

Smart Shopping Math



Topics Include:

Retail & Wholesale, Reading Ads, Rental Sales, Buying on Layaway, Getting the Best Deal, On-line Shopping, Shopping for a Neighbor, Second Time Around

Table of Contents

To the Student iv

Unit 1: Retail & Wholesale

Preview 1
Lesson 1: Retail Deals 2
Lesson 2: Visiting the Outlets 4
Lesson 3: Liquidation and Closeouts 6
Lesson 4: *Strategic Purchases* 8
Lesson 5: Co-ops & Clubs 10
Review 12

Unit 2: Reading Ads

Preview 14
Lesson 1: Misleading Data 15
Lesson 2: Reading the Classifieds 17
Lesson 3: Everyday Ads 19
Lesson 4: Reading the Fine Print 21
Lesson 5: *Stretching Dollars* 23
Review 25

Unit 3: Rental Sales

Preview 27
Lesson 1: On Vacation 28
Lesson 2: Renting Movies 30
Lesson 3: *Rented Out!* 32
Lesson 4: Temporary Help 34
Lesson 5: Renting Your Home 36
Review 38

Unit 4: Buying on Layaway

Preview 40
Lesson 1: All Sorts of Items to Layaway 41
Lesson 2: Terms & Conditions 43
Lesson 3: Return Policies 45
Lesson 4: *Making Payments* 47
Lesson 5: Timing Is the Key 49
Review 51

Unit 5: Getting the Best Deal

Preview	53
Lesson 1: Picking the Time & the Place	54
Lesson 2: <i>A Matter of Timing</i>	56
Lesson 3: Vacation Deals	58
Lesson 4: Trade Show Opportunities	60
Lesson 5: Getting an Advantage	62
Review	64

Unit 6: On-line Shopping

Preview	66
Lesson 1: Making Comparisons	67
Lesson 2: <i>Shopping without Dropping</i>	69
Lesson 3: Searching for Special Items	71
Lesson 4: What's New?	73
Lesson 5: Consulting the Experts	75
Review	77

Unit 7: Shopping for a Neighbor

Preview	79
Lesson 1: In Their Shoes	80
Lesson 2: Following Their Lists	82
Lesson 3: Price or Quantity	84
Lesson 4: Being a Good Neighbor	86
Lesson 5: <i>Match It!</i>	88
Review	90

Unit 8: Second Time Around

Preview	92
Lesson 1: Garage Sales	93
Lesson 2: Estate & Other Sales	95
Lesson 3: <i>What's the Missing Number?</i>	97
Lesson 4: Cars, Clothes, & Books	99
Lesson 5: Recycling Trash	101
Review	103

Teacher's Notes and Answer Key	105
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Unit 1

Retail & Wholesale

Preview

How You Will Use This Unit

As you think about retail and wholesale shopping, you will consider many different things. Price and selection are two examples. You will probably also consider retail outlets and closeout sales. You may also think about co-ops. As you compare options and make choices, you will often use math. The math skills you use include mental math and estimation, basic operations and equations, statistics and probability, ratios and proportions, and graphs.



What You Will Do in This Unit

In this unit, math steps demonstrate how to solve problems. These steps can help you answer questions such as these:

SneakerDeals is holding a sale. The first pair of sneakers costs \$54. The second pair costs half that amount. The next pair costs half that amount again, and so on. How does the mean cost per pair change, as the number of pairs increases?

Out of a stack of 60 dinner plates, you find five that you like. Suppose that you find the same fraction of mugs in the stacks of mugs. How many mugs do you find?

A flyer reads, "Purchase items for as little as 15% of the retail cost." You buy a swimsuit for \$11. The retail tag reads \$72. Does this item meet the flyer's promise?

You compare the prices of items at the food co-op and the supermarket. You want to know the answers to two questions. For which item is there the greatest difference in price between the two stores? At which store is \$20 enough money to buy one of each item on your list?

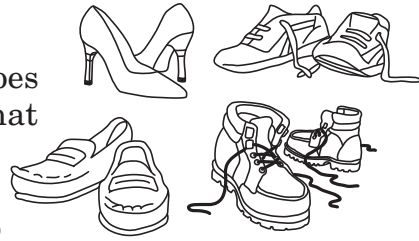
What You Can Learn from This Unit

When you complete this unit, you will have used mathematics to work problems related to retail and wholesale shopping. These problems are similar to those that may actually occur in your daily life.

