

# Chapter Review Problems

For all answers that are percents, express the answer to the nearest tenth of a percent.

## Unit 6.1 Markup

For Problems 1–4, find the missing amount.

	Cost	Markup(\$)	Selling price
1.	\$2450	\$800	<b>\$3,250</b>
2.	\$1.57	\$0.50	<b>\$2.07</b>
3.	\$100	<b>\$70</b>	\$170
4.	<b>\$300</b>	\$200	\$500

- You, as the owner of a shoe store, discount the price of a certain pair of shoes to \$72. If your cost is \$72, what is the dollar amount of markup? **\$0. Selling price is the same as cost.**
- Markup can be used only for products, not for pricing services. (T or F) **False**
- Ben Bower owns a computer store. Ben pays \$700 for a computer and uses a 20% markup on cost. At what price should Ben resell the computer?

$$\begin{aligned}
 S &= C + M \\
 S &= \$700 + 20\%(\$700) \\
 S &= \$700 + \$140 \\
 S &= \mathbf{\$840}
 \end{aligned}$$

- Ben has the chance to buy a used computer that he thinks he can resell for \$360. If Ben needs a 20% markup on cost, what price should Ben pay?

$$\begin{aligned}
 S &= C + M \\
 \$360 &= 100\%C + 20\%C \\
 \$360 &= 120\%C \\
 \$360 &= 1.20C \\
 \frac{\$360}{1.20} &= \frac{1.20}{1.20}C \\
 \mathbf{\$300} &= C
 \end{aligned}$$

- Grace Frandsen owns an appliance store. Grace has the chance to buy a used refrigerator that she thinks she can resell for \$250. If Grace needs a 30% markup on selling price, what price can she pay?

$$\begin{aligned}
 S &= C + M \\
 \$250 &= C + 30\%(\$250) \\
 \$250 &= C + \$75 \\
 \mathbf{\$175} &= C
 \end{aligned}$$

- Grace buys a new microwave for \$168. If she needs a 30% markup on selling price, at what price should she resell the microwave?

$$\begin{aligned}
 S &= C + M \\
 100\%S &= \$168 + 30\%(S) \\
 70\%S &= \$168 \\
 .70S &= \$168 \\
 \frac{.70S}{.70} &= \frac{\$168}{.70} \\
 S &= \mathbf{\$240}
 \end{aligned}$$

- A property management company furnishes skilled help to maintain apartment complexes. If it pays employees \$10.50 per hour and wishes to maintain a 20% markup based on the employees' hourly pay, what hourly rate should it bill property owners?

$$\begin{aligned}
 S &= C + M \\
 S &= \$10.50 + 20\%(\$10.50) \\
 S &= \$10.50 + \$2.10 \\
 S &= \mathbf{\$12.60}
 \end{aligned}$$

12. Refer to Problem 11. If the property owners expect to be charged \$12 per hour, what hourly rate must the property management company pay its employees in order to maintain a 20% markup, based on the employees' hourly pay?

$$\begin{aligned}
 S &= C + M \\
 \$12 &= 100\%C + 20\%C \\
 \$12 &= 120\%C \\
 \$12 &= 1.20C \\
 \frac{\$12}{1.20} &= \frac{1.20}{1.20}C \\
 \$10 &= C
 \end{aligned}$$

### Unit 6.2 Percent markup

13. A clothing retailer paid \$48 for a jacket. The retailer later sold the jacket for \$72. Find: (a) dollar amount of markup, (b) percent markup on cost, and (c) percent markup on selling price.

- a.  $M = S - C = \$72 - \$48 = \$24$
- b. Percent markup on cost =  $\frac{M}{C} = \frac{\$24}{\$48} = .50 = 50\%$
- c. Percent markup on selling price =  $\frac{M}{S} = \frac{\$24}{\$72} \approx .333 \approx 33.3\%$

For Problems 14–17, find the missing amount.

