

Percent Applications

We Mean Business

ACTIVITY

1.6

SUGGESTED LEARNING STRATEGIES: Marking the Text, Summarize/Paraphrase/Retell, Identify a Subtask, Vocabulary Organizer, Quickwrite

My Notes

Eric and Marie are friends who have decided to start a summer business. In past summers they would often visit a nearby park where people play sports, have picnics, and swim. Every time Eric and Marie were there, they noticed that people became really thirsty but had nowhere to purchase drinks. So they have decided to sell cold bottled water at the park on weekends during the month of July. To do this, however, they have many decisions to make.

Eric and Marie decide that their goal is to sell at least one case of 24 bottles of water per day, for the four weekends in July.

1. If they buy two extra cases just in case they sell more than their goal, how many total cases of bottled water will they buy?

To get started, Eric and Marie need money to buy their supplies. Eric already has a large cooler, but they must purchase the cases of water as well as the ice to keep them cold. Marie's parents offer to loan them money for supplies, but say they must pay back the money with 2% interest at the end of the month.

They use information from a grocery store sales flyer to determine how much money they will need to borrow.

2. Explain what **discount** means, and how you can find the amount of a discount.
3. Help Eric and Mary calculate their cost for water and ice.
 - a. Use the discounts to find the sale price of one case of water and one bag of ice. Show how you can estimate to check the reasonableness of your answers.

CONNECT LANGUAGE ARTS

People who start their own businesses are called *entrepreneurs*.



<u>Case of 24 Bottles Spring Water</u> Originally \$7.99 Discount: 15% off	<u>Ten Pound Bag of Ice</u> Originally \$1.99 Now 20% off
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My Notes

MATH TERMS

A **sale price** is the reduced price of an item. **Sales tax** is a percentage of the cost of an item that is added by local or state governments.

SUGGESTED LEARNING STRATEGIES: Identify a Subtask, Think/Pair/Share, Marking the Text, Vocabulary Organizer, Quickwrite

b. What is the **sale price** for the total number of cases they plan to buy plus an equal number of bags of ice? Show your work.

c. Add a 4.9% **sales tax** to find the total cost.

4. At the end of July, they must repay Marie's parents the money they borrow plus an additional 2% in interest. How much money will they owe them?

Now Eric and Marie must decide how much they will charge for each bottle of water.

5. To determine this, first divide the amount they paid Marie's parents by the number of water bottles they have purchased. This will give their total cost per bottle.

6. If they sell each bottle for this amount of money, they will only break even. Since this is a business, their purpose is to make a **profit**. What does this mean?

7. Develop a formula that they can use for calculating profit.

8. To make a profit, they decide to **mark up** the cost of each bottle so that the selling price is \$1.05.

a. How much of a **markup** is this from the price they found in Question 5? Explain what a markup is.

b. What percent of the original cost from Question 5 is this? In other words, what is the **percent of increase**?

SUGGESTED LEARNING STRATEGIES: Quickwrite, Self Revision/Peer Revision, Discussion Group, Look for a Pattern, Marking the Text, Vocabulary Organizer, Think/Pair/Share

My Notes

c. Explain your answer in Part b.

9. How are markup and percent of increase related?
10. How are finding markups and discounts similar and different?
11. Think about Eric and Marie's profit.
- a. How much money will they make as profit for each bottle using the sale price?
 - b. What **percent of profit** is this? In other words, what percent of the sale price is this amount?

Just before Eric and Marie start selling the bottled water, they learn that the park put in a vending machine that sells bottled water for \$1.00. So they decide to lower their price to \$0.95.

12. By how much money are they **discounting** their original selling price of the bottled water?
13. What is the **percent of decrease** of their discount from the original sale price of \$1.05?
14. What is the new percent of increase from their cost per bottle found in Question 5?
15. How are discount and percent of decrease related?

SUGGESTED LEARNING STRATEGIES: Create Representations, Quickwrite

My Notes

Weekend	Day	Bottles Sold
1	Sat.	21
	Sun.	24
2	Sat.	1
	Sun.	37
3	Sat.	38
	Sun.	22
4	Sat.	61
	Sun.	29

16. Eric and Marie made the table shown in the My Notes space for their water sales for the four weekends in July.

Did they meet their goal of selling one case of water each day? Explain.

17. One way to compare their sales for each day is to find the percent of their goal met each day.

a. On the first Saturday, they sold 21 out of the 24 bottles set as their goal. What percent is this? Write the answer in this table. Round to the nearest percent.

Weekend	Day	Bottles Sold	Percent of Goal Met
1	Sat.	21	
	Sun.	24	
2	Sat.	1	
	Sun.	37	
3	Sat.	38	
	Sun.	22	
4	Sat.	61	
	Sun.	29	

b. Complete the table in Part a by finding the percent of their goal met each of the other days. Round to the nearest percent.

18. Are the water sales on any of the days unusually high or low? What may have caused this?

SUGGESTED LEARNING STRATEGIES: Think/Pair/Share, Self Revision/Peer Revision, Group Presentation, Create Representations, Quickwrite

My Notes

19. What does it mean for a percent to be over 100%?
20. Is it always possible for percents to be greater than 100%? Give an example in your explanation.
21. What percent of the total water bottle sales occurred on each Saturday and Sunday of the month? Complete this table.

Weekend	Day	Bottles Sold	Percent of Total Sales
1	Sat.	21	
	Sun.	24	
2	Sat.	1	
	Sun.	37	
3	Sat.	38	
	Sun.	22	
4	Sat.	61	
	Sun.	29	

22. What does it mean for a percent to be under 1%?
23. In the table to the right, for Weekends 2, 3, and 4, write whether the total sales increased or decreased from the previous weekend and find the percent of change.

