Budgeting and Banking
Math

Topics Include:

Paying Your Way, Buying Large Items, Unplanned Expenses,

Credit Card Buying, Rental Budgeting, Self-Employment,

Going on a Trip, Keeping the Books

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Unit 1

Paying Your Way

Preview

How You Will Use This Unit

Paying your way involves many different things. Sharing day-to-day costs and budgeting for special items are just two examples. You probably also consider saving some of the money you make. You may also want to compare services from banks. 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 ratios and proportions.
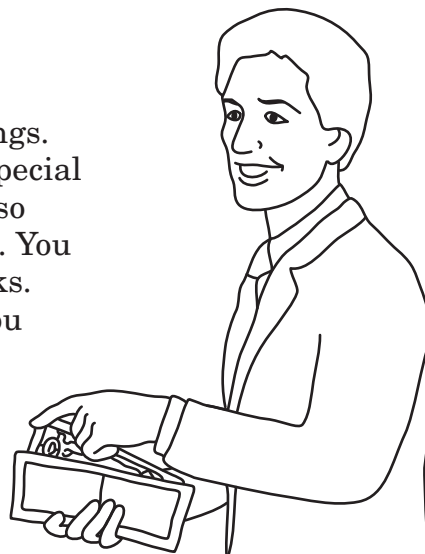
What You Will Do in This Unit

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

You share an apartment with a friend, and share equally the cost of rent, utilities, and food. How much money do you budget for these expenses each month?

Out of your weekly income, you budget $20 toward new windsurfing equipment. How much do you have toward your new equipment after six weeks?

You keep $1,000 in your checking account. When this grows to $1,500, you transfer $500 to savings. What is the percent increase in your checking account just before you transfer funds?

Your bank offers free checking when you maintain a minimum daily balance of $2,000. When you do not maintain this balance, the bank charges a $5 monthly service charge, and a $0.05 transaction charge. What is the fee if your daily balance is $800, and you write 15 checks?

What You Can Learn from This Unit

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

Sharing Day-to-Day Costs

Example Milan and Dale share a student apartment. They share equally the cost of rent, utilities, food, and miscellaneous living expenses. Milan draws a circle graph to show their total costs for this month.

Miscellaneous, $25

Food, $400

Rent, $450

Utilities, $125
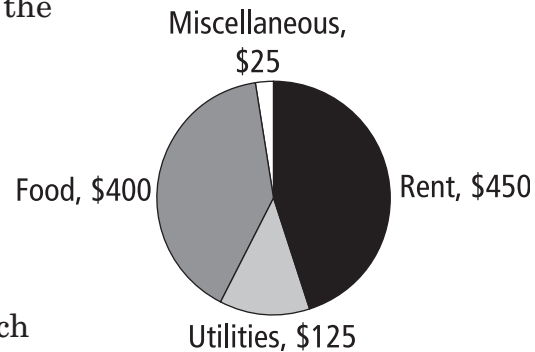
a. What fraction of the total costs is the rent?

b. What dollar amount does each student budget for these expenses per month?

Solve

Step 1: First, find the total expenses by adding.
$450 + $125 + $400 + $25 = $1000

Step 2: Then, write the rent as a fraction of the total. Simplify the fraction by dividing out the common factors.

$$\frac{\$450}{\$1000} = \frac{9}{20}$$

Step 3: Underline the sentence that tells how Milan and Dale handle apartment costs.

<u>They share equally the cost of rent, utilities, food, and miscellaneous living expenses.</u>

Step 4: Divide to find *x,* the amount of the two equal shares of the costs.

x = total cost ÷ 2
  = $1,000 ÷ 2
  = $500

Answer the Question

Step 5: a. The rent is $\frac{9}{20}$ of the total cost.
b. Each student budgets $500 each month.

✏ Now try these problems.

1. Milan and Dale share equally the costs of rent, utilities, food, and other living expenses equally. Their rent increases to $549. They reduce their other shared costs to $366.

   a. What fraction of the total is this increased rent?

b. What amount does each student budget for these expenses per month?

Answer: a. The rent is _____ of the total.

          b. Each student budgets $_____.

2. Melissa pays a car insurance premium of $160 each month. She starts to carpool to work. She informs her car insurance company of the change. The company takes 5% off her car insurance premium. How much is her monthly car insurance premium now? Circle the bills and write the number of those bills under each, to represent this amount.

_____   _____   _____   _____   _____

3. Jo-emma rents a house. She makes an agreement with the owner about the garden. The owner buys the plants, and Jo-emma plants and waters them. The owner saves $100 a month for a gardener. The owner reduces Jo-emma's rent each month by this amount. This represents a 20% savings each month on Jo-emma's rent. What is the amount Jo-emma actually pays each month for rent?

    A $160   **B** $200   **C** $400   **D** $500

4. Ruben budgets $20 a week for lunch. On Monday, Alex and Melvyn invite him to go to lunch with them. Ruben's lunch costs $5.75. Alex's lunch costs $6.25. Melvyn's lunch costs $6.00. They split the total bill equally between them. How much does Ruben have left for lunches for the rest of the week?