	Percent markup on cost	Percent markup on selling price
14.	40%	$\frac{40\%}{100\% + 40\%} = \frac{40\%}{140\%} = \frac{40}{140} \approx .286 \approx 28.6\%$
15.	25%	$\frac{25\%}{100\% + 25\%} = \frac{25\%}{125\%} = \frac{25}{125} = .20 = 20\%$
16.	$\frac{30\%}{100\% - 30\%} = \frac{30\%}{70\%} = \frac{30}{70} \approx .429 \approx 42.9\%$	30%
17.	$\frac{25\%}{100\% - 25\%} = \frac{25\%}{75\%} = \frac{25}{75} \approx .333 \approx 33.3\%$	25%

For Problems 18–21, answer questions about Jacob Marchant's business. Jacob builds birdhouses. His markup is 60% on cost.

18. What is the dollar amount of markup on a birdhouse that costs \$40?

$$\text{Markup} = 60\%(\$40) = .60(\$40) = \$24$$

19. What should the selling price be?

$$S = C + M = \$40 + \$24 = \$64$$

20. What is the equivalent percent markup on selling price?

$$\frac{60\%}{100\% + 60\%} = \frac{60\%}{160\%} = \frac{60}{160} = .375 = 37.5\%$$

21. Using the preceding numbers, show that a 37.5% markup on selling price is identical to a 60% markup on cost.

$$\text{Markup} = 37.5\%(\$64) = .375(\$64) = \$24 \quad (\text{This is the same dollar amount of markup found in Problem 18})$$

### Unit 6.3 Markdown

22. Merchandising companies often have markdowns on products that are in high demand. (T or F) **False**

23. If a retailer sells a \$250 TV at \$50 off, what is the reduced price?  $\$250 - \$50 = \$200$

For Problems 24–26, answer questions about the price of a refrigerator.

24. Dependable Appliance Company advertises a refrigerator at a 15% discount, based on an original marked price of \$900. What is the reduced price?

Original marked price	\$900
Dollar markdown: $\$900 \times 15\%$	<u>-135</u>
Reduced price	<b>\$765</b>

25. True Appliance Company advertises the same refrigerator at a 10% discount, based on an original marked price of \$870. What is the reduced price?

Original marked price	\$870
Dollar markdown: $\$870 \times 10\%$	<u>- 87</u>
Reduced price	<b>\$783</b>

26. Which company has the lowest reduced price? **Dependable Appliance Company (\$765)**
27. A ski shop priced a snowboard at \$500. New models were coming in, so the store reduced the price 25%. Eight weeks later, as the ski season was coming to a close, the store reduced the price an additional 20%. Calculate the reduced price, after the second markdown.

Original marked price	\$500
Markdown 1: $\$500 \times 25\%$	<u>- 125</u>
Reduced price, after markdown 1	\$375
Markdown 2: $\$375 \times 20\%$	<u>- 75</u>
Reduced price, after markdown 2	<b>\$300</b>

28. A hot tub, originally priced at \$9,500 is marked down to \$8,250. What is the percent markdown?

**Step 1 Find dollar markdown:**  $\$9,500 - \$8,250 = \$1,250$

**Step 2 Find percent markdown:**  $\frac{\$1,250}{\$9,500} \approx .132 \approx 13.2\%$

For Problems 29–32, answer questions about pricing pineapples.

29. A grocer bought 200 pineapples at \$0.60 each. Experience has shown that, as a result of aging, 15% of the pineapples will be sold at cost and 20% will be discarded. Find the original marked price per pineapple that will result in a 25% markup on cost.

**Step 1 Determine desired sales proceeds from entire stock**

$$S = C + M$$

$$S = \$120 + 25\%(\$120) \quad (C = 200 \times \$0.60 = \$120)$$

$$S = \$120 + \$30$$

$$S = \$150$$

**Step 2 Deduct proceeds from products sold at a discount**

Desired sales proceeds (from Step 1)	\$150
Less proceeds from those sold at cost: 30 pineapples ( $200 \times 15\% = 30$ ) $\times \$0.60$	<u>- 18</u>
Proceeds required from top-quality pineapples	<b>\$132</b>

**Step 3 Find original marked price**

200 total pineapples - 30 sold at cost - 40 discarded ( $200 \times 20\% = 40$ ) = 130 pineapples  
 130 pineapples will sell at original marked price, so:  $\$132 \div 130 \approx \$1.015 \approx \mathbf{\$1.02 \text{ each}}$  (Always round up.)