Lesson 1

Retail Deals

Example *ShoeDeals* is holding a shoe sale on its discontinued lines. The first pair of shoes costs \$36. The second pair costs half that amount. The third pair costs half the amount of the second pair, and so on. Draw a graph to show the relationship of the number of pairs of shoes a person buys to the total cost of their purchase. How does the mean cost per pair of shoes change as the number of pairs increases?

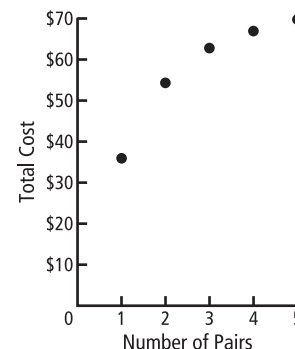


Solve

Step 1: Make a table to show the total cost of 1 to 5 pairs of shoes.

Number of Pairs of Shoes	Sum of Individual Costs	Total Cost	Mean Cost per Pair
1	\$36	\$36	$\frac{\$36}{1} = \36
2	\$36 + \$18	\$54	$\frac{\$54}{2} = \27
3	\$36 + \$18 + \$9	\$63	$\frac{\$63}{3} = \21
4	\$36 + \$18 + \$9 + \$4.50	\$67.50	$\frac{\$67.50}{4} = \16.88
5	\$36 + \$18 + \$9 + \$4.50 + \$2.25	\$69.75	$\frac{\$69.75}{5} = \13.95

Step 2: Now draw a graph. First label the horizontal axis as “Number of Pairs,” and the vertical axis as “Total Cost.” Next, plot the data from the table. Graph the number of pairs of shoes (x -axis) against the total cost (y -axis).



Answer the Question

Step 3: The mean cost per pair of shoes decreases as the number of pairs increases.

Now try these problems.

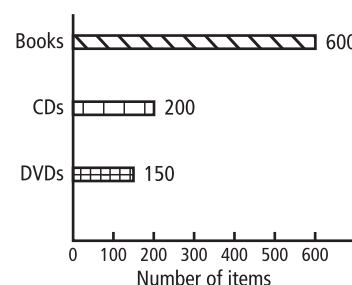
- Joris sees a sale on camera lenses. The first lens costs \$168.75. The second lens costs two thirds of that amount. The third lens costs two thirds of the second, and so on. Joris buys three lenses.

a. Complete the table to show the total cost of his purchase.

Number of Lenses	Sum of Individual Costs	Total Cost
1	\$168.75	\$168.75
2		
3		

b. What is the difference between the cost per lens for three lenses and the cost of the first lens? \$ _____

2. Tami organizes the bookstore's annual sale of overstocked items. Books are on sale for \$2 each. CDs and DVDs are on sale for \$3 each. How much money does the bookstore make when they sell all the CDs and DVDs? How many books do they need to sell to equal that amount? Draw and label a bar on the graph to represent this number.



Answer: The bookstore makes \$ _____ when they sell all the CDs and DVDs.

They need to sell _____ books to make the same amount of money.

3. On Saturday, all display pottery items are on sale at 75% off. JoAnn and Linda each buy several items and spend a total of \$95. How much would they have spent before the sale?
A \$71.25 **B** \$126.67 **C** \$380.00 **D** \$475.00
4. Over the holidays, the town of Fan holds an annual *ShopAround*. The town's only trolley car makes an hour-long circle around town. Shoppers can get on and off at six different stops. Daren gets on the trolley at 10 a.m. At each stop, he gets off, spends half an hour, and then waits until he can get on again. Circle the time at which he gets back to his starting point.
 11 a.m. 12 p.m. 1 p.m. 2 p.m. 3 p.m. 4 p.m.

☆ Challenge Problem

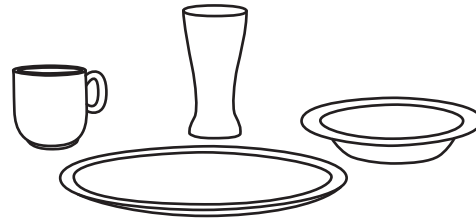
You may want to talk this one over with a partner.

