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CONTEMPORARY BUSINESS MATHEMATICS

for Colleges



Deitz / Southam



Markup

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Learning Objectives

By studying this chapter and completing all assignments, you will be able to:

Learning Objective

1

Compute the variables in the basic markup formula.

Learning Objective

2

Compute the markup variables when the markup percent is based on cost.

Learning Objective

3

Compute markup percent based on cost.

Learning Objective

4

Compute the markup variables when the markup percent is based on selling price.

Learning Objective

5

Compute markup percent based on selling price.

STEPS

to Compute the Selling Price Based on Cost

- 1. Multiply the cost by the markup percent to get the dollar markup.**
- 2. Add the dollar markup to the cost to get the selling price.**

EXAMPLE A

Using markup based on cost, what are the dollar markup and the selling price for merchandise that costs \$60 and has a 35% markup?

STEP 1

$$\text{Dollar markup} = \text{Markup percent} \times \text{Cost} = 0.35 \times \$60 = \$21$$

STEP 2

$$\text{Selling price} = \text{Cost} + \text{Dollar markup} = \$60 + \$21 = \$81$$

STEPS

to Compute the Selling Price Directly from the Cost

1. Add the markup percent to 100%.
2. Multiply this sum by the cost to get the selling price.

EXAMPLE B

What is the selling price of a large camping tent that has a cost of \$250 and a markup percent of 40% based on cost?

STEP 1 $100\% + \text{Markup percent} = 100\% + 40\% = 140\%$

STEP 2 $\text{Selling price} = (100\% + \text{Markup percent}) \times \text{Cost} = 1.40 \times \$250 = \$350$

STEPS

to Compute the Cost Directly from the Selling Price

1. Add the markup percent to 100%.
2. Divide the selling price by this sum to get the cost.

EXAMPLE C

The selling price of a hiking vest is \$65. The markup percent based on cost is 30%. Find the cost.

STEP 1 $100\% + \text{Markup percent} = 100\% + 30\% = 130\%$

STEP 2 $\text{Cost} = \text{Selling price} \div (100\% + \text{Markup percent}) = \$65 \div 1.30 = \$50$

You can always check your work in markup problems.

Cost is \$50, and markup percent is 30%.

$$\text{Dollar markup} = \text{Cost} \times \text{Markup percent} = \$50 \times 0.30 = \$15$$

$$\text{Selling Price} = \text{Cost} + \text{Dollar markup} = \$50 + \$15 = \$65$$

STEPS

to Compute the Markup Percent Based on Cost

1. Subtract the cost from the selling price to get the dollar markup.
2. Divide the dollar markup by the cost to get the markup percent.

EXAMPLE D

What is the markup percent based on cost when the selling price of an exercise machine is \$480 and the cost is \$320?

STEP 1

$$\text{Dollar markup} = \text{Selling price} - \text{Cost} = \$480 - \$320 = \$160$$

STEP 2

$$\text{Markup percent} = \text{Dollar markup} \div \text{Cost} = \$160 \div \$320 = 0.50, \text{ or } 50\%$$

EXAMPLE E

What is the markup percent based on cost when the dollar markup is already known to be \$30 and the cost is \$75? (Step 1 is not necessary.)

STEP 2

$$\text{Markup percent} = \text{Dollar markup} \div \text{Cost} = \$30 \div \$75 = 0.40, \text{ or } 40\%$$

STEPS

to Compute the Cost Based on Selling Price

- 1. Multiply the selling price by the markup percent to get the dollar markup.**
- 2. Subtract the dollar markup from the selling price to get the cost.**

EXAMPLE F

Rosa Buckles enters Mel's Appliance Store to buy a washing machine. She finds one with a selling price of \$400. She knows that she can buy it for \$375 at another store, but she prefers this store because of its reputation for good service. She tells the sales manager, "I would buy it for \$375." The manager, Mike Haynes, knows that the markup percent is 40% based on selling price. Based on \$400, what was Mike's cost for the washing machine?

STEP 1 Dollar markup = Markup percent \times Selling price = $0.40 \times \$400 = \160

STEP 2 Cost = Selling price $-$ Dollar markup = $\$400 - \$160 = \$240$

Mike can then decide whether he prefers a sale for which he gets a \$135 markup or no sale at all for which he was hoping to have a \$160 markup. Although it would be helpful if Mike knew how much markup he would need to pay for expenses, at least he would know the cost.

EXAMPLE G

Find the dollar markup and the cost of microwave oven that sells for \$140 and has a markup percent that is 35% based on selling price.

