. Find the cost and markup of a box of cereal that sells for $4.65 and has a markup rate of 85% based on the cost.
22. A model train engine sells for $595 and has a markup rate of 165% based on the cost. What is the cost and markup of the engine?
23. Charlie at the 7th Inning sells Topps baseball cards for $65 a box and has a markup rate of 45% based on cost. Find the cost and markup of each box of cards.
24. AutoZone sells Anco windshield wiper blades for $9.99 and has a markup rate of 62% based on cost. What is the cost and markup for the wiper blades?

9-1 Section Exercises

Skill Builders

Round amounts to the nearest cent and percents to the nearest tenth of a percent.

1. Cost = $30; markup = $20. Find the selling price.
   See **Example 1** .
2. Selling price = $75; cost = $50. Find the markup.
   See **Example 2** .
3. Selling price = $36.99; markup = $12.99. Find the cost.
   See **Example 3** .
4. Cost = $60; selling price = $150. *See* **Example 4** .
   a. Find the markup.
   b. Find the rate of markup based on cost.

5. Cost = $82; markup = $46. *See* **Example 4** .
   a. Find the rate of markup based on cost.
   b. Find the selling price.

6. Cost = $40; rate of markup based on cost = 35%.
   See **Example 5** .
   a. Find the markup.
   b. Find the selling price.

7. Markup = $70; rate of markup based on cost = 83%.
   See **Example 6** .
   a. Find the cost.
   b. Find the selling price.

8. Selling price = $148.27; rate of markup based on cost = 40%. *See* **Example 7** .
   a. Find the cost.
   b. Find the markup.

APPLICATIONS

9. Belts cost $4 and sell with a markup of $2.40. Find the selling price of the belts. *See* **Example 1** .
10. Find the selling price if a case of photocopier paper costs $8 and is marked up $14. *See* **Example 1** .
11. Twenty decorative enamel balls cost $12.75 each and are marked up $9.56. *See* **Example 1** .
    a. Find the selling price for each one.
    b. Find the total amount of margin or markup for the 20 balls.

12. Mugs cost $2 each and sell for $6 each. Find the markup. *See* **Example 2** .

13. A compact disc player sells for $300. The cost is $86. Find the markup of the CD player. *See* **Example 2** .
14. A DVD costs $4 and sells for $12. Find the amount of markup. *See* **Example 2** .
15. Find the cost of a magazine that sells for $3.50 and is marked up $1.75. *See* **Example 3** .
16. Find the cost if a hard hat is marked up $5 and has a selling price of $12.50. *See* **Example 3** .
17. A lamp costs $32 and is marked up based on cost. If the lamp sold for $72, what was the percent of markup?
    See **Example 4** .
18. A computer desk costs $196 and sells with a markup of 101.5% based on cost. What is the selling price?
    See **Example 5** .
19. What is the cost of a sink that is marked up $188 if the markup rate is 70% based on cost? Find the selling price.
    See **Example 6** .
20. A wallet is marked up $12, which is an 80% markup based on cost. What is the cost and selling price of the wallet?
    See **Example 6** .
21. A wristwatch sells for $289. The markup rate is 250% of cost. *See* **Example 7** .
    a. Find the cost of the watch.
    b. Find the markup.
22. Battery-powered massagers cost $8.50 if they are purchased in lots of 36 or more. The Gift Horse Shoppe purchased 48 and sells them at a 45% markup based on cost. Find the selling price of each massager.
23. A TV that costs $1,899 sells for a 63% markup based on the cost. What is the selling price of the TV?
24. An audio system sells for $2,980, which is 160% of the cost. The cost is $1,862.50.

a. What is the rate of markup?
b. What is the markup?

25. A sofa costs $398 and sells for $716.40, which is 180% of the cost.
    a. Find the rate of markup.
    b. Find the markup.

26. Tombo Mono Correction Tape sells for $3.29. The markup rate is 65% of the cost.
    a. What is the cost?
    b. What is the markup of the tape?

27. A Vizio® Razor 230 LED HDTV sells for $349 and has a 48% markup based on cost. Find the cost and markup. Find the cost.
    Find the cost.

    Find the markup.

28. A DreamGear Wii® Lady Fitness Workout Kit sells for $70.19 on a popular web site. The kit has a 62% markup based on cost. Find the cost and markup.
    Find the cost.

    Find the markup.

9-2 Markup Based On Selling Price And Markup Comparisons

Learning Outcomes

1. Find the cost, markup, selling price, or percent of markup when the percent of markup is based on the selling price.
2. Compare the markup based on the cost with the markup based on the selling price.

The markup can be calculated as a portion of either the cost or the selling price of an item. Most manufacturers and distributors calculate markup as a portion of *cost*, because they typically keep their records in terms of cost. Some wholesalers and a few retailers also use this method. Many retailers, however, use the *selling price* or *retail price* as a base in computing markup because they keep most of their records in terms of selling price.

1 Find the cost, markup, selling price, or percent of markup when the percent of markup is based on the selling price.

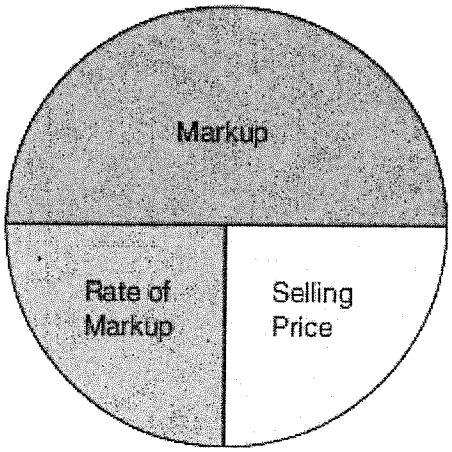


Figure 9-2 Markup Based on Cost

When the markup is based on selling price, the rate of the selling price is known and is 100%. The amount of the selling price is the base in the basic percentage formulas $P = RB$.

We can apply the percentage formula to markup to get the formula shown in **Figure 9-2** .

Markup = rate of markup × selling price or $M = M\%(S)$

Then, we can find variations of the formula by solving the equation for each variable.

Solve for $M\%$. $M = M\%(S)$

$\frac{M}{S} = \frac{M\%S}{S}$ Divide both sides by S

$\frac{M}{S} = M\%$ Simplify

$M\% = \frac{M}{S}$ Write the isolated variable on the left

$M\%$ is expressed as a decimal

Solve for S.

$M = M\%(S)$ Divide both sides by $M\%$ in decimal form

$\frac{M}{M\%} = \frac{M\%(S)}{M\%}$ Simplify

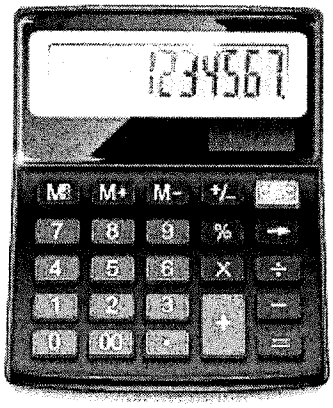
$\frac{M}{M\%} = S$ Write the isolated variable on the left

$S = \frac{M}{M\%}$

Solve for *S*.

How To Find the rate of markup based on the selling price, the selling price, or the markup when any two of the three are known.

1. Identify the known and unknown amounts.
2. Select the formula variation that has the unknown on the left side of the equation.
3. Substitute the known amounts into the formula.
4. Solve for the missing amount.



Cost = $4 Amount of Markup Markup = selling price - Cost

Selling price = $10 Rate of Markup based on the selling price

$M\% = \frac{M}{S}(100\%)$

Solution

$M = S - C$

$M = \$10 - \$4$

$M = \$6$ Amount of markup

Example 1

A calculator costs $4 and sells for $10. Find the rate of markup based on the selling price.

Solution

Find the markup:

Find the rate of markup based on selling price:

Conclusion

The rate of markup for the calculator is 60%.

Try Stop & Check 1–6.