Where you live, you can buy sweet corn at any time of the year. But the cost varies, from \$0.05 per ear to \$1.00 per ear. Draw a double line graph to show the cost per ear for one to ten ears at each of these two prices. How do the two graphs differ?

Lesson 2

Visiting the Outlets

Example Bridget visits the wholesale district to look for bargains. In *Elegant Tables*, she hunts through the stacks of china for her patterns she likes. Out of a stack of 60 dinner plates, she finds five that she likes. She looks through stacks of 50 salad plates, 88 bowls, and 72 mugs. Suppose she chooses these items in about the same proportion as the dinner plates. How many pieces of each item does she find?



Solve

Step 1: Write the ratio of the number of dinner plates she chooses to the total number of dinner plates in the stack.

$$\frac{5}{60} = \frac{1}{12}$$

Step 2: Underline the sentence that tells you the assumption for finding the number of other items.
Suppose she chooses these items in about the same proportion as the dinner plates.

Step 3: Use the ratio of dinner plates to write a proportion that gives the number of pieces of each of the other items.

$$\frac{(\text{Chosen salad plates})}{(\text{Total number of salad plates})} = \frac{1}{12}$$

$$\begin{aligned}\text{Chosen salad plates} &= \frac{1}{12} \times 50 \\ &= 4 + \text{remainder of } 2\end{aligned}$$

$$\begin{aligned}\text{Chosen bowls} &= \frac{1}{12} \times 88 \\ &= 7 + \text{remainder of } 4\end{aligned}$$

$$\begin{aligned}\text{Chosen mugs} &= \frac{1}{12} \times 72 \\ &= 6\end{aligned}$$

Answer the Question

Step 4: Bridget finds 4 salad plates, 7 bowls, and 6 mugs.

 **Now try these problems.**

1. In *SportsOutlet*, Coe hunts through a pile of tracksuits. From a selection of 16, he finds four that he likes. Suppose he finds pairs of sneakers in the same proportion as the tracksuits. Write a proportion and solve it to find the number of good pairs of sneakers, s , out of a selection of eight.

Answer: _____ / _____ = _____ / _____ $s =$ _____

2. In *Music's*Out*, Marcile hunts through the rack of CDs. From one rack of 40 CDs, she finds seven to buy. Suppose she finds the same number of DVDs from a selection of 28. Write a word sentence and an expression for the fraction of DVDs that she will buy.

Answer: _____

3. Ricardo often buys fruit and vegetables at the farm stand near work. The price is two thirds of what he would pay at the regular supermarket. Today he spends \$4.50 for 7 pounds of apples and two pumpkins. What would he have spent at the regular supermarket? Label his produce with this dollar amount.



4. Terri reads the table on the wall over the 'seconds' stand. How many items would she purchase to get the lowest mean price per item?

Number of Items	1	2	3	4
Price	\$15	\$25	\$35	\$45

- A** 1 **C** 3
B 2 **D** 4

☆ Challenge Problem

You may want to talk this one over with a partner.

It takes you one hour and a gallon of gas to get to the outlet mall. You stay three hours and pay \$1.25 per hour for parking. The trip home costs you another hour and another gallon of gas. You pay \$1.68 per gallon for gas. Suppose you have a seen a sweater that you like for \$40 in a local retail store. How much does a similar sweater have to cost in an outlet store to make the trip worthwhile?

Answer: A similar sweater has to cost less than \$_____.

Lesson 3

Liquidation & Closeouts

Example When Ross goes downtown, he makes his trip pay for itself by visiting discount shops. He records his expenses and estimates his savings based on typical retail store prices. The table shows the results of one of his trips. This trip takes him four hours. He spends \$2.50 on gas and \$0.75 on parking. How much does the trip earn him in savings per hour?