STEP 1 Dollar markup = Markup percent \times Selling price = $0.35 \times \$140 = \49

STEP 2 Cost = Selling price $-$ Dollar markup = $\$140 - \$49 = \$91$

STEPS

to Compute the Cost Directly from the Selling Price

1. Subtract the markup percent from 100%.
2. Multiply this difference by the selling price to get the cost.

EXAMPLE H

What is the cost of a clothes dryer that has a selling price of \$340 and a markup percent of 60% based on selling price?

STEP 1

$$100\% - \text{Markup percent} = 100\% - 60\% = 40\%$$

STEP 2

$$\text{Cost} = (100\% - \text{Markup percent}) \times \text{Selling price} = 0.40 \times \$340 = \$136$$

STEPS

to Compute the Selling Price Directly from the Cost

1. Subtract the markup percent from 100%.
2. Divide the cost by this difference to get the selling price.

EXAMPLE 1

The cost of a new mountain bike is \$210. The markup percent based on selling price is 40%. Find the selling price.

STEP 1 $100\% - \text{Markup percent} = 100\% - 40\% = 60\%$

STEP 2 $\text{Selling price} = \text{Cost} \div (100\% - \text{Markup percent}) = \$210 \div 0.60 = \$350$

You can always check your work in markup problems:

Selling price is \$350, and markup percent is 40% based on selling price.

$$\text{Dollar markup} = \text{Markup percent} \times \text{Selling price} = 0.40 \times \$350 = \$140$$

$$\text{Cost} = \text{Selling price} - \text{Dollar markup} = \$350 - \$140 = \$210$$

STEPS

to Compute the Markup Percent from the Selling Price

1. Subtract the cost from the selling price to get the dollar markup.
2. Divide the dollar markup by the selling price to get the markup percent.

EXAMPLE J

What is the markup percent based on selling price when the selling price is \$80 and the cost is \$50?

STEP 1

$$\text{Dollar markup} = \text{Selling price} - \text{Cost} = \$80 - \$50 = \$30$$

STEP 2

$$\text{Markup percent} = \text{Dollar markup} \div \text{Selling price} = \$30 \div \$80 = 0.375, \text{ or } 37.5\%$$

EXAMPLE K

What is the markup percent based on selling price when the dollar markup is already known to be \$150 and the selling price is \$375? (Step 1 is not necessary.)

STEP 2

$$\text{Markup percent} = \text{Dollar markup} \div \text{Selling price} = \$150 \div \$375 = 0.40, \text{ or } 40\%$$

cost of goods sold

dollar markup

markup

markup based on selling price

markup percent

markup percent based on cost

markup rate

Assignment 8.1: Markup Based on Cost

A Calculate the missing terms.

Cost	Dollar Markup	Selling Price	Cost	Dollar Markup	Selling Price
1. \$480.70	\$175.25	<u>\$655.95</u>	2. \$51.37	<u>\$23.58</u>	\$74.95
$\$480.70 + \$175.25 = \$655.95$			$\$74.95 - \$51.37 = \$23.58$		
3. <u>\$455.48</u>	\$374.50	\$829.98	4. \$273.40	\$93.55	<u>\$366.95</u>
$\$829.98 - \$374.50 = \$455.48$			$\$273.40 + \$93.55 = \$366.95$		
5. \$629.00	<u>\$280.99</u>	\$909.99	6. <u>\$383.99</u>	\$415.50	\$799.49
$\$909.99 - \$629.00 = \$280.99$			$\$799.49 - \$415.50 = \$383.99$		

Assignment 8.1: Markup Based on Cost

B In the following problems, the markup percent is based on *cost*. Find the missing terms.

Cost	Markup Percent	Dollar Markup	Selling Price	Cost	Markup Percent	100% + Markup Percent	Selling Price
7. \$850	40%	\$340	\$1,190	8. \$780	140%	240%	\$1,872
$0.40 \times \$850 = \340 $\$850 + \$340 = \$1,190$				$100\% + 140\% = 240\%$ $2.40 \times \$780 = \$1,872$			
9. \$1,500	70%	\$1,050	\$2,550	10. \$240	100%	200%	\$480
$0.70 \times \$1,500 = \$1,050$ $\$1,500 + \$1,050 = \$2,550$				$100\% + 100\% = 200\%$ $2.0 \times \$240 = \480			
11. \$640	75%	\$480	\$1,120	12. \$1,740	125%	225%	\$3,915
$0.75 \times \$640 = \480 $\$640 + \$480 = \$1,120$				$100\% + 125\% = 225\%$ $2.25 \times \$1,740 = \$3,915$			
13. \$2,500	90%	\$2,250	\$4,750	14. \$150	210%	310%	\$465
$0.9 \times \$2,500 = \$2,250$ $\$2,500 + \$2,250 = \$4,750$				$100\% + 210\% = 310\%$ $3.1 \times \$150 = \465			

Assignment 8.1: Markup Based on Cost

- C** In the following problems, the markup percent is based on *cost*. Find the missing terms. Round all percents to the nearest tenth of a percent.