Example 2

Find the selling price and cost if a handbag is marked up $5 with a 20% markup rate based on the selling price.

Markup = $5 Selling price $S = \frac{M}{M\%}$

M% based on Cost

Selling price = 20% $C = S - M$

$$S = \frac{M}{M\%}$$

$$S = \frac{\$5}{20\%}$$

$$S = \frac{\$5}{0.2}$$

S = $25 Selling price

Solution

Find the selling price:

Find the cost:

Conclusion

The selling price of the handbag is $25 and the cost is $20.

Try Stop & Check 7–12.

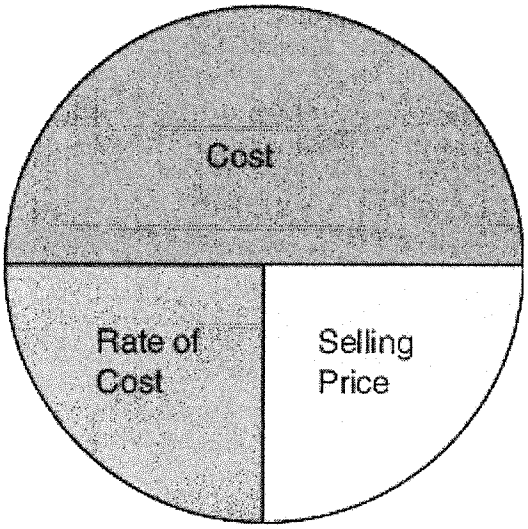


Figure 9-3 Cost When Markup is Based on Selling Price

In the percentage formula the portion and the rate must correspond to the base. When we use the markup formulas, if we know the cost, then the rate should be the rate of the cost. If we know the markup, then the rate should be the rate of the markup. If we know the selling price, the rate should be the rate of the selling price. The rates are related just like the amounts or portions are related.

$S = C + M$

$S\% = C\% + M\%$

When the markup is based on the cost, we have $S\% = 100\% + M\%$.

When the markup is based on the selling price, we have $100\% = C\% + M\%$ or $C\% = 100\% - M\%$.

A variation of the formula $C = C\%(S)$ can be used to relate the cost and selling price when the markup is based on the selling price to get the relationship $S = \frac{C}{C\%}$, where $C\% = 100\% - M\%$.

The percentage formula can be used to get the formula shown in **Figure 9-3** .

Cost = Rate of Cost × Selling Price or $C = C\%(S)$

Then, we can find the selling price formula by solving the equation for S.

Solve for S.

How To Find the rate of cost and the selling price when the cost and rate of markup based on the selling price are known

1. Identify the known and unknown amounts.
2. Select the appropriate formula.
   $C\% = 100\% - M\%$
   $S\% = \frac{C}{C\%}$
   $C = C\%(S)$
3. Substitute the known amounts into the formula.
4. Solve for the missing amount.

Example 3

Find the selling price and markup for a pair of jeans that costs the retailer $28 and is marked up 30% of the selling price.

Solution

Find the rate of cost:

Find the selling price:

Find the markup:

Conclusion

The selling price is $40 and the markup is $12.

Try Stop & Check 13–18.

Example 4

Find the markup and cost of a box of pencils that sells for $2.99 and is marked up 25% of the selling price.

Solution

Find the markup:

Find the cost:

Conclusion

The cost of the box of pencils is $2.24 and the markup is $0.75.

Try Stop & Check 19–22.

To summarize the concepts we have presented in this chapter to this point, all markup problems are solved in basically the same way. One key point is that one rate is known when you know if the markup is based on the *cost* or the *selling price.* When the markup is based on cost, the rate of the cost is 100%.

When the markup is based on selling price, the rate of the selling price is 100%.

In markup problems there are three amounts and three percents (rates). If three of the six parts are known and at least one known part is an amount and another is whether the markup is based on the cost or the selling price, the other three parts can be determined.

To organize the known and unknown parts, we can use a chart. This chart can guide you in selecting the appropriate formula.

How To Find all the missing parts if three parts are known and at least one part is an amount and it is known whether the markup is based on the cost or the selling price

1. Place the three known parts into the chart.

If the $ column has two entries:

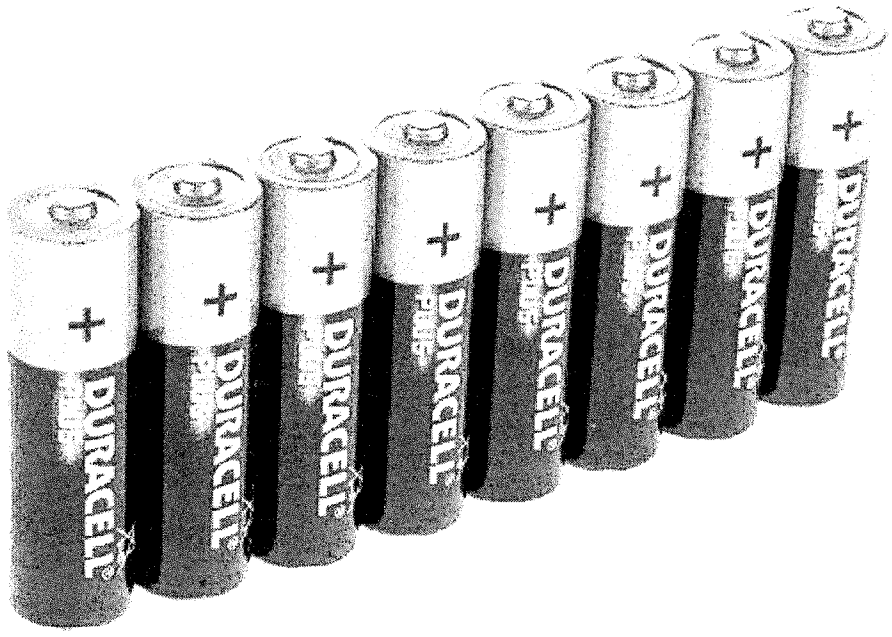
2. Add or subtract as appropriate to find the third amount.
3. Find a second percent by using the formula $R = \frac{P}{B}$.
4. Find the third percent by adding or subtracting as appropriate.

If the % column has two entries:

Add or subtract as appropriate to find the third percent.

Find an additional amount by using the formula $P = RB$ or $B = \frac{P}{R}$.

Find the third amount by adding or subtracting as appropriate.