    Answer: $_____

☆ *Challenge Problem*
You may want to talk this one over with a partner.

Can you use the same sequence of symbols, in the same order, to make each equation correct? Choose from these symbols: +, −, ×, ÷, (). Write an equation to support your answer.
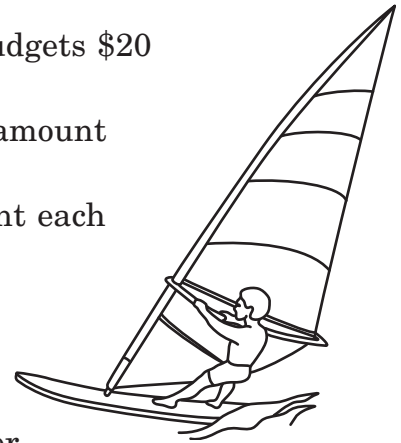
    4 __4__4__4__4 = 1   5__5__5__5__5 = 1   6__6__6__6__6 = 1

_____

_____

Lesson 2

Budgeting for Special Items

Example Out of her weekly income of $480, Carmen budgets $20 toward new windsurfing equipment.

a. What percent of her weekly income is the amount she budgets?

b. She plans to continue to budget this amount each week. How much will she have toward her windsurfing equipment after six weeks?

Solve

Step 1: Underline the sentence that tells the amount Carmen budgets of her income.

Out of her weekly income of $480, Carmen budgets $20 ...

Step 2: Write an equation that gives the budgeted amount as a percent of her income.

Percent = $\frac{20}{480} \times 100\%$

= 4.167%

Step 3: Use a proportion to find the amount x that Carmen has after six weeks.

First, use words to write the proportion.

$$\frac{\text{amount in one week}}{\text{one week}} = \frac{\text{amount after six weeks}}{\text{six weeks}}$$

Second, write the proportion using numbers.

$\frac{20}{1} = \frac{x}{6}$

Step 4: Solve for x.

$x = 20 \times 6$

$x = 120$

Answer the Question

Step 5: a. Carmen budgets 4.167% of her weekly income.

b. After six weeks, she has $120 toward her windsurfing equipment.

✏ Now try these problems.

1. Out of his monthly income of $1,200, Chaz budgets $60 for a digital camera.

a. Chaz budgets _____% of his monthly income for a digital camera.

---

b. He plans to continue to budget the same amount each month towards the camera. Which equation gives the amount he will have after six months?

A $\frac{x}{60} = \frac{1}{6}$ **B** $\frac{x}{6} = \frac{60}{1}$ **C** $\frac{x}{1} = \frac{6}{120}$ **D** $\frac{x}{6} = \frac{1}{1,200}$

2. As a book illustrator, Ravenna takes about four hours to create one finished drawing. She likes to create at least 15 drawings per week. Ravenna budgets her time so that she has Sundays off. This week she completes four drawings on Monday and two on Tuesday. How can she budget her time for the rest of the week and meet her goals? Fill in a number of working hours for each day.

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
		____ hours	____ hours	____ hours	____ hours	____ hours

3. Veronica budgets $19.95 a month for a new E-zine she reads. Her monthly expenses total $760 per month before this new expense. Her income is $800 per month. How much money will she have left over each month after this new budget item?

Answer: $_____

4. Dimitri buys a car for $3,600. He agrees to pay for it in equal monthly installments over two years. His car insurance is $1,600 per year. He pays it in equal monthly installments. Write a set of steps to calculate the change in Dimitri's monthly expense budget.

Answer: _____

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

Ask a friend to pick (without telling you) the number of times a week that they would like to have dinner out (more than once, less than 10). Then give them these directions: Multiply this number by 2. Add 5. Multiply by 50. If they have already had their birthday this year, add 1753. If they haven't, add 1752. Add 1 if this year is 2004. Add 2 if this year is 2005. Add 3 if this year is 2006 … and so on. Now subtract the four digit year that they were born. Ask your friend what the final three-digit number is.

You can decode this final number! The first digit is the number of times your friend chose to eat out. The next two digits is the age of your friend! See if you can figure out why this always works.

_____

_____

Lesson 3

Saving, a Little at a Time

Example Roe keeps $1,000 in her checking account. When this grows to $1,500, she transfers $500 to her savings account.

a. What is the percent increase in her checking account just before she transfers funds out?

Roe keeps $3,000 in her savings account. When this account has the same percent increase, she transfers the excess to an investment account.

b. What amount does her savings account reach just before she transfers out funds?

c. How much money does she transfer out?

Solve

Step 1: Underline the sentence that tells how much Roe keeps in her checking account.

Roe keeps $1,000 in her checking account.

Step 2: To find the percent increase in Roe's checking account, first subtract to find the amount of the increase.

