Lesson 6-5
Discount and Markup

Interactive Study Guide
See pages 137–138 for:
- Getting Started
- Real-World Link
- Notes

Essential Question
How can you use proportional relationships to solve real-world percent problems?

Common Core State Standards
Content Standards
7.RP.3, 7.EE.2, 7.EE.3
Mathematical Practices
1, 3, 4

Vocabulary
markup
selling price
discount

What You'll Learn
- Solve real-world problems involving markup.
- Solve real-world problems involving discount.

Real-World Link
School Supplies Some states have sales tax holidays. Depending on where you live, clothes, computers, and school supplies may be tax free for two to seven days during the summer. This "holiday" and the back-to-school sales make it a perfect time to shop!

Using Markup

A store sells items for more than it pays for those items. The amount of increase is called the **markup**. The percent of markup is a percent of increase. The **selling price** is the amount the customer pays for an item.

Example 1

Find the selling price if a store pays $42 for a pair of in-line skates and the markup is 25%.

Method 1 **Find the amount of the markup first.**

The whole is $42. The percent is 25. You need to find the amount of the markup, or the part. Let m represent the amount of the markup.

$m = 0.25 \cdot 42$ part = percent · whole

$m = 10.5$ Multiply.

Then add the markup to the cost. So, $42 + $10.50 = $52.50.

75(1.4) = 105 (MARKUP)

COST OF BIKE

Method 2 **Find the total percent first.**

Use the percent equation to find 100% + 25% or 125% of the price. Let p represent the price.

$p = 1.25(42)$ part = percent · whole

$p = 52.50$ Multiply.

Using either method, the selling price is $52.50.

$\frac{75}{100} = 0.75$ 0.75 is 1% of 75

0.75(40) = 30

75 + 30 = $105

Got It? Do this problem to find out.

1. Find the selling price if a store pays $75 for a bike and the markup is 40%.

75(0.4) = 30 75 + 30 = 105

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Using Discount

A **discount** is the amount by which the regular price is reduced. The percent of discount is a percent of decrease.

Example 2

Summer Sports is having a sale. A volleyball has an original price of $59. It is on sale for 65% off the original price. Find the sale price of the volleyball.

Method 1 **Find the amount of the discount.**

The percent is 65 and the whole is 59. Let d represent the amount of the discount.

$d = 0.65 \cdot 59$ part = percent · whole

$d = 38.35$ Multiply.

Subtract the discount from the original cost to find the sale price.
So, $59 − $38.35 = $20.65.

Watch Out!
Remember to convert the percent to a decimal when finding a discount or a markup.

Method 2 **Find the total percent first.**

If the amount of the discount is 65%, the percent the customer will pay is 100% − 65% or 35%. Find 35% of $59.

Let s represent the sale price.

$s = 0.35(59)$ part = percent · whole

$s = 20.65$ Multiply.

Using either method, the sale price of the volleyball is $20.65.

YOU SAVE 100% − 67% = 33% YOU PAY

35(0.33) = $11.55 SALE PRICE

35(0.67) = 23.45 YOU SAVE

35 − 23.46 = $11.55 YOU PAY

Got It? Do this problem to find out.

2. A magazine subscription has a cover price of $35. It is on sale for 67% off the original price. Find the sale price of the magazine subscription.

Example 3

Financial Literacy **Henrik had a 25% discount on hockey equipment. The selling price was $172.50. What was the original price?**

If the amount of the discount is 25%, the selling price was 100% − 25% or 75%. 75% of the original price is $172.50.

Let r represent the original price.

$\frac{172.5}{r} = \frac{75}{100}$ Write the percent proportion.

$172.5 \cdot 100 = 75r$ Find the cross products.

$17{,}250 = 75r$ Multiply.

$230 = r$ Divide each side by 75.

$\frac{225}{0.25} = \$900$

The original price was $230.

Got It? Do this problem to find out.

3. Luisa got a 75% discount on a sofa. She paid a total of $225. What was the original price?

25% OF THE ORIGINAL PRICE

225(4) = $900

Example 4

Cody is buying a ring that had an original price of $295 but is advertised at 30% off. Sales tax of 8.25% is applied to the discounted price. How much will Cody pay for the ring?