Example 5

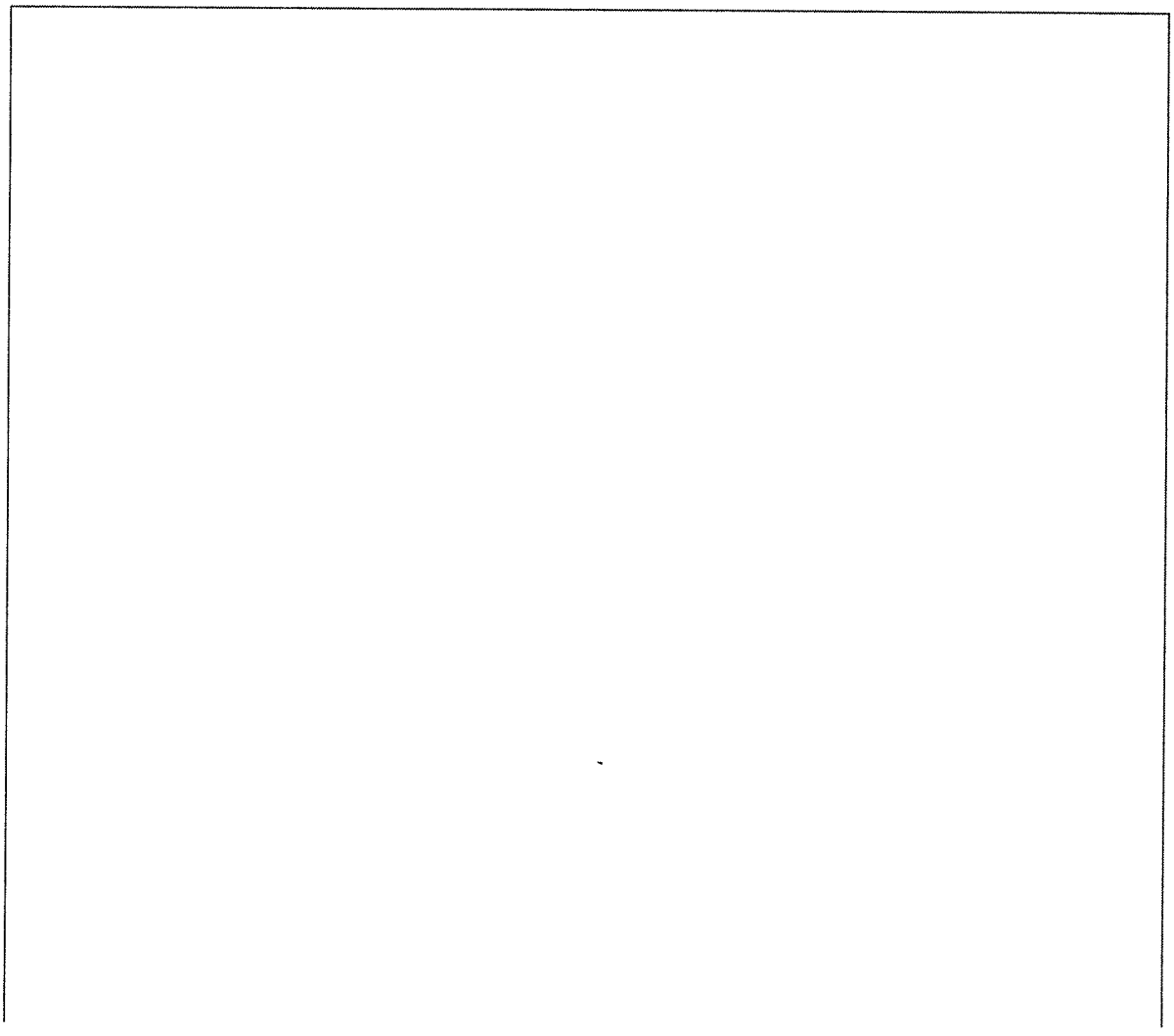
Wal-Mart plans to mark up a package of 8 AA batteries $3.50 over cost. This will be a 50% markup based on cost. Find the cost and selling price of the batteries and the rate of the selling price.

Solution

Conclusion

The rate of the selling price is 150%, the cost is $7.00, and the selling price is $10.50.

Try Stop & Check 23–25.



Tip Check for Reasonableness

When so many formulas can be used in a process, it is important to have a sense of the reasonableness of an answer.

Stop & Check

Round to the nearest tenth of a percent. See **Example 1** .

1. A textbook costs $58 and sells for $70. Find the rate of markup based on the selling price.
2. The manufacturer's suggested retail price for a refrigerator is $1,499 and it costs $385. What is the rate of markup based on the suggested retail price?
3. Hale's Trailers purchases 16-ft trailers for $395 and sells them for $795. What is the rate of markup based on the selling price?
4. Martha's Birding Society purchases hummingbird feeders for $2.40 and sells them for $6. Find the rate of markup based on the selling price.
5. AutoZone purchases tire cleaner for $0.84 and sells it for $2.39. What is the rate of markup based on the selling price?
6. Federated Department Stores purchased men's shoes for $132 and sells them for $229. What is the rate of markup based on selling price?

Round to the nearest cent. See **Example 2** .

7. Find the cost and selling price if a handbag is marked up $195 with a 60% markup rate based on selling price.
8. Find the cost and selling price of a baseball that is marked up $21 with an 80% markup based on the selling price.
9. The 7th Inning marks a soccer trophy up $14, a 75% markup based on the selling price. What is the cost and selling price of the trophy?
10. Wolf Camera marks a camera up 25% of the selling price. If the markup is $145, what is the cost and selling price of the camera?
11. Shekenna's Dress Shop marks up a business suit $38. This represents a 70% markup based on the selling price. What is the cost and selling price of the suit?
12. May Department Store marks one stock keeping unit (SKU) of its Coach handbags up $70.08 or 32% of the selling price.

See **Example 3** .

13. Dollar General Stores buys detergent from the manufacturer for $2.99 and marks it up 25% of the selling price. Find the selling price and markup for the detergent.
14. Best Buy buys a digital camera for $187 and marks it up 38% of the selling price. Find the selling price and markup for the camera.
15. Lucinda Gallegos buys scissors for $3.84 and sells them with a 27% markup based on selling price. What is the selling price and markup for the scissors?
16. A Singer sewing machine costs $127.59 and the Fabric Center marks it up 23% of the selling price. What is the selling price and markup for the machine?
17. The Fabric Center pays $1.92 per yard for bridal satin, then marks it up 65% of the selling price. What is the selling price and markup for the fabric?
18. IZZE sparkling grapefruit soda costs $32.49 per case and Trader Joe's marks it up 35% of the selling price. Find the selling price and markup per case.

See **Example 4**

19. Find the markup and cost of a fishing lure that sells for $18.99 and is marked up 38% of the selling price.
20. A scanner that is marked up 46% of the selling price sells for $675. Find the cost and the amount of markup of the scanner.

See **Example 4** .

21. What is the cost and markup of a chair that sells for $349 and is marked up 58% of the selling price?
22. Ronin Copies marks up signs that sell for $49. The markup is 80% based on the selling price. What is the cost and the amount of markup of a sign?
23. Al's Golf Supply plans to mark up its persimmon wood drivers by 60% based on cost, or $135. Find the rate of the selling price, the cost and selling price for the drivers.

See **Example 5** .

24. A Canon copier is marked up 38% of the selling price. It costs $3,034.90. Find the selling price and markup of the copier.

2 Compare the markup based on the cost with the markup based on the selling price.

If a store manager tells you that the standard markup rate is 25%, you don't know if that means markup based on cost or on selling price. What's the difference?

Tip Using Subscripts

It is a common notation to use subscripts to distinguish between similar amounts. $M\%_{\text{cost}}$ means the markup rate based on the cost. $M\%_{\text{selling price}}$ means the markup rate based on the selling price.

Example 6

Find the rate of markup based on cost and based on selling price of a computer that costs $1,500 and sells for $2,000.

Solution

Conclusion

The markup rate based on cost is 33|% and the markup rate based on selling price is 25%.

Try Stop & Check 1–2.

Sometimes it is necessary to switch from a markup rate based on selling price to a markup rate based on cost, or vice versa.

How To Convert a markup rate based on selling price to a markup rate based on cost

1. Find the complement of the markup rate based on the selling price. That is, subtract the markup rate from 100%.
2. Divide the decimal equivalent of the markup rate based on the selling price by the decimal equivalent of the difference found in step 1.

$$M\%_{\text{cost}} = \frac{M\%_{\text{selling price}}}{100\% - M\%_{\text{selling price}}}(100\%)$$

Example 7

A desk is marked up 30% based on selling price. What is the equivalent markup rate to the nearest tenth of a percent based on the cost?

Solution

Conclusion

A 30% markup based on selling price is equivalent to a 43% markup based on cost.

Try Stop & Check 3–4.

How To Convert a markup rate based on cost to a markup rate based on selling price

1. Add 100% to the markup rate based on the cost.
2. Divide the decimal equivalent of the markup rate based on the cost by the decimal equivalent of the sum found in step 1.

$$M\%_{\text{cost}} = \frac{M\%_{\text{cost}}}{100\% + M\%_{\text{cost}}}(100\%)$$

Example 8

A Bluetooth player is marked up 40% based on cost. What is the markup rate to the nearest tenth of a percent based on selling price?

M% cost = 40% M% selling price M% selling price =

$$\frac{M\% \text{ cost}}{100\% + M\% \text{ cost}} 100\%$$

Solution

Conclusion

A 40% markup based on cost is equivalent to a 29% markup based on selling price.