Source	Item	Cost	Estimated Savings
<i>Everything Wholesale</i>	50 pounds of cat food	\$16.75	\$0.99
	4 gallons of generic shampoo/conditioner	\$15.80	\$12.90
	25 pounds of generic detergent	\$6.25	\$9.40
<i>Tex's Liquidations</i>	12 12-ounce cans of orange juice	\$6.50	\$3.00
	24 12-ounce cans of cranberry juice	\$15.60	\$8.50
<i>Yard Sales</i>	Winter jacket	\$2.00	\$62.00
	Box of old CDs	\$3.00	\$60.00

Solve

Step 1: Calculate the total amount Ross estimates that he saves on the items he purchases.

$$\$0.99 + \$12.90 + \$9.40 + \$3.00 + \$8.50 + \$62.00 + \$60.00 = \$156.79$$

Step 2: Now subtract the cost of gas and parking to find the actual amount he saves.

$$\$156.79 - \$2.50 - \$0.75 = \$153.54$$

Step 3: Now calculate his savings per hour.

$$\frac{\$153.54}{4} = \$38.39 \quad \text{Divide by the number of hours that the trip takes.}$$

Answer the Question

Step 4: The trip earns Ross \$38.39 in savings per hour.

Now try these problems.

Refer to the information in the example as you work the first problem.

1. When Ross goes downtown, he makes his trip pay for itself. The table in the example shows the results of one of his trips. On his *next* trip, he buys the same items at the same prices at *Everything Wholesale* and *Tex's Liquidations*. He does *not* catch the yard sales. But he does visit a discount sports store where he buys a pair of sneakers

for \$28.97, instead of \$98.99. This trip takes him five hours. He spends \$3.00 on gas and nothing on parking. Complete the sentences to tell how much this trip earns him in savings per hour?

Answer: Total Savings = \$_____ - \$_____ = \$_____

This trip earns Ross \$_____ in savings per hour.

2. Charlcie picks up a flyer as she walks into the sports store closeout sale. The flyer reads, "Purchase items for as little as 15% of the retail cost." Charlcie picks up diving accessories for \$35. The tags say the total retail price for these items is \$175.
- a. Add symbols to complete the math sentence that gives Charlcie's percent saving.

Answer: Charlcie's percent saving = \$35 ___ \$175 ___ 100 = _____%

- b. Do the items meet the flyer's promise of 15% discount? If not, by how much is the promise off?

Answer: _____

3. Every two months Fayrene closes *DeepDiscounts* for one month to go in search of new liquidated stock for the store. What portion of the year is the store closed?

A $\frac{1}{4}$

C $\frac{1}{2}$

B $\frac{1}{3}$

D $\frac{2}{3}$

4. In *Dings&Dents*, Berto finds a suitcase for one fifth of its regular retail price, reduced because of a scratch. He pays \$45 for the suitcase. He also finds a sports bag for \$37, reduced from its regular retail price of \$111. Circle the correct entry in each column.

Regular price of suitcase	Percent the sports bag is reduced	Total that Berto saves
\$135	20%	\$82
\$180	33.3%	\$254
\$225	66.7%	\$336

☆ Challenge Problem

You may want to talk this one over with a partner.

You and a friend go downtown on a shopping trip. You visit eight different stores, and pay \$3.25 for parking and \$4.50 for gas.

- a. What is the mean cost of the trip per person, excluding the cost of the items that you buy?

Answer: Mean cost of the trip per person is \$_____.

- b. What is the mean cost of the trip per store?

Answer: Mean cost of the trip per store is \$_____.

Lesson 4

Strategic Purchases

A Board Game (for Two Players)

The goal of this game is to cover (or buy) sets of cells on the board. First, you look for four cells that are not covered. Then you place a purchase coupon over these four cells.

Materials

Game board (on the next page), 24 purchase coupons (on the next page)

Directions

1. Put the purchase coupons so each player can reach them. Sit with players on opposite sides of the game board.
2. Player 1 picks a purchase coupon and places it over four cells on the game board.
3. Player 2 then takes a turn, picks another purchase coupon and places it over another four cells. A player cannot place a purchase coupon over four cells if one or more cells are already covered.
4. Players take turns picking and placing purchase coupons.
5. The winner is the last player to place a purchase coupon on the board.

Before you play the game, try these warm-up problems.

1. After three turns, how many cells on the game board will be covered?

Answer: _____

2. Yancy has made six plays, and Zarek has made five plays. Yancy could only make another move if he covers a cell that is already covered. How many cells are still uncovered on the game board? Explain why neither player could be able to make another move.

A 20

B 30

C 34

D 44

If neither player can make another move, it could be because