30. Prove that the total proceeds are equal to (or slightly more than) the desired proceeds.

130 pineapples at full price: $130 \times \$1.02$	\$132.60	
30 pineapples at cost: $30 \times \$0.60$	18.00	
<u>+40 pineapples discarded</u>	<u>+ 0.00</u>	Total sales proceeds are slightly more than the
200	<b>\$150.60</b>	desired \$150 because we rounded up the original
		marked price to \$1.02.

31. Find the price/cost ratio.

$$\text{Price/cost ratio} = \frac{\text{Price}}{\text{Cost}} = \frac{\$1.02}{\$0.60} = 1.70$$

32. Assuming the next bunch of pineapples costs \$0.70 each, use the price/cost ratio to find the original marked price.

$$\$0.70 \times 1.70 = \mathbf{\$1.19 \text{ each}}$$

## Challenge problems

For Problems 33–39, fill in the blanks.

	Cost	Markup			Selling price
		% of cost	Dollar amount	% of selling price	
33.	\$1,300	40%	\$520	—	\$1,820
34.	\$180	97.2%	\$175	49.3%	\$355
35.	\$2,550	—	\$850	25%	\$3,400
36.	\$28.50	—	—	30%	\$40.71
37.	\$3,913.04	15%	\$586.96	13.0%	\$4,500
38.	—	20%	—	16.7%	—
39.	—	150%	—	60%	—

For Problems 40–47, answer questions about a winter coat.

40. A retailer purchased a winter coat for \$95. If the coat is priced at \$165, what is the dollar amount of markup?

$$\$165 - \$95 = \$70$$

41. What is the percent markup on cost?  $\frac{\$70}{\$95} \approx .737 \approx 73.7\%$
42. What is the percent markup on selling price?  $\frac{\$70}{\$165} \approx .424 \approx 42.4\%$
43. Because the winter season was coming to a close, the price was reduced 20%. After 3 weeks, the price was reduced an additional 15%. After the price was reduced an additional 10%, the coat sold. What is the reduced price after the third markdown?

Original marked price	\$165.00
Markdown 1: $\$165 \times 20\%$	<u>- 33.00</u>
Reduced price, after markdown 1	\$132.00
Markdown 2: $\$132 \times 15\%$	<u>- 19.80</u>
Reduced price, after markdown 2	\$112.20
Markdown 3: $\$112.20 \times 10\%$	<u>- 11.22</u>
Reduced price, after markdown 3	<b>\$100.98</b>


44. What is the net markup in dollars?  $\$100.98$  reduced price -  $\$95.00$  cost = **\$5.98**
45. Based on the reduced price, what is the percent markup on cost?  $\frac{\$5.98}{\$95} \approx .063 \approx 6.3\%$
46. What is the total dollar amount of markdown?  $\$165$  original marked price -  $\$100.98$  reduced price = **\$64.02**
47. What is the markdown as a percent of the original marked price?  $\frac{\$64.02}{\$165} = .388 = 38.8\%$
48. A certain bank pays interest on savings accounts of 2.45% interest. They use this same money to make car loans at 7.9%. What is the percent markup on cost?

$$M = S - C = 7.90 - 2.45 = 5.45 \quad \text{Percent markup on cost} = \frac{5.45}{2.45} \approx 2.224 \approx 222.4\%$$

49. Write a short answer to the “Ask Marilyn” question.

## ASK MARILYN

**BY MARILYN VOS SAVANT**



A wholesaler sells a dress for \$20. The store marks it up to \$40—a markup of 100%. But the dress doesn't sell by

by the end of the holiday season, and the store discounts it to 50% off. The price is now back to \$20. How can a 100% markup and a 50% reduction result in the same figure?

—Judy and Greg Winski,  
Lakeland, Fla

The 100% markup is based on the \$20 cost. The 50% markdown is based on the \$40 retail price.