Try Stop & Check 5-6.

Tip Estimating Markup Equivalencies

Stop & Check

Round to the nearest tenth of a percent. See **Example 6** .

1. Find the rate of markup based on cost and based on selling price of a blanket thatcosts $12.50 and sells for $38.
2. Find the rate of markup based on cost and based on selling price of a copy machine that costs $12,500 and sells for $18,900.

See **Example 7** .

3. A diamond ring is marked up 75% based on selling price. Find the equivalent markup based on cost.

See **Example 7** .

4. A stroller is marked up 40% based on selling price. What is the equivalent markup based on cost?

See **Example 8** .

5. A Bluetooth speaker is marked up 120% of cost. What is the equivalent rate of markup based on selling price?

See **Example 8** .

6. A wallet is marked up 60% of cost. What is the equivalent rate of markup on selling price?

9-2 Section Exercises

Skill Builders

Round to the nearest cent or tenth of a percent.

1. Cost = $32; selling price = $40. Find the rate of markup based on the selling price. *See* **Example 1** .
2. Selling price = $1,980; cost = $795. Find the rate of markup based on the selling price. *See* **Example 1** .

3. An item sells for $5,980 and costs $3,420. What is the rate of markup based on selling price? *See* **Example 1** .
4. Markup = $75; markup rate of 60% based on the selling price. *See* **Example 2** .
    a. Find the selling price.
    b. Find the cost.

5. Markup rate based on selling price = 15%; markup = $250. Find the selling price and cost. *See* **Example 2** .
6. Markup = $2,050; markup rate is 42% of the selling price. *See* **Example 2** .
    a. Find the selling price.
    b. Find the cost.

7. An item has a 30% markup based on selling price. The markup is $100. *See* **Example 2** .
    a. Find the selling price.
    b. Find the cost.

8. Find the selling price and markup for an item that costs $792 and is marked up 42% of the selling price. *See* **Example 3** .
    a. Find the cost rate.
    b. Find the selling price.
    c. Find the markup.

9. Selling price = $1.98; markup is 48% of the selling price. *See* **Example 4** .
    a. What is the markup?
    b. What is the cost?

10. The selling price of an item is $18.50 and the markup rate is 86% of the selling price. *See* **Example 4** .

a. Find the markup.
b. Find the cost.

11. Zagg, Inc. plans to mark up a folio $66 over cost. This will be a 32% markup based on cost. Find the cost and selling price of the folio and the rate of the selling price. *See* **Example 5** .
12. An item costs $20 and sells for $50. *See* **Example 6** .
    a. Find the rate of markup based on cost.
    b. Find the rate of markup based on selling price.

13. An item has a 60% markup based on selling price. What is the equivalent markup percent based on the cost? *See* **Example 7** .
14. A 40% markup based on cost is equivalent to what percent based on selling price (retail)? *See* **Example 8** .

APPLICATIONS

15. An air compressor costs $350 and sells for $695. Find the rate of markup based on the selling price. *See* **Example 1** or **5** .
16. A lateral file is marked up $140, which represents a 28% markup based on the selling price. *See* **Example 2** or **5** .
    a. Find the selling price.
    b. Find the cost.

17. A recliner chair that sells for $1,499 is marked up 60% of the selling price. *See* **Example 4** .
    a. What is the markup?
    b. What is the cost?

18. A lawn tractor that costs the retailer $599 is marked up 36% of the selling price. *See* **Example 5** .
    a. Find the selling price.
    b. Find the markup.

19. Lowe's plans to sell its best-quality floor tiles for $15 each. This is a 48% markup based on selling price. *See* **Example 5** .
    a. Find the cost.
    b. Find the markup.

20. A serving tray costs $1,400 and sells for $2,015. *See* **Example 5** .
    a. Find the rate of markup based on cost.
    b. Find the rate of markup based on selling price.

21. What is the equivalent markup based on cost of a water fountain that is marked up 63% based on the selling price? *See* **Example 7** .
22. A box of Acco paper clips is marked up 46% based on cost. What is the markup based on selling price? *See* **Example 8** .

9-3 Markdown, Series Of Markdowns, And Perishables

Learning Outcomes

1. Find the amount of markdown, the reduced (new) price, and the percent of markdown.
2. Find the final selling price for a series of markups and markdowns.
3. Find the selling price for a desired profit on perishable and seasonal goods.

Merchants often have to reduce the price of merchandise from the price at which it was originally sold. The amount by which the original selling price is reduced is called the **markdown** .

Markdown:
amount by which an original selling price is reduced.

Perishable:
an item for sale that has a relatively short time during which the quality of the item is acceptable for sale.

There are many reasons for making markdowns. Sometimes merchandise is marked too high to begin with. Sometimes it gets worn or dirty or goes out of style. Flowers, fruits, vegetables, and baked goods are called **perishables** and are sold for less when the quality of the item is not as good as the original quality. Competition from other stores may also require that a retailer mark prices down.

1 Find the amount of markdown, the reduced (new) price, and the percent of markdown.

Markdowns are generally based on the original selling price. That is, the original selling price is the base in the percentage formulas and the rate of the selling price is 100%.

How To markdown, the reduced (new) price, and the percent of markdown

1. Place the known values into the chart:
2. Select the appropriate formula based on the known values:
   Markdown = original selling price — reduced price M = S — N
   Reduced price = original selling price — markdown N = S — M

$$\text{Rate of markdpwn} = \frac{\text{amount of markdown}}{\text{original selling price}} \times 100\% \quad M\% \frac{M}{S}(100\%)$$

Example 1

A lamp originally sold for $36 and was marked down to sell for $30. Find the markdown and the rate of markdown to the nearest tenth of a percent based on the selling price.

Solution

Conclusion

The markdown is $6 and the rate of markdown is 16.7%.

Try Stop & Check 1-2.

Tip Making Connections between Markup and Markdown

Some business processes use the same or similar terminology in different contexts. Examine the terms original price and new price when associated with markup and markdown.

Example 2

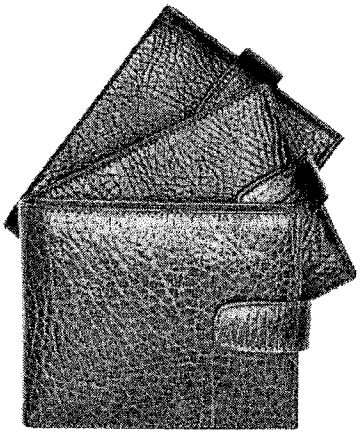
A wallet was originally priced at $12 and was reduced by 25%. Find the markdown and the sale (new) price.

Solution

Conclusion

The markdown is $3 and the sale price is $9.

Try Stop & Check 3–6.



Stop & Check

See **Example 1** .

1. A purse originally sold for $135 and was marked down to sell for $75. Find the markdown and the rate of markdown to the nearest tenth of a percent.
2. An umbrella originally sold for $15 and was marked down to sell for $8. Find the markdown and rate of markdown rounded to the nearest tenth of a percent.

See **Example 2** .

3. A ladder was originally priced to sell for $249 and was reduced by 35%. Find the amount of markdown and the reduced price.
4. A book bag is priced to sell for $38.99. If the bag was reduced 25%, find the amount of markdown and the reduced price.
5. A corkboard was originally priced to sell at $85 and was reduced by 40%. Find the amount of markdown and the reduced price.
6. Lowe's reduced a Maytag dishwasher 12.563%. If the dishwasher was priced at $398, find the amount of markdown and the reduced price.

