

# Chapter 21

## TAXES AND FEES

### TAXES

**TAXES** are fees charged by the government to pay for creating and taking care of things that we all share, like roads and parks. **SALES TAX** is a fee charged on something purchased. The amount of sales tax we pay is usually determined by a percentage.

The tax rate stays the same, even as the price of things change. So the more something costs, the more taxes we have to pay. That's a proportion!

Sales taxes are charged by your state and city so that they can provide their own services to the people like you who live in your state. Sales tax rates vary from state to state.

For example, an **8%** sales tax means we pay an extra **8** cents for every **100** cents (**\$1**) we spend. Eight percent can also be written as a ratio (**8:100**) or fraction ( $\frac{8}{100}$ ).

**EXAMPLE:** You want to buy a sweater that costs \$40, and your state's sales tax is 8%. How much will the tax be? (There are three different ways to figure out how much you will pay.)



**Method 1:** Multiply the cost of the sweater by the percent to find the tax.

**STEP 1:** Change 8% to a decimal.

$$8\% = 0.08$$

**STEP 2:** Multiply 0.08 and 40.

$$40 \times 0.08 = 3.2$$

So, the tax will be \$3.20.

Don't forget to include a dollar sign and use standard dollar notation when writing your final answer.

**Method 2:** Set up a proportion and solve to find the tax.

**STEP 1:**  $8\% = \frac{8}{100}$

**STEP 2:** Set your tax equal to the proportional ratio with the unknown quantity.

$$\frac{8}{100} = \frac{x}{40}$$

**STEP 3:** Cross multiply to solve.

$$100x = 320$$

$$x = 3.2$$

So, the tax will be **\$3.20**.

**Method 3:** Create an equation to find the answer.

**STEP 1:** Make a question: "What is **8%** of **\$40**?"

**STEP 2:** Translate the word problem into mathematical symbols.

$$x = 0.08 \times 40$$

$$x = 3.2$$

So, the tax will be **\$3.20**.

## Finding the Original Price

You can also find the original price if you know the final price and the percent of tax.

**EXAMPLE:** You bought new headphones. The receipt says that the total cost of headphones is **\$53.99**, including an **8%** sales tax. What was the original price of the headphones without the tax?

**STEP 1:** Add the percent of the cost of the headphones and the percent of the tax to get the total cost percent.

$$100\% + 8\% \text{ tax} = 108\%$$

YOU PAID FULL PRICE, SO THE COST OF THE HEADPHONES IS 100% OF THE ORIGINAL PRICE.

**STEP 2:** Convert the percent to a decimal.

$$108\% = 1.08$$

**STEP 3:** Solve for the original price.

$$53.99 = 1.08 \cdot x \text{ (Divide both sides by } 1.08 \text{ to get } x \text{ alone.)}$$

$$x = 49.99 \text{ (rounding to the nearest cent)}$$

The original cost of the headphones was **\$49.99**.

## FEES

Other types of fees can work like a tax—the amount of the fee can be determined by a percentage of something else.

**EXAMPLE:** A bike rental company charges a **17%** late fee whenever a bike is returned late. If the regular rental fee is **\$65**, but you return the bike late, what is the late fee, and what is the total that you have to pay? (Let's use Method 1 from before.)



$$17\% = 0.17 \longrightarrow 65 \times 0.17 = 11.05$$

So, the late fee is **\$11.05**.

To get the total that you have to pay, you add the late fee to the original rental price.

$$\$11.05 + \$65 = \$76.05$$

So, you have to pay **\$76.05**.

### Finding the Original Price

You can also find the original price if you know the final price and the percent of the fee.



**EXAMPLE:** You rent a snowboard for the day, but have such a blast that you lose track of time and return the board late. The receipt says that the total cost of the rental was \$66.08 including a 12% late fee. What was the original price of the snowboard rental without the fee?

**STEP 1:** Add the percent of the cost of the rental and the percent of the fee to get the total cost percent:

$$100\% + 12\% \text{ tax} = 112\%$$

YOU PAID FULL PRICE,  
SO THE COST OF THE  
SNOWBOARD RENTAL  
IS 100% OF THE  
ORIGINAL PRICE.

**STEP 2:** Convert the percent to a decimal.

$$112\% = 1.12$$

**STEP 3:** Solve for the original price.

$$66.08 = 1.12 \cdot x$$

$$x = 59$$

The original cost of the snowboard rental was \$59.00.



# CHECK YOUR KNOWLEDGE

1. Complete the following table. Round answers to the nearest cent.

	8% Sales Tax	8.5% Sales Tax	9.25% Sales Tax
Book \$12.00			
Total Price (with tax)			
Board game \$27.50			
Total Price (with tax)			
Television \$234.25			
Total Price (with tax)			

2. You buy your favorite band's new album. The receipt says that the total cost of the album is **\$11.65**, including a **6%** sales tax. What was the original price of the album without the tax?

# CHECK YOUR ANSWERS

1.



	8% Sales Tax	8.5% Sales Tax	9.25% Sales Tax
Book \$12.00	\$0.96	\$1.02	\$1.11
Total Price (with tax)	\$12.96	\$13.02	\$13.11
Board game \$27.50	\$2.20	\$2.34	\$2.54
Total Price (with tax)	\$29.70	\$29.84	\$30.04
Television \$234.25	\$18.74	\$19.91	\$21.67
Total Price (with tax)	\$252.99	\$254.16	\$255.92

2. \$10.99