

Chapter 22

DISCOUNTS AND MARKUPS

DISCOUNTS

Stores use **DISCOUNTS** to get us to buy their products.

In any mall or store, you will often see signs such as



But don't be swayed by signs and commercials that promise to save you money. Calculate how much you will save to decide for yourself whether it's a good deal or not.

Other words and phrases that mean you will save money (and that you subtract the discount from the original price):
savings, price reduction, markdown, sale, clearance.

Calculating a discount is like calculating tax, but because you are saving money, you subtract it from the original price.

EXAMPLE: A new hat costs **\$12.50**. A sign in the window at the store says, "**ALL ITEMS 20% OFF**." What is the discount off of the hat, and what is the new price of the hat?

Method 1: Find out the value of the discount and subtract it from the original price.

STEP 1: Change the percent discount to a decimal.
 $20\% = 0.20$

STEP 2: Multiply the decimal by the original amount to get the discount.
 $0.20 \times \$12.50 = \2.50

STEP 3: Subtract the discount from the original price.
 $\$12.50 - \$2.50 = \$10$

The new price of the hat is **\$10.00**.

Method 2: Create an equation to find the answer.

STEP 1: Write a question: "What is **20%** of **\$12.50**?"

STEP 2: Translate the word problem into mathematical symbols.

$$x = 0.20 \cdot 12.50$$

$$x = 2.5$$

STEP 3: Subtract the discount from the original price.

$$\$12.50 - \$2.50 = \$10$$

The new price of the hat is **\$10.00**.

What if you are lucky enough to get an additional discount after the first? Just deal with one discount at a time!

EXAMPLE: Valery's Videos is selling all games at a **25%** discount. However, you also have a membership card to the store, which gives you an additional **15%** off. What will you end up paying for **\$100** worth of video games?

Let's deal with the first discount:

$$25\% = 0.25$$

$$0.25 \times \$100 = \$25$$

So, the first discount is **\$25**.

$$\$100 - \$25 = \$75$$

The first discounted price is **\$75**.

Now, we can calculate the additional **15%** discount from the membership card.

$$15\% = 0.15$$

$$0.15 \times \$75 = \$11.25$$

(DON'T FORGET THAT THE SECOND DISCOUNT IS ADDITIONAL, SO IT'S CALCULATED BASED ON THE FIRST DISCOUNTED PRICE—**NOT** THE ORIGINAL PRICE.)

So, the second discount is **\$11.25**.

$$\$75 - \$11.25 = \$63.75$$

The final price is **\$63.75**. That's a pretty good deal!

Finding the Original Price

You can also find the original price if you know the final price and the discount.

EXAMPLE: A video game is on sale for **30%** off of the regular price. If the sale price is **\$41.99**, what was the original price?

STEP 1: Subtract the percent of the discount from the percent of the original cost:

$$100\% - 30\% = 70\%$$

STEP 2: Convert the percent to a decimal.

$$70\% = 0.7$$

UNLIKE THE EXAMPLES IN THE LAST CHAPTER, YOU DID NOT PAY FULL PRICE—YOU PAID **ONLY** 70% OF THE ORIGINAL PRICE. SWEET DEAL!

STEP 3: Solve for the original price.

$$41.99 = 0.7 \cdot x \text{ (Divide both sides by } 0.7 \text{ to get } x \text{ alone.)}$$

$$x = 59.99 \text{ (rounding to the nearest cent)}$$

The original price of the video game was \$59.99.

Finding the Percent Discount

Similarly, you can also find the percent discount if you know the final price and the original price.

EXAMPLE: Julie paid \$35 for a shirt that is on sale. The original price was \$50. What was the percent discount?

$$35 = x \cdot 50 \text{ (Divide both sides by 50 to get } x \text{ alone.)}$$

$$x = 0.7 \text{ (This tells us Julie paid 70\% of the original price for the shirt.)}$$

$$1 - 0.7 = 0.3 \text{ (We need to subtract the percent paid from the original price to find the percent discount.)}$$

The discount was 30% off of the original price.

MARKUPS

Stores often offer discounts during sales. But if they did that all the time, they would probably go out of business. In fact, stores and manufacturers usually increase the price of their products to make a profit. These increases are known as **MARKUPS**.

EXAMPLE: A video game costs \$40 to make. To make a profit, a manufacturer marks it up 20%. What is the markup amount? What is the new price of the game?

Method 1: Find out the value of the markup.

STEP 1: Change the percent discount to a decimal.

$$20\% = 0.20$$

STEP 2: Multiply the decimal by the original cost.

This is the markup.

$$0.20 \times \$40 = \$8$$

STEP 3: Add the markup price to the original cost.

$$\$40 + \$8 = \$48$$

The new price of the game is \$48.

Method 2: Create an equation to find the answer.

STEP 1: Write a question: "What is 20% of \$40?"

STEP 2: Translate the word problem into mathematical symbols.

$$x = 0.20 \cdot 40 \rightarrow x = 8$$

STEP 3: Add the markup price to the original cost.

$$\$40 + \$8 = \$48$$

The new price of the game is \$48.

Finding the Original Cost

Just like when you calculate for tax and fees, you can also find the original cost if you know the final price and the markup.

EXAMPLE: A bakery charges **\$5.08** for a cake.

In order to make a profit, the store marks up its goods by **70%**. What is the original cost of the cake?

STEP 1: Add the percent of the original cost of the cake and the percent of the markup to get the total cost percent:
 $100\% + 70\% = 170\%$

YOU PAID THE FULL ORIGINAL COST PLUS THE STORE'S MARKUP, SO THE COST OF THE CAKE IS ACTUALLY 170% OF THE ORIGINAL COST.

STEP 2: Convert the percent to a decimal.
 $170\% = 1.7$

STEP 3: Solve for the original cost.
 $5.08 = 1.7 \cdot x$

$x = 2.99$ (rounding to the nearest cent)

The original cost of the cake was **\$2.99**.