$1,500 − $1,000 = $500

> Percent of change (increase or decrease) equals
> $$\frac{\text{amount of change}}{\text{original amount}}$$

Step 3: Next, find the percent by comparing the amount of change to the original amount.

$\frac{50}{1,000} \times 100\% = 50\%$

Step 4: Now, use the same percent to calculate the amount of increase for her savings account.

50% of $3,000 = $1,500   Find 50% of the amount she keeps in that account.

$3,000 + $1,500 = $4,500   Add this increase.

Answer the Question

Step 5: a. Roe's checking account has increased by 50% when she transfers out funds.
b. Roe's savings account grows to $4,500.
c. Then she transfers out $1,500.

✏ Now try these problems.

1. Monty keeps $800 in his checking account. When this grows to $1,000, he transfers $200 to his savings account.

a. When Monty's checking account increases by _____%, he transfers funds out.

Monty keeps $2,000 in his savings account. When this grows by the same percent increase, he transfers the excess to an investment account.

b. What amount is in his savings account when he transfers out funds?

c. How much money does he transfer out?

Answer: Monty's savings account grows to $_____.

Then he transfers $_____ out.

2. To save money, Donna separates her essential expenses from her optional expenses. On her telephone bill, the essential service charge expense is about $20.00 a month. Her optional long-distance calls average about $50 per month. She reduces her optional expenses by 20%. How much does she save per month?

    A $5   **B** $10   **C** $20   **D** $50

3. During the first year of their marriage, Dawn and Jeff save $1,000. With $600, they buy a three-year Certificate of Deposit (CD). With the remaining money they buy a used sewing machine and a chain saw. Dawn uses the sewing machine to make gifts. She spends $300 less on buying gifts. Jeff uses the chain saw to cut up logs. He spends $250 less on their heating bill. Circle the numbers that represent savings. Draw squares around the numbers that represent expenses.

<div align="center">

$600 $400 $300 $250

</div>

4. Eduardo earns $25,000 a year this year. He estimates that he will get an 8% increase in salary each year. He plans to save 10% of his income each year. Complete the chart. How much can he save in 3 years?

Year	Income	Year's Savings	Accumulated Savings
1	$25,000	10% of $25,000 = $	$
2	$1.08 \times$ $25,000 = $	$	$
3		$	$

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

You count the change you have been saving. You have exactly enough for the hubcaps that cost $98. You have four five-dollar bills, 21 one-dollar bills, 141 quarters, 69 dimes, and a lot of nickels. How many nickels do you have?   **Answer:** _____
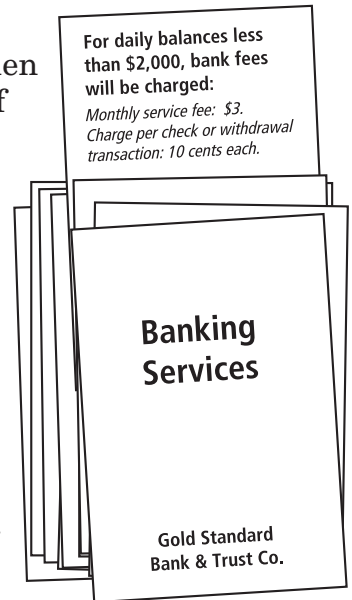
Example Marta's bank offers free checking when she maintains a minimum daily balance of $2,000. When she does *not* maintain a minimum daily balance of $2,000, the bank charges a fee. The fee includes a monthly service charge of $3, and a 10-cent charge for each check or withdrawal transaction. Marta does *not* maintain a daily balance of $2,000. Write an equation for the bank fee for one month.

For daily balances less than $2,000, bank fees will be charged:

Monthly service fee: $3.
Charge per check or withdrawal transaction: 10 cents each.

Banking Services

Gold Standard Bank & Trust Co.

Solve

Step 1: Use f for the bank fee for one month.

Use t for the number of check or withdrawal transactions in one month.

Write an expression for the charge for t transactions.

Charge for t transactions = $\$0.10 \times t$ 10 cents for each transaction.

Step 2: Now, write an equation for the bank fee, f, for the month.

$f = (\$0.10 \times t) + \$3$ Add the $3 monthly service charge.

Answer the Question

Step 3: The equation for the bank fee for one month is:
$f = (\$0.10 \times t) + \$3.$

✎ Now try these problems.

1. Cody's bank offers free checking when he maintains a minimum daily balance of $2,500. When he does *not* maintain this minimum daily balance, the bank charges a fee. The fee includes a $4 monthly service charge and a $0.05 transaction charge. Cody maintains a daily balance of $2,000. Which equation gives Cody's bank fee for one month?

   A $f = \$0$ **C** $f = (\$0.05 \times t) + \$4$

   B $f = (\$0.04 \times t) + \$5$ **D** $f = \$4$

2. Jere does *not* maintain the required $1,500 minimum daily balance at her bank. This month, she writes 21 checks, and makes two withdrawal transactions. Her bank charges her a