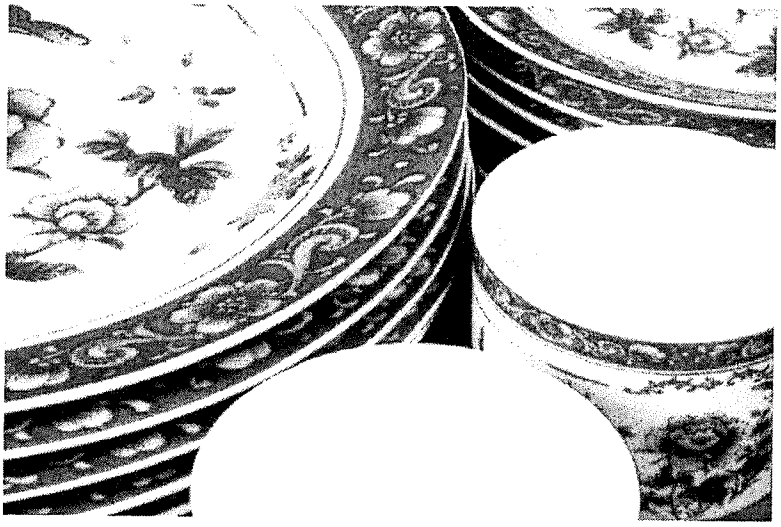
2 Find the final selling price for a series of markups and markdowns.

Prices are in a continuous state of flux in the business world. Markups are made to cover increased costs. Markdowns are made to move merchandise more rapidly, to move dated or perishable merchandise, or to draw customers into a store.

Sometimes prices are marked down several times before the merchandise is sold. In calculating each stage of prices, markups, markdowns, and rates, we use exactly the same markup/markdown formulas and procedures as before. To apply these formulas and procedures, we agree that both the markup and the markdown are based on the previous selling price in the series.

How To Find the final selling price for a series of markups and markdowns

1. Find the first selling price using the given facts and markup procedures in Sections 9-1 and 9-2.
2. For each remaining stage in the series:
   If the stage requires a *markdown*, identify the previous selling price as the original selling price S for this stage. Find the reduced price N. This reduced price is the new selling price for this stage.
3. Identify the selling price for the last stage as the final *selling* price.



Example 3

Belinda's China Shop paid a wholesale price of $800 for a set of imported china. On August 8, Belinda marked up the china 50% based on the cost. On October 1, she marked the china down 25% for a special 10-day promotion. The china was again marked down 30% for a preholiday sale. What was the final selling price of the china?

Solution

Stage 1: August 8

Find the first selling price (S_1), which is a markup, based on cost:

Stage 2: October 1

Find the second selling price (N_2), which is a markdown, using S_1 as the original selling price:

Stage 3: Final markdown

Find the final selling price (N_3), which is a markup, using S_3 as the selling price:

Conclusion

The final price of the china in the series is $630.

Try Stop & Check 1.

Sometimes in retail marketing all changes in the series are markdowns. We can adapt our procedure for finding the net price after applying a trade discount series, which was discussed in **Chapter 8** . Repricing individual items can be very time-consuming, and many department stores have chosen to use a single sign on an entire table or rack to indicate the same percent markdown on a variety of items. Also, as a further incentive to buy, they may publish a coupon that entitles customers to "take an extra 10% off already reduced prices." This is a situation that can model the procedure for finding the net price after applying a trade discount series.

$$\begin{aligned} \text{Net decimal equivalent} &= \text{product of decimal equivalents of the complements of each discount} \\ \text{Net price} &= \text{net decimal equivalent} \times \text{original price} \\ \text{Total rate of reduction} &= (1 - \text{net decimal equivalent})\,(100\%) \end{aligned}$$

Example 4

Burdines' has various sales racks throughout the store. Chloe Duke finds a coat from a rack labeled 40% off. She also has a newspaper coupon that reads "Take an additional 10% off any already reduced price." How much will she pay for a coat (net price) that was originally priced at $145? What is the total rate of reduction?

Solution

Find the net decimal equivalent:

Conclusion

The final reduced price is $78.30 and the total percent of reduction is 46%.

Try Stop & Check 2-4.

Stop & Check

See **Example 3** .

1. Holly's Interior Design Shoppe paid $189 for a fern stand and marked it up 60% based on the cost. Holly included it in a special promotional markdown of 30%. The stand was damaged during the sale and was marked down an additional 40%. What was the final selling price of the stand?

See **Example 4** .

2. Johnson's Furniture bought a table for $262 and marked it up 85% based on the cost. For a special promotion, it was marked down 25%. Store management decided to mark it down an additional 30%. What was the final reduced price?

3. Rich's placed a "10% off' coupon in a newspaper for a holiday sale. Becca selected shoes from the sale rack that were marked 30% off and also used the coupon. How much will Becca pay for the shoes if they were originally priced at $128? What is the total percent reduction?
4. Neilson's Department Store placed a "15% off' coupon in the newspaper for an after-Thanksgiving sale. Lakisha purchased a formal dress that was marked 40% off and used the coupon. The dress was originally priced at $249. How much did Lakisha pay for the dress? What is the total rate of reduction?

3 Find the selling price for a desired profit on perishable and seasonal goods.

Most businesses anticipate that some seasonal merchandise will not sell at the original selling price. Stores that sell perishable or strictly seasonal items (fresh fruits, vegetables, swimsuits, or coats, for example) usually know from past experience how much merchandise will be marked down or discarded because of spoilage or merchandise out of date. For example, most retail stores mark down holiday items to 50% of the original price the day after the holiday. Thus, merchants set the original markup of such items to obtain the desired profit level based on the projected number of items sold at "full price" (the original selling price).

How To Find the selling price to achieve a desired profit

1. Establish the rate of profit (markup)—based on cost—desired on the sale of the merchandise.
2. Find the total cost of the merchandise by multiplying the unit cost by the quantity of merchandise. Add in additional charges such as shipping.
3. Find the total desired profit (markup) based on cost by multiplying the rate of profit (markup) by the total cost.
4. Find the total selling price by adding the total cost and the total desired profit.
5. Establish the quantity expected to sell.
6. Divide the total selling price (step 4) by the expect-to-sell quantity (step 5).

$$\text{selling price per item to achieve desired profit (>markup)} = \frac{\text{total selling price}}{\text{expect-to-sell quality}}$$

Example 5

Green's Grocery specializes in fresh fruits and vegetables. Merchandise is priced for quick sale and some must be discarded because of spoilage. Hardy Green, the owner, receives 400 pounds of bananas, for which he pays $0.15 per pound. On average, 8% of the bananas will spoil. Find the selling price per pound to obtain a 175% markup on cost.

Solution

Hardy must receive $165 for the bananas he expects to sell. He expects 8% not to sell, or 92% to sell.

He can expect to sell 368 pounds of bananas.

$$\text{Selling proce per pound} = \frac{\text{total selling price}}{\text{pounds expected to sell}}$$
$$= \frac{\$165}{368} = \$0.4483695652 \text{ or } \$0.45$$

Conclusion

Hardy must sell the bananas for $0.45 per pound to receive the profit he desires. If he sells more than 92% of the bananas, he will receive additional profit.

Try Stop & Check 1–4.

Stop & Check

See **Example 5** .

1. Drewrey's Market pays $0.30 per pound for 300 pounds of peaches. On average, 5% of the peaches will spoil before they sell. Find the selling price per pound needed to obtain a 180% markup on cost.
2. Cozort's Produce pays $0.35 per pound for 500 pounds of apples. On average, 8% of the apples will spoil before they sell. Find the selling price per pound needed to obtain a 175% markup on cost.
3. Wesson Grocery buys tomatoes for $0.27 per pound. On average, 4% of the tomatoes must be discarded. Find the selling price per pound needed to obtain a 160% markup on cost for 2,000 pounds.
4. EZ Way Produce pays $0.92 per pound for 1,000 lb of mushrooms. On average, 10% of the mushrooms will spoil before they sell. Find the selling price per pound needed to obtain a 180% markup based on cost.

9-3 Section Exercises

Skill Builders

Round dollar amounts to the nearest cent and percents to the nearest tenth of a percent.

See **Example 1** .