Cost	\$20.00
Markup: $\$20 \times 100\%$	<u>+20.00</u>
Original marked price	\$40.00
Markdown: $\$40.00 \times 50\%$	<u>-20.00</u>
Reduced price	<b>\$20.00</b>

# Practice Test

1. Tai Chow has an art gallery. He pays \$525 for a painting and uses a 60% markup on cost. At what price should Tai resell the painting?

$$\begin{aligned}
 S &= C + M \\
 S &= \$525 + 60\%(\$525) \\
 S &= \$525 + \$315 \\
 S &= \mathbf{\$840}
 \end{aligned}$$

2. An automotive repair shop employs automotive technicians to work on customers' cars. The prevailing billing rate for other repair shops is \$45 per hour. If the repair shop decides to charge customers the prevailing rate, what hourly rate can the technicians be paid in order to maintain a 125% markup on employees' pay?

$$\begin{aligned}
 S &= C + M \\
 \$45 &= 100\%C + 125\%C \\
 \$45 &= 225\%C \\
 \$45 &= 2.25C \\
 \frac{\$45}{2.25} &= \frac{\cancel{2.25}C}{\cancel{2.25}} \\
 \mathbf{\$20} &= C
 \end{aligned}$$

3. Kermit Shaw owns an appliance store. He has the chance to buy a used refrigerator that he thinks he can resell for \$200. If Kermit needs a 40% markup on selling price, what price can he pay?

$$\begin{aligned}
 S &= C + M \\
 \$200 &= C + 40\%(\$200) \\
 \$200 &= C + \$80 \\
 \mathbf{\$120} &= C
 \end{aligned}$$

4. Delma Swint owns a shoe store. Delma paid \$55 for a pair of shoes and later sold the shoes for \$77. What is the percent markup on cost?

$$M = S - C = \$77 - \$55 = \$22 \quad \text{Percent markup on cost} = \frac{\$22}{\$55} = .40 = \mathbf{40\%}$$

5. A computer retailer uses a 40% markup on cost. What is the equivalent percent markup on selling price (to the nearest tenth of a percent)?

$$\frac{40\%}{100\% + 40\%} = \frac{40\%}{140\%} = \frac{.40}{1.40} \approx .286 \approx \mathbf{28.6\%}$$

6. Brad Hayes, a snowmobile retailer, priced a snowmobile at \$5,500. New models were coming in, so Brad reduced the price 10%. Eight weeks later, as the winter season was coming to a close, he reduced the price an additional 10%. Calculate the reduced price, after the second markdown.

Original marked price	\$5,500
Markdown 1: \$5,500 × 10%	<u>- 550</u>
Reduced price, after markdown 1	\$4,950
Markdown 2: \$4,950 × 10%	<u>- 495</u>
Reduced price, after markdown 2	<b>\$4,455</b>

7. A desk, originally priced at \$1,200, is marked down to \$780. What is the percent markdown?

**Step 1 Find dollar markdown:**  $\$1,200 - \$780 = \$420$

**Step 2 Find percent markdown:**  $\frac{\$420}{\$1,200} = .35 = \mathbf{35\%}$

8. A grocer bought 300 pounds of bananas at 32¢ per pound. Experience indicates that, as a result of aging, 25% of the bananas are sold at 75% of cost and another 15% are discarded. Find the original marked price that will produce a 25% markup on cost.

**Step 1 Determine desired sales proceeds from entire stock**

$$\begin{aligned}
 S &= C + M \\
 S &= \$96 + 25\%(\$96) && (C = 300 \text{ lb} \times \$0.32 = \$96) \\
 S &= \$96 + \$24 \\
 S &= \$120
 \end{aligned}$$

**Step 2 Deduct proceeds from products sold at a discount**

Desired sales proceeds (from Step 1)	\$120
Less proceeds from those sold at 75% of cost:	
75 lb (300 lb × 25% = 75) × \$0.24 (\$0.32 cost × 75% = \$0.24)	- 18
Proceeds required from top-quality bananas	\$102

**Step 3 Find original marked price**

300 lb - 75 lb sold at discount - 45 lb discarded (300 lb × 15% = 45) = 180 lb  
 180 lb will sell at original marked price, so:  $\$102 \div 180 \approx \$0.567 \approx \mathbf{\$0.57 \text{ per pound}}$  (Always round up.)

**Check answer**

180 lb at full price: 180 × \$0.57	\$102.60
75 lb at 75% of cost: 75 × \$0.24	18.00
<u>+ 45 lb discarded</u>	<u>+ 0.00</u>
300	\$120.60

↑  
 Total sales proceeds are slightly more than the desired \$120 because we rounded *up* the original marked price to \$0.57.

9. If selling price is \$157.50 and cost is \$90, what is the price/cost ratio?  $\text{Price/Cost ratio} = \frac{\text{Price}}{\text{Cost}} = \frac{\$157.50}{\$90} = 1.75$