Weekend	Increase or Decrease?	Percent Change
2		
3		
4		

My Notes

SUGGESTED LEARNING STRATEGIES: Marking the Text, Vocabulary Organizer, Quickwrite, Summarize/Paraphrase/Retell, Group Presentation, Self Revision/Peer Revision

One of their friends helped Eric and Marie sell water in the park each weekend. Instead of paying a salary to their friend, they agreed to pay this friend a **commission** of $\frac{1}{4}$ of the total profit.

24. What do you think a commission is?
25. Calculate the total earnings for Eric and Marie from their business of selling bottled water.
26. Calculate the total profit.
27. How much money must they pay their friend for helping?
28. After paying their friend, what will be the remaining profit? How much profit will Eric and Marie each have?

Marie wants to open a savings account with the money she made selling bottled water and \$47.32 she has from babysitting. She must decide which of four banks offers the best investment.

29. This table shows the differences in bank offerings.

Bank 1	Bank 2	Bank 3	Bank 4
Simple interest of 6%	6% compound interest: compounded annually	6% compound interest: compounded semi-annually	6% compound interest: compounded quarterly

- a. How are the bank offerings similar and different?

- b. Describe what you recall about **simple interest**.

SUGGESTED LEARNING STRATEGIES: Think/Pair/Share, Create Representations, Look for a Pattern, Vocabulary Organizer, Discussion Group, Quickwrite, Self Revision/Peer Revision

My Notes

30. Show what Marie's account balance would be after each year if she deposited her money in Bank 1 and never withdrew any.

Year	1	2	3
Interest Earned			
Account Balance			

31. Write a formula that can be used to find simple interest. Let I = interest, r = rate, P = principal, and t = time.

32. Suppose that at the end of the first year, the interest Marie earned is added to the principal, and the new amount is used to calculate the interest for the second year. How much money would she have after two years if she never makes any deposits or withdrawals?

33. When interest is calculated using this method, it is called **compound interest**. In your own words, write what you think compound interest means.

34. Show what Marie's account balance would be after each year if she deposited her money in Bank 2 without making any withdrawals.

Year	Interest Earned	Account Balance
1		
2		
3		

ACADEMIC VOCABULARY

The **principal** is the amount of money deposited into an account or the amount of money borrowed for a loan.

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My Notes

35. What is the difference between simple and compound interest? Which type of interest is better for the customer, simple or compound? Explain.

36. If Marie plans to keep her money in the bank for only one year, and the bank will calculate interest only at the end of that year, which is the better choice, simple or compound interest? Explain.

37. Some interest is compounded semi-annually.

- a. What does semi-annually mean?
- b. Show what Marie's account balance would be after each year if she deposited her money in Bank 3 without making any deposits or withdrawals.

CONNECT TO LANGUAGE ARTS

Semi is a prefix. Some other words with this prefix include:

- semicircle
- semifinal
- semicolon

Year	Interest Earned	Account Balance
1		
2		
3		

SUGGESTED LEARNING STRATEGIES: Think/Pair/Share, Create Representations, Quickwrite

My Notes

38. Some interest is compounded quarterly.

- a. What does quarterly mean?
- b. Show what Marie's account balance would be after each year if she deposited her money in Bank 4 without making any deposits or withdrawals.

Year	Interest Earned	Account Balance
1		
2		
3		

39. Compare the account balances after 3 years using Banks 2, 3, and 4. Write a generalization about compounding interest.

40. In which bank would you recommend that Marie deposit her money? Explain why.

CHECK YOUR UNDERSTANDING

Write your answers on notebook paper. Show your work.

1. It costs Tia \$450 to purchase food to cater a picnic. She gets paid \$725.
 - a. How much money did she make as profit?
 - b. What percent of profit is this?
2. Noah wants to buy a laptop that he sees for \$799. By the time he goes to buy it, the price has increased to \$1050.
 - a. Find the percent of increase of the laptop.
 - b. If the price increases by another 5%, what will be the additional markup and final sale price?
3. A video game originally priced at \$65.50 is on sale at a 15% discount.
 - a. What is the amount of the discount and the final sale price?
 - b. Would it be a better or worse deal if the store had simply lowered the original price to \$55.95? Use percent of decrease to explain.
4. Convert each number to the specified form.
 - a. $\frac{107}{100}$ (percent)
 - b. 345% (fraction)
 - c. 225% (decimal)

- d. 1.42 (percent)
- e. 0.0047 (percent)
- f. 0.3% (decimal)
- g. 0.08% (fraction)
- h. $\frac{3}{1000}$ (percent)

5. A realtor sells a house for \$460,000. If her commission is 3%, how much money does she make as commission?
6. Maria takes out a loan for \$30,000 to buy a car. If her bank charges 5.4% simple interest, how much total interest will she pay in 3 years?
7. Gage must choose between two banks for investing his money that both offer compound interest. Bank 1 offers 3.9% interest compounded quarterly, and Bank 2 offers 4.3% interest compounded semi-annually.
 - a. Show how much money Gage would have in his account after 2 years at each bank if he invests \$1200.

Bank 1	
Year 1	
Year 2	

Bank 2	
Year 1	
Year 2	

- b. Which bank should Gage use and why?
8. **MATHEMATICAL** Why is finding percent an important skill in the real world? Give two examples of how you would use percents in a real-world setting.

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