Discount and Markup
Remember that for markup, you can use $x + 0.0825x$ or $1.0825x$. For discount, you can use $x - 0.3x$ or $0.7x$.

Step 1 Find the discounted price.

If the amount of the discount is 30%, the discounted price is 100% − 30% or 70%. Find 70% of $295.

Let d represent the discounted price.

$d = 0.7(295)$ part = percent • whole

$d = 206.5$ Multiply.

The discounted price is $206.50.

Step 2 Add the sales tax.

Use the percent equation to find 100% + 8.25%, or 108.25% of the discounted price.

Let s represent the selling price, or the amount Cody paid.

$s = 1.0825(206.5)$ part = percent • whole

$s = 223.53625$ Multiply.

Rounded to the nearest cent, Cody paid $223.54

Got It? Do this problem to find out.

4. A CD with an original price of $11.95 is discounted 20%. Sales tax of 5.5% is added to the discounted price. How much does it cost to purchase the CD?

11.95(0.8) = 9.56 DISCOUNT - YOU SAVE; YOU PAY

9.56(1.055) = 10.0858 100% SALE PRICE; 5.5% TAX

$10.09

5.5% =

Guided Practice

Find the selling price for each item given the cost and the percent of markup. (Example 1)

1. shoes: $30; 25% markup
2. CD player: $45; 31% markup
3. jeans: $22; 20% markup
4. guitar: $100; 34% markup
5. swim suit: $36: 28% markup
6. flash drive: $12: 35% markup

7. Find the sale price of a bike that is regularly $110 and is on sale for 45% off the original price. (Example 2)

8. An art supply store has a sale advertising 40% off all canvases. Shelly buys four large canvases and pays a total of $141.60. How much would she have paid without the discount? (Example 3)

9. Danisha picks up a takeout meal at a local restaurant that is discounted 25%. The price is $24.60 without the discount, and sales tax of 4.5% is added. How much does Danisha pay? (Example 4)

Independent Practice

Go online for Step-by-Step Solutions eHelp

Find the selling price for each item given the cost and the percent of markup. (Example 1)

10. video game: \$60; 28% markup

11 bracelet: \$26.50; 35% markup

12. jacket: \$25; 32% markup

13. stereo: \$55; 40% markup

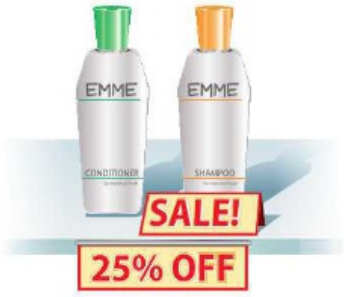
14. wallet: \$14.50; 30% markup

15. phone: \$34; 36% markup

16. television: \$499; 20% markup

17. mountain bike: \$255; 34% markup

18. A salon is having a sale on their hair products. Find the sale price of the shampoo and conditioner set shown below that regularly costs \$30. (Example 2)



19. The unlimited rental plan at a video store costs \$30 a month. It is on sale for 35% off the original price. What is the sale price of the plan? (Example 2)

Find the selling price for each item given the cost and the percent of the markup or discount. (Examples 1- 2)

20. shirt: \$7; 50% discount

21. jeans: \$32; 40% markup

22. sweater: \$35; 28% discount

23. DVD: \$15; 33% markup

24. coat \$43; 40% discount

25. boots \$60; 25% discount

26. Wayne buys an HD television set for \$466 that was marked down $33\frac{1}{3}$% from the list price. What is the list price of the television set? (Example 3)

27. **Financial Literacy** Geoff marked down the prices of several items by 20%. Find the original price of each item and copy and complete the table. Round to the nearest cent. (Example 3)

Marked-down Price	\$2.99	\$4.99	\$6.99	\$8.99	\$10.99
Original Price				\$11.24	

$\frac{8.99}{x} = \frac{80}{100}$

$899 = 80x$

$11.2375 = x$

MARK DOWN (SAVE) = 20%

PAY = 80%

28. A hat originally priced at \$28 is on sale for \$15% off. What is the total cost of the hat if the tax is 6.75%? (Example 4)

29. **Financial Literacy** A store has ergonomic chairs on sale for 10% off of the regular price. Cayley finds a chair she wants to buy that has an original price of \$325. How much will Cayley pay for the chair if she pays 8.5% tax? (Example 4)

State whether the percent of change is a *markup* or a *discount*. Then find the percent to the nearest tenth.