	Selling Price	Markup Percent	100% + Markup Percent	Cost		Selling Price	Cost	Dollar Markup	Markup Percent
15.	\$1,240	60%	<u>160%</u>	<u>\$775</u>	16.	\$252	\$120	<u>\$132</u>	<u>110%</u>
	$100\% + 60\% = 160\%; \$1,240 \div 1.6 = \775					$\$252 - \$120 = \$132; \$132 \div \$120 = 1.1$			
17.	\$110	120%	<u>220%</u>	<u>\$50</u>	18.	\$1,683	\$1,100	<u>\$583</u>	<u>53%</u>
	$100\% + 120\% = 220\%; \$110 \div 2.2 = \50					$\$1,683 - \$1,100 = \$583; \$583 \div \$1,100 = 0.53$			
19.	\$594	35%	<u>135%</u>	<u>\$440</u>	20.	\$679	\$388	<u>\$291</u>	<u>75.0%</u>
	$100\% + 35\% = 135\%; \$594 \div 1.35 = \440					$\$679 - \$388 = \$291; \$291 \div \$388 = 0.75$			
21.	\$2,250	50%	<u>150%</u>	<u>\$1,500</u>	22.	\$600	\$240	<u>\$360</u>	<u>150%</u>
	$100\% + 50\% = 150\%; \$2,250 \div 1.5 = \$1,500$					$\$600 - \$240 = \$360; \$360 \div \$240 = 1.5$			

Assignment 8.1: Markup Based on Cost

D Business Applications. In the following problems, the markup percent is based on cost. Round all percents to the nearest tenth of a percent.

- 23.** Patty Wales owns a firm that sells office furniture to regional businesses. One set of six matched pieces costs Patty \$2,100. To cover her own business expenses and allow a reasonable profit, Patty marks up this set by 75% of the cost. Find the dollar markup and the selling price.

Dollar markup \$1,575 $0.75 \times \$2,100 = \$1,575$

Selling price \$3,675 $\$2,100 + \$1,575 = \$3,675$

- 24.** Lew Devlin manufactures a handheld heart monitoring device. He sells it for \$960, which represents a markup of 275% on his production cost. Lew marks it up this much to cover additional business expenses and profit as well as his product development. Find Lew's production cost and the dollar markup.

Cost \$256 $100\% + 275\% = 375\%$ $\$960 - \$256 = \$704$

Dollar markup \$704 $\$960 \div 3.75 = \256

- 25.** Digital Alarm Company sells burglar and fire alarm systems for homes and small businesses. One new system costs Digital \$720. Digital marks up the alarm system by \$396. Find the selling price, and find the markup percent based on cost.

Selling price \$1,116 $\$720 + \$396 = \$1,116$

Markup percent 55% $\$396 \div \$720 = 0.55, \text{ or } 55\%$

Assignment 8.1: Markup Based on Cost

D **Business Applications.** In the following problems, the markup percent is based on cost. Round all percents to the nearest tenth of a percent. (cont'd)

- 26.** After Buzz Landles drove his pickup truck in a desert race, the truck needed a new motor. A local mechanic charged Buzz \$3,600 for a rebuilt motor that had cost the mechanic \$2,250. All labor was additional. Compute the dollar markup and the markup percent based on the cost of the rebuilt motor.

Dollar markup \$1,350 $\$3,600 - \$2,250 = \$1,350$

Markup percent 60% $\$1,350 \div \$2,250 = 0.6, \text{ or } 60\%$

Assignment 8.2: Markup Based on Selling Price

A Calculate the missing terms.

Cost	Dollar Markup	Selling Price	Cost	Dollar Markup	Selling Price
1. \$67.34	\$82.15	<u>\$149.49</u>	2. \$274.47	<u>\$258.51</u>	\$532.98
$\$67.34 + \$82.15 = \$149.49$			$\$532.98 - \$274.47 = \$258.51$		
3. <u>\$1,819</u>	\$840	\$2,659	4. \$632.75	\$325.40	<u>\$958.15</u>
$\$2,659 - \$840 = \$1,819$			$\$632.75 + \$325.40 = \$958.15$		
5. \$62.50	<u>\$37.49</u>	\$99.99	6. <u>\$266.32</u>	\$483.27	\$749.59
$\$99.99 - \$62.50 = \$37.49$			$\$749.59 - \$483.27 = \$266.32$		

Assignment 8.2: Markup Based on Selling Price

B In the following problems, the markup percent is based on selling price. Find the missing terms.

