Percent markdown

In this lesson we'll learn how to calculate the sale price of an item, that is, the price of an item that's sold at a discount.

What is a percent markdown? In retail, a store will discount an item in order to sell it more quickly. The store usually does this as a percentage off the original amount they had planned to charge, and if that's the case we call this a percent markdown.

Here are three different formulas we can use to describe this:

$$\text{Discount Price} = \text{Original Price} - \text{Discount Amount}$$

$$\text{Discount Price} = \text{Original Price}\left(1 - \frac{\text{Percent Markdown}}{100}\right)$$

$$\text{Discount Amount} = \text{Original Price}\left(\frac{\text{Percent Markdown}}{100}\right)$$

A useful proportion:

$$\frac{\text{Discount Amount}}{\text{Original Price}} = \frac{\text{Percent Markdown}}{100}$$

The percent markdown is the percentage off the original price of the item; sometimes we say the item is on sale for ___% off.

The original price (regular price) is the price the person or store was selling the item for before they discounted it.

The discount amount is the amount in dollars that is taken off the original price.

The sale price is the price of the item after the discount is applied.

Let's do a couple of examples.

Example

A shirt has an original price of $\$25.00$, and it's now on sale for $\$22.50$. What is the percent markdown?

Here's what we know:

Original Price: $\$25.00$

Sale Price: $\$22.50$

We can find the discount amount:

$$\$25.00 - \$22.50 = \$2.50$$

Now use the proportion:

$$\frac{\text{Discount Amount}}{\text{Original Price}} = \frac{\text{Percent Markdown}}{100}$$

$$\frac{2.5}{25} = \frac{x}{100}$$

$$\frac{2.5 \cdot 4}{25 \cdot 4} = \frac{x}{100}$$

$$\frac{10}{100} = \frac{x}{100}$$

$$x = 10$$

The percent markdown is $10\,\%$.

Let's look at another example.

Example

A doll has an original price of $\$22.00$, but it's on sale for $\$16.50$. What is the percent markdown?

A doll was originally $\$22.00$, but the price is now reduced by $\$5.50$ ($\$22.00 - \$16.50 = \$5.50$). Use the proportion:

$$\frac{\text{Discount Amount}}{\text{Original Price}} = \frac{\text{Percent Markdown}}{100}$$

$$\frac{5.5}{22} = \frac{x}{100}$$

$$100 \cdot \frac{5.5}{22} = x$$

$$\frac{550}{22} = x$$

$$x = 25$$

The percent markdown is $25\,\%$.

Let's look at an example on calculating the sale price.

Example

The regular price of an item is $\$150.00$, and the item is on clearance for $75\,\%$ off the regular price. What is the sale price of the item?

The item was originally $\$150.00$, but the price is reduced by $75\,\%$, which means we need to figure out what $75\,\%$ of $\$150.00$ is and then subtract that from the regular price.

$$75\,\% \text{ of } \$150.00$$

$$\frac{75}{100} \cdot \$150.00$$

$$\$112.50$$

That means that the sale price of the item is

$$\$150.00 - \$112.50$$

$$\$37.50$$

Alternatively, since the item is discounted by $75\,\%$, we know that it will only cost $25\,\%$ of its original price (because $100\% - 75\,\% = 25\,\%$). So we could also calculate the cost by multiplying the original price by $25\,\%$.

$$25\,\%\ \text{of}\ \$150.00$$

$$\frac{25}{100} \cdot \$150.00$$

$$\$37.50$$

Let's look at a final example on calculating the original price.

Example

The sale price of an item is $\$35.00$, and the item is on sale for $30\,\%$ off the original price. What is the original price of the item?

The item was originally $\$x$, the price was reduced by $30\,\%$, and the item now costs $\$35.00$. This means that the current price of $\$35.00$ is $70\,\%$ of the original price because $100\% - 30\,\% = 70\,\%$. Therefore, we can set up an equation to find the original price x.

$$\frac{70}{100} \cdot x = \$35.00$$

$$0.7 \cdot x = \$35.00$$

$$x = \$50.00$$

That means that the regular price of the item was $\$50.00$.