1. An item sells for $48 and is reduced to sell for $30. Find the markdown amount and the rate of markdown.
2. An item is reduced from $585 to sell for $499. What is the markdown amount and the rate of markdown?

3. Selling price = $850; reduced (new) price = $500. Find the markdown amount and the rate of markdown.
4. Selling price = +795; reduced price = +650. Find the markdown amount and the rate of markdown.

See **Example 2** .

5. A sound system originally priced to sell for $3,895 was reduced by 28%. Find the amount to markdown and the reduced price.
6. A storage cabinet that originally sold for $849.95 was reduced 45% in a clearance sale. Find the amount to markdown and the reduced price.

See **Example 3** .

7. Kendra and Mikala, owners of Nue Rhythm Clothing, paid $30 a pair for jeans. On September 15, Kendra marked up the jeans 145% based on the cost. On November 24, she marked the jeans down 40% for a Black Friday sale. The jeans were marked down an additional 25% for final clearance. What was the final selling price of the jeans?
8. Kendra and Mikala, owners of Nue Rhythm Clothing, paid $42 for each of their signature leather belts. On June 1, Mikala marked up the belts 180% based on the cost. On August 1, she marked the belts down 25% for a summer sale. On October 1, the belts were marked down an additional 35% for clearance. What was the final selling price of the belts?

See **Example 4** .

9. A table is originally priced to sell for $75 and is marked down 40%. A customer has a coupon for an additional 15%. What is the total percent reduction and the final selling price?

See **Example 3 –4** .

10. A printer costs $400 and is marked up 60% based on the cost. The first markdown rate is 20% and the second markdown rate is 30%. What is the final selling price?

APPLICATIONS

See **Example 1** .

11. Deron marks down pillows at the end of the season. They sell for $35 and are reduced to $20. What is the markdown and the rate of markdown?
12. Julia purchased a sweatshirt that was reduced from $42 to sell for $26. What was the markdown and the rate of markdown?

See **Example 2** .

13. Desmond found a bicycle with an original price tag of $349 but it had been reduced by 45%. What is the amount of markdown and the sale price?

See **Example 3** .

14. The 7th Inning is buying Ohio State T-shirts. The cost of the shirts, which includes permission fees paid to Ohio State, will be $10.90 each if 1,000 shirts are purchased. Charlie sells 800 shirts before the football season begins at a 50% markup based on cost. What is the gross margin (markup) if Charlie sells the remaining 200 shirts at a 25% reduction from the selling price?

See **Example 3** .

15. A ladies' suit selling for $135 is marked down 25% for a special promotion. It is later marked down 15% of the sale price. Because the suit still hasn't sold, it is marked down to a price that is 75% off the original selling price. What are the two sale prices of the suit? What is the final selling price of the suit?
16. The Swim Shop paid a wholesale price of $24 each for Le Paris swimsuits. On May 5 it marked up the suits 50% of the cost. On June 15 the swimsuits were marked down 15% for a two-day sale, and on June 17 they were marked up again to the original selling price. On August 30, the shop sold all remaining swimsuits for 40% off the

original selling price. What was the May 5 price, the June 15 price, and the final selling price of a Le Paris swimsuit?

See **Example 5**

17. Jung's Grocery received 1,000 pounds of onions at $0.12 per pound. On the average, 4% of the onions will spoil before they are sold. Find the selling price per pound to obtain a markup rate of 200% based on cost.

See **Example 5**

18. Drewrey's fruit stand sells fresh fruits and vegetables. Becky Drewrey, the manager, must mark the selling price of incoming produce high enough to make the desired profit while taking expected markdowns and spoilage into account. Becky paid $0.35 per pound for 300 pounds of grapes. On average, 12% of the grapes will spoil. Find the selling price per pound needed to achieve a 175% markup on cost.
19. Tancia Boone ordered 600 pounds of Red Delicious apples for the produce section of the supermarket. She paid $0.32 per pound for the apples and expected 15% of them to spoil. If the store wants to make a profit of 90% on the cost, what should be the per-pound selling price?

Chapter 9 Exercise Set

Round dollar amounts to the nearest cent and percents to the nearest tenth of a percent.

1. Find the selling price of a Casio® calculator if the cost is $12.74 and the markup is $9.25.
2. Find the selling price of a Men's Stainless Steel Black Detail money clip if the cost is $42.25 and the markup is $84.40.
3. Peacock's Jewelry buys a pair of stylish earrings for $52 and sells them for $129. What is the markup?
4. A Waterford® Marquis ballpoint pen costs $22.50 and sells for $50.99. What is the markup?
5. AmeriMark® sells ladies' patent sandals for $56.99 and marks them up $26.22. What is the cost of the sandals?
6. A set of stainless steel tableware sells for $159.99 and has a markup of $83.59. What is the cost of the tableware?
7. Beach Glass Bingo® Jewelry makes handcrafted bracelets and marks them up 175% based on cost. The cost of making one bracelet is $26. Find the selling price of the bracelets.
8. Fujifilm digital camera with software is marked up 67% based on cost. The cost of the camera is $167.45. Find the selling price of the camera.
9. A flower arrangement is marked up $12, which is 50% of the cost.
    a. Find the cost.
    b. Find the selling price.

10. Paradise Solar Lights marked up each box of four-color changing LED solar accent lights $8.25. The 60% markup of $8.25 was based on cost. Find the cost and selling price of each box of lights.
11. Macy's Department Store marked up a Cuisinart® blender 38% based on cost. If the markup was $53.20, find the cost and selling price of each blender.
12. Jenny's Electronics sells a camera for $1,399. The markup rate is 72% of the cost. Find the cost and markup for the camera.
13. Lenox® sells a serving platter for $359. The markup rate is 110% of the cost. Find the cost and markup for the platter.
14. May Department Stores plans to mark up a Cuisinart Single Serve® brewing system $82.25 over cost, which is a 72% markup based on the cost. Find the cost, the selling price, and the rate of the selling price.

15. A briefcase is marked up $15.30, which is 30% of the selling price.
    a. Find the selling price of the briefcase.
    b. Find the cost.

16. Find the selling price and cost if an over-the-range microwave oven is marked up $182 with a 65% markup rate based on the selling price.

17. Find the selling price and cost if a tennis table is marked up $279.99 with a 56% markup rate based on the selling price.
18. Find the selling price and markup for a pair of Orvis sensor gloves that costs the retailer $20.40 if the markup is 60% of the selling price.
19. Find the selling price and markup for a case of Newman's Own® special blend coffee that costs the retailer $35.87 if the markup is 22% of the selling price.
20. A toaster sells for $28.70 and has a markup rate of 50% based on selling price.
    a. Find the markup.
    b. Find the cost.

21. A desk organizer sells for $35, which includes a markup rate of 60% based on the selling price.
    a. Find the markup.
    b. Find the cost.

22. Macy's Department Store marks up Bite lip liner $11.25 over cost. If the markup based on cost is 80%, find the rate of the selling price, the cost, and the selling price.
23. Dollar General marks up Pledge furniture polish $2.43 over cost. If the markup based on cost is 62%, find the rate of the selling price, the cost, and the selling price.
24. A computer table sells for $198.50 and costs $158.70.
    a. Find the markup.
    b. Find the rate of markup based on the cost.

25. Old Towne Hardware pays $12.15 for lightbulbs that have a 35,000-hour life. The bulbs sell for $29.99. What is the percent of markup based on cost? Round to the nearest tenth of a percent.
26. A hole punch costs $40 and sells for $58.50.
    a. Find the markup.
    b. Find the rate of markup based on selling price.

27. A reclaimed T-shirt scarf sells for $32 and costs $20. Find the rate of markup based on cost and based on selling price. Round to the nearest tenth of a percent.

A Canon® black-and-white multifunction laser printer costs $49 and sells for $119.99. Find the rate of markup based on the selling price.

•

Costco sells a set of Velox® custom vehicle wheels for $529. They cost $278. Find the rate of markup based on cost and based on selling price. Round to the nearest tenth of a percent.