30. from \$159 to \$153

31. from \$227 to \$285

32. from \$140.75 to \$379.99

33. from \$84.65 to \$41.95

34. from \$28 to \$26

35. from \$41.50 to \$45

36. A bike shop marks up a hybrid bike from $200 to $330 and discounts a road bike from $330 down to $200.

a. By what percent is the hybrid bike marked up?

b. By what percent is the road bike discounted?

c. Are the percents equal?

37 **Financial Literacy** Two electronics stores sell a game system that has a regular price of $299. Lassen Toys discounts the game system by $75 and then adds 7.5% sales tax. Pineapple Systems adds the tax first and then takes the discount. Are the selling prices the same? Justify your answer.

38. **Justify Conclusions** Two electronics stores sell a game system that has a regular price of $195. Calby Electronics discounts the game system by 35% and then adds 6.75% sales tax. Game Zinger adds the tax first and then takes the discount. Are the selling prices the same? Justify your answer.

39. A store buys shirts from a distributor for $10 each and marks them up 50%. After a few weeks, they discount the shirts by 50%. Is the discounted price $10? Explain your reasoning.

H.O.T. Problems Higher Order Thinking

40. **Persevere with Problems** An item at a consignment shop is marked down 10% each week until it sells. A dress originally priced at $150 sells during the seventh week. How much did the dress sell for? What percent discount does this represent from the original price?

41. **Model with Mathematics** Describe a real-world situation and a discount price where an item was marked down 95%. Then find the regular price.

42. **Find the Error** Quinn used a credit card that discounts her purchases by 3%. The discounted price she paid for a skirt was $76.24. Quinn is finding the regular price of the skirt. Find her error and correct it.

$r = 1.03(76.24)$
$r = 78.5272$
The regular price was $78.53

43. **Use a Counterexample** Determine whether each statement is *true* or *false*. If false, provide a counterexample.

a. It is impossible to increase the cost of an item by more than 100%.

b. It is possible to decrease the cost of an item by less than 1%.

44. **Persevere with Problems** Suppose a store has an item on sale for 25% off the original amount. By what percent does the store have to increase the price of the item in order to sell it for the original amount? Explain.

45. **Building on the Essential Question** Write and solve a real-world problem involving a discount of an item.

Standardized Test Practice

46. Mrs. Olsen wants to buy a DVD player that regularly costs $120 and is on sale for 30% off the original price. What is the sale price of the DVD player?

A $210 **C** $84
B $90 **D** $36

47. A store held a going-out-of-business sale where everything was 70% off. Jackson spent a total of $115.74. What would he have spent on the same items if there had been no sale?

F $385.80 **H** $165.34
G $196.76 **J** $150.46

48. A home is on the market for $315,000. After 90 days, the seller reduces the price by 8%. What is the new price of the home?

A $252,000
B $258,300
C $283,500
D $289,800

49. Short Response A $350 camera is marked down 50% for a 2-day sale. At the end of the sale, the price is marked up from the sales price. What percent markup is needed so that the price of the camera is $350 again?

Common Core Review

Write each rational number as a fraction. 7.EE.3

50. -12
51. 4.7
52. $3\frac{2}{3}$
53. $-9\frac{1}{4}$
54. 0.17
55. -1.03

56. Every 1000 feet above Earth's surface, air temperature decreases 5°F. How much would the temperature change from sea level to the hightest point on each mountain? 7.NS.3

Mountain	Highest Point (ft)
Mt. McKinley	20,320
Mt. St. Elias	18,008
Mt. Foraker	17,400

Find each difference. 7.NS.1d

57. $2 - (-7)$
58. $11 - 111$
59. $-15 - (-20)$
60. $-3 - 19$
61. $-17 - 5$
62. $48 - (-47)$

Determine how the next term in each sequence can be found. Then find the next two terms in the sequence. 5.OA.3

63. 16, 18, 20, 22, ...
64. 66, 57, 48, 39, ...
65. 1024, 256, 64, 16, ...
66. 1.6, 4, 10, 25, ...

Simplify each expression. 6.EE.1

67. $(-3)^4$
68. $(-2)^3$
69. -5^2
70. 0^{20}