Selling Price	Markup Percent	Dollar Markup	Cost	Selling Price	Markup Percent	100% – Markup Percent	Cost
7. \$120	55%	<u>\$66</u>	<u>\$54</u>	8. \$150	25%	<u>75%</u>	<u>\$112.50</u>
$0.55 \times \$120 = \66 $\$120 - \$66 = \$54$				$100\% - 25\% = 75\%$ $0.75 \times \$150 = \112.50			
9. \$360	40%	<u>\$144</u>	<u>\$216</u>	10. \$1,248	65%	<u>35%</u>	<u>\$436.80</u>
$0.40 \times \$360 = \144 $\$360 - \$144 = \$216$				$100\% - 65\% = 35\%$ $0.35 \times \$1,248 = \436.80			
11. \$1,998	50%	<u>\$999</u>	<u>\$999</u>	12. \$75	70%	<u>30%</u>	<u>\$22.50</u>
$0.50 \times \$1,998 = \999 $\$1,998 - \$999 = \$999$				$100\% - 70\% = 30\%$ $0.30 \times \$75 = \22.50			
13. \$824	60%	<u>\$494.40</u>	<u>\$329.60</u>	14. \$2,260	35%	<u>65%</u>	<u>\$1,469</u>
$0.60 \times \$824 = \494.40 $\$824 - \$494.40 = \$329.60$				$100\% - 35\% = 65\%$ $0.65 \times \$2,260 = \$1,469$			

Assignment 8.2: Markup Based on Selling Price

C In the following problems, the markup percent is based on selling price. Find the missing terms.

Cost	Markup Percent	100% – Markup Percent	Selling Price	Selling Price	Cost	Dollar Markup	Markup Percent
15. \$855	40%	<u>60%</u>	<u>\$1,425</u>	16. \$1,040	\$676	<u>\$364</u>	<u>35%</u>
$100\% - 40\% = 60\%; \$855 \div 0.60 = \$1,425$				$\$1,040 - \$676 = \$364; \$364 \div \$1,040 = 0.35$			
17. \$143	45%	<u>55%</u>	<u>\$260</u>	18. \$156	\$39	<u>\$117</u>	<u>75%</u>
$100\% - 45\% = 55\%; \$143 \div 0.55 = \260				$\$156 - \$39 = \$117; \$117 \div \$156 = 0.75$			
19. \$2,520	30%	<u>70%</u>	<u>\$3,600</u>	20. \$1,400	\$924	<u>\$476</u>	<u>34%</u>
$100\% - 30\% = 70\%; \$2,520 \div 0.70 = \$3,600$				$\$1,400 - \$924 = \$476; \$476 \div \$1,400 = 0.34$			
21. \$533	35%	<u>65%</u>	<u>\$820</u>	22. \$640	\$256	<u>\$384</u>	<u>60%</u>
$100\% - 35\% = 65\%; \$533 \div 0.65 = \820				$\$640 - \$256 = \$384; \$384 \div \$640 = 0.60$			

Assignment 8.2: Markup Based on Selling Price

D Business Applications. In the following problems, the markup percent is based on selling price. Round all percents to the nearest tenth of a percent.

- 23.** At the start of spring, Portola Hardware features garden equipment specials. One rototiller has a selling price of \$348. The markup to cover expenses and profit is 50% based on the selling price. Calculate the dollar markup and the cost.

Dollar markup \$174 $0.50 \times \$348 = \174

Cost \$174 $\$348 - \$174 = \$174$

- 24.** Lakefront Cycling is a retail bicycle store. For last year's summer racing season, Lakefront purchased one new model of racing bike to use in a special promotion. The bicycles cost \$366 each. For the promotion, Lakefront's markup was 40% of the selling price. Find the selling price and the dollar markup.

Selling price \$610 $100\% - 40\% = 60\%$

Dollar markup \$244 $\$366 \div 0.60 = \$610; \$610 - \$366 = \$244$

- 25.** Blenz TV & Stereo sells telephones, along with televisions and stereos. A two-line cordless telephone set with a speaker phone base, four extra remote handsets, and an answering machine is priced at \$182.40. This price includes a markup of \$109.44. If this set actually sells for \$182.40, what are the cost and the markup percent based on selling price?

Cost \$72.96 $\$182.40 - \$109.44 = \$72.96$

Markup percent 60% $\$109.44 \div \$182.40 = 0.60, \text{ or } 60\%$

Assignment 8.2: Markup Based on Selling Price

D Business Applications. In the following problems, the markup percent is based on selling price. Round all percents to the nearest tenth of a percent. (cont'd)

26. Patio World, a volume discount store, purchased a large quantity of cedar picnic chairs for \$66 each. Seating pads were included in the price. To sell the chairs and pads quickly, the store priced the chairs at \$110 each. Compute the dollar markup and the markup percent based on selling price.

Dollar markup \$44 $\$110 - \$66 = \$44$

Markup percent 40% $\$44 \div \$110 = 0.40$, or 40%