•

A desk has an 84% markup based on selling price. What is the rate of markup based on cost?

•

Find the rate of markup based on cost of a textbook that is marked up 20% based on the selling price.

•

A chest is marked up 63% based on cost. What is the rate of markup based on selling price?

•

A dining room suite is marked up 45% based on cost. What is the rate of markup based on selling price?

•

A fiberglass shower originally sold for $379.98 and was marked down to sell for $341.98.

a. Find the markdown.
b. Find the rate of markdown based on selling price.

•

A three-speed fan originally sold for $29.98 and was reduced to sell for $25.40. Find the markdown and the rate of markdown based on selling price.

- A portable DVD player was originally priced at $249.99 and was reduced by 20%.

    a. Find the markdown.
    b. Find the sale (new) price.

- A down comforter was originally priced to sell at $280 and was reduced by 65%. Find the markdown and the sale price.

- Bolivia's Gifts paid a wholesale price of $625 for a set of imported hand-cut crystal and marked the crystal up 82% based on cost. On April 1, the crystal was marked down 30% for a special promotion. On September 12, the crystal was marked down an additional 35% for a clearance sale. What was the final selling price of the crystal?

-

Crystal stemware originally marked to sell for $49.50 was reduced 20% for a special promotion. The stemware was then reduced an additional 30% to turn inventory. What were the markdown and the sale price for each reduction?

•

Michelle Dockter has selected a Sonic® electric toothbrush that is on sale for 25% off. She also has a store coupon that reads "Take 15% off any already reduced price." How much will she pay for the toothbrush if it was originally priced at $79.99? What is the rate of reduction?

•

Keven Dockter has selected a Garmin® portable GPS that is on sale for 20% off. He also has a store coupon that reads "Take 10% off any already reduced price." How much will he pay for the portable GPS if it was originally priced at $279.99? What is the rate of reduction?

•

Hampton's Organic Market specializes in organic produce. Merchandise is priced for quick sale and some is expected to be discarded because of spoilage. The market receives 500 pounds of apples that cost $0.62 per pound. On average 6.3% of the apples will spoil. Find the selling price per pound to obtain a 210% markup on cost.

•

James McDonnell purchases 800 pounds of potatoes at a cost of $0.18 per pound. If he anticipates a spoilage rate of 20% of the potatoes and wishes to make a profit of 140% of the cost, for how much must he sell the potatoes per pound?

Chapter 9 Practice Test

Round dollar amounts to the nearest cent and percents to the nearest tenth of a percent.

1. If a television costs $498.15 and was marked up $300, what is the selling price?
2. A refrigerator that costs $489.99 was marked up $100. What is the selling price?
3. A calculator sells for $23.99 and costs $16.83. What is the markup?
4. A mixer sells for $109.98 and has a markup of $36.18. Find the cost.
5. Laura's Home Design pays $258 for a modern kitchen faucet and sells it for $417.96. What is the rate of markup based on cost?
6. A Yamaha® 88 Portable Grand Keyboard has a cost of $345.58 and is marked up 63% based on cost. Find the selling price of the keyboard.
7. A cookbook has a 34% markup rate based on cost. If the markup is $5.27, find the cost of the cookbook. Find the selling price.
8. A stainless steel patio heater is marked up $87 over cost. The markup rate of 48% is based on cost. Find the cost and selling price of the heater. Find the rate of the selling price.
9. A box of printer paper sells for $22.68. Find the cost and markup if there is a 35% markup rate based on cost.
10. A CD costs $0.90 and sells for $1.50. Find the rate of markup based on selling price. Round to the nearest whole percent.
11. Find the selling price and cost of an Amana® portable room air conditioner that is marked up $220 with a 55% markup rate based on selling price.
12. A lamp costs $88. What is the selling price and markup if the markup is 45% of the selling price?

Chapter 9 Critical Thinking

1. Will the series markdown of 25% and 30% be more than or less than 55%? Explain why.
2. Explain why taking a series of markdowns of 25% and 30% is not the same as taking a single markdown of 55%. Illustrate your answer with a specific example.
3. Under what circumstances would you be likely to base the markup of an item on the selling price?
4. Under what circumstances would you be likely to base the markup for an item on cost?
5. What clues do you look for to determine whether the cost or selling price represents 100% in a markup problem?
6. If you were a retailer, would you prefer to base your markup on selling price or cost? Why? Give an example to illustrate your preference.
7. When given the rate of markup, describe at least one situation that leads to adding the rate to 100%. Describe at least one situation that leads to subtracting the rate from 100%.
8. Show by giving an example that the final reduced price in a series markdown can be found by doing a series of computations or by using the net decimal equivalent.
9. An item is marked up 60% based on a selling price of $400. What is the cost of the item? Find and correct the error in the solution.
10. Explain why the percent of markup based on selling price cannot be greater than 100%.
11. If an owner of a retail store uses a 40% markup on cost to determine a desired profit margin, what would be the rationale for marking up all items 40% versus setting different markups for individual products/product categories, to achieve the desired profit margin?

A computer stand sells for $385. What is the markup if it is 45% of the selling price? What is the cost?

•

One big box store sells a Toshiba® notebook computer for $549.99. Each computer has a 57% markup based on selling price. What is the markup and cost of each computer?

•

A 10-ream case of printer paper sells for $39.99 and has a 47% markup based on the selling price. Find the markup and cost of one case of paper.

•

Landers' Gifts plans to mark up a blue pottery rabbit $18.75 over cost. This will be a 45% markup based on cost. Find the rate of the selling price, the cost, and the selling price of the pottery.

•

Becky Drewery purchased a small refrigerator for her dorm room for $159. The refrigerator costs $127. Find the rate of markup based on cost and based on the selling price.

•

A radio is marked up 65% of the selling price. Find the equivalent markup rate based on the cost.

•

A copy machine is marked up 82.2% based on the cost. Find the markup rate based on selling price.

•

The reduced price of a dress is $54.99. Find the original selling price if a reduction of 40% has been taken.

•

A coffeemaker that originally sold for $86.90 was marked down to sell for $60.83. What is the markdown?

•

What is the rate of markdown of the coffeemaker in **Exercise 21** ?

•

What is the rate of markdown based on the selling price of a scanner that sells for $498 and is marked down $142?

•

A wallet was originally priced at $49.99 and was reduced by 30%. Find the markdown and the sale price.

•

A file cabinet originally sold for $215 but was damaged and had to be reduced. If the reduced cabinet sold for $129, what was the rate of markdown based on the original selling price?

•

Amy's Gift Baskets paid $49 for a handmade bracelet. On January 5 Amy marked it up 120% of the cost. On February 5, she marked the bracelet down 40% of the selling price for a Valentine's Day promotion. On June 30, Amy marked the bracelet down 20% to reduce inventory. What was the final selling price of the bracelet?

•

A desk that originally sold for $589 was marked down 25%. During the sale it was scratched and had to be reduced an additional 25% off the current price. What was the final selling price of the desk?

•

A rugby shirt that was originally priced at $89.95 is marked down 35%. Madison has a coupon for 15% off the reduced price. How much will Madison pay for the shirt? What is the total rate of reduction?

•

Brenda Wimberly calculates the selling price for all produce at Quick Stop Produce. If 400 pounds of potatoes were purchased for $0.13 per pound and 18% of the potatoes were expected to spoil before being sold, determine the price per pound that the potatoes must sell for if a profit of 120% of the purchase price is desired.

Case Studies

9-1 Acupuncture, Tea, and Rice-Filled Heating Pads

Karen is an acupuncturist with a busy practice. In addition to acupuncture services, Karen sells teas, herbal supplements, and rice-filled heating pads. Because Karen's primary income is from acupuncture, she feels that she is providing the other items simply to fill a need and not as an important source of profits. As a matter of fact, the rice-filled heating pads are made by a patient who receives acupuncture for them instead of paying cash. The rice-filled pads cost Karen $5.00, $8.00, and $12.00, respectively, for small, medium, and large sizes. The ginger tea, relaxing tea, cold & flu tea, and detox tea cost her $2.59 per box plus $5.00 shipping and handling for 24 boxes. Karen uses a cost plus markup method, whereby she adds the same set amount to each box of tea. She figures that each box costs $2.59 plus $0.21 shipping and handling, which totals $2.80, then she adds $0.70 profit to each box and sells it for $3.50.

1. What is the markup percent based on cost for a box of ginger tea?
2. If the rice-filled heating pads sell for $7, $10, and $15 for small, medium, and large, respectively, what is the markup percent on each one?

3. Karen wants to compare using the cost plus method to the percent markup method. If she sells 2 small rice pads, 4 medium rice pads, 2 large rice pads, and 20 boxes of $3.50 tea in a month, how much profit does she accumulate? What markup percent based on cost would she have to use to make the same amount of profit on this month's sales? Round to the nearest whole percent.
4. What prices should Karen charge (using the markup percent) to obtain the same amount of profit as she did with the cost plus method? Do not include shipping.

9-2 Carolina Crystals

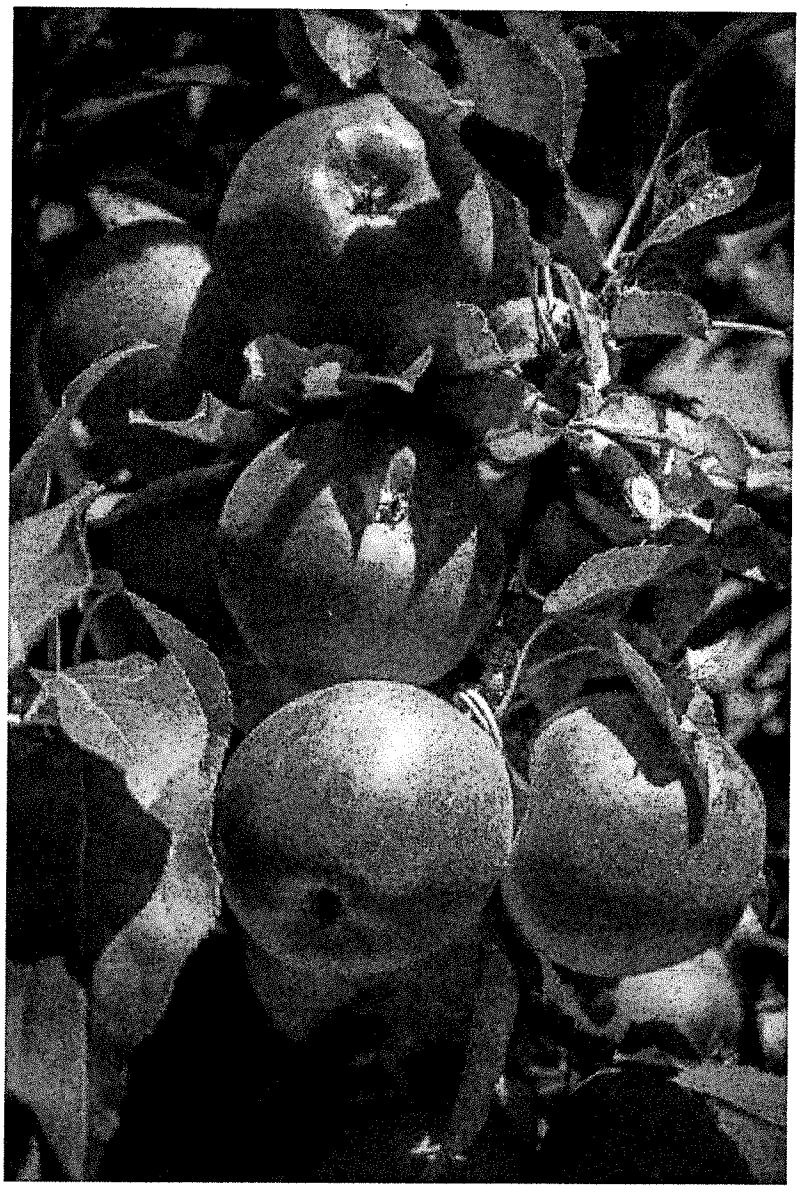
Carolina Crystals, a midrange jewelry store located at Harbor Village in San Diego, serves two clienteles: regular customers who purchase gifts and special-occasion jewelry year-round, and tourists visiting the city. Although tourism is high in San Diego most months of the year, the proprietor of Carolina Crystals, Amanda, knows that her regular customers tend to purchase more jewelry during November and December for Christmas presents; in late January and early February for Valentine's Day; and in late April and May for summer weddings. Typically, jewelry is marked up 100% based on cost, but Amanda adjusts her pricing throughout the year to reflect seasonal needs. Amanda always carries a selection of diamond engagement and eternity rings, a wide array of gold charms that appeal to tourists, both regular and baroque pearl strands, and other types of jewelry.

1. If Amanda purchases diamond rings at $1,200 each, what would be the regular selling price to her customers, assuming a 100% markup on cost?
2. If Amanda thinks that an 85% markup on cost is more appropriate for gold charms, what would be the selling price on a gold sailboat charm Amanda purchases for $135?

3. Amanda also sells gold bracelets on which the charms can be mounted. She runs a special all year that allows a customer to purchase a gold charm bracelet at 50% off if the customer also buys three gold charms at the same time. If a 7" gold bracelet costs Amanda $125, what would be the price if the customer bought only the bracelet (without the charms) at a regular 100% markup on cost?
4. What would be the total price of the purchase if a customer purchased 3 charms and the bracelet, assuming the first charm cost Amanda $150, the second $185, and the third $125, and were marked up 85% based on cost?
5. Amanda often suggests to her male customers who buy diamond engagement rings that they also purchase a pearl necklace as a wedding gift for their bride. As a courtesy to men purchasing diamond engagement rings, Amanda discounts pearl strands 18" and shorter by 35% and pearl strands longer than 18 by 45%. If the diamond rings have a 100% markup on cost and the pearl necklaces have a 60% markup on cost, what would be Amanda's cost for a ring selling at $4,500 and a 22" pearl necklace selling for $1,500?
6. If a customer purchases both the diamond ring for $4,500 and the 22" pearl strand for $1,500 and receives the 45% discount on the pearl strand, what would be the total purchase price? How much did the customer save by purchasing the ring and necklace together?

9-3 Deer Valley Organics, LLC

With an original goal of selling fresh apples from the family orchard at a roadside stand, Deer Valley Organics has become a unique operation featuring a wide variety of locally grown organic produce and farm products that include their own fruit as well as products from the area's finest growers. A number of different products are available, including apples, straw-berries, and raspberries as either prepackaged or pick your own; assorted fresh vegetables; ciders, jams, and jellies; and organic fresh eggs and free-range chicken whole fryers. Prepackaged apples are still the mainstay of the business, and after adding all production and labor costs, Deer Valley determined that the cost of these apples was 84 cents per pound.



Round dollar amounts to the nearest cent and percents to the nearest tenth of a percent.

1. What would be the selling price per pound for the prepackaged apples using a 30% markup based on cost? A 40% markup? A 50% markup?
2. Based on the national average for apples sold on a retail basis, Deer Creek sets a target price of $1.49 per pound for the prepackaged apples. Using this selling price, compute the percent of markup **based on cost** for the prepackaged apples. Then, compute the percent of markup **based on selling price**.
3. Deer Valley allows customers to pick their own apples for $10.50 a bag, which works out to approximately 62 cents per pound. How is that possible given the cost data in the introductory paragraph? Would the orchard be losing money? Explain.
4. Deer Valley receives a delivery of 1,250 lb of tomatoes from a local supplier, for which they pay 58 cents per pound. Normally, 6% of the tomatoes will be discarded because of appearance or spoilage. Find the selling price needed per pound to obtain a 120% markup based on cost.