Section 8.1: Percent, Sales Tax, And Discounts

§1 Basics Of Percent

Percent literally means (in Latin) for every hundred. This should make sense, because if you think about what does it mean to get an 85% on a test? It means that your score is 85 out of 100. What you should be able to do is to convert from a fraction to a decimal, and from a decimal to a percent, and vice versa. It’s pretty easy as long as you remember the steps!

To convert from a fraction to a decimal, we simply divide the numerator by the denominator. For example, a fraction such as $\frac{3}{20}$ as a decimal would be 0.15. Similarly, a fraction such as $\frac{13}{15}$ in decimal form would be 0.8666... You can always round decimal numbers to two decimal values, so a number like 0.8666... that keeps repeating can be rounded as 0.87.

To convert from a decimal to a percent, we simply move the decimal point two places to the right, and attach the percent sign to the number. This second step may seem trivial, but it’s very important! A number without the percent sign is not a percent, even if it may look like one!

For example, let’s say you got a 21/25 on a test. What percent is this? First, we can convert this to a decimal by dividing the numbers. You should end up with 0.84. To convert this decimal to a percentage, we move the decimal point two places to the right, and add the percent sign! Hence, a 21/25 would be 84%!

Note that a fraction less than 1 will always give a percent less than 100%. Is it possible to have a percentage above 100%? Of course! For example, what would the fraction 8/5 be as a percentage? In decimal form, 8/5 is equivalent to 1.6. As a percentage, then, the answer is 160%.

To convert from a percent to a decimal, we move the decimal point two places to the left, and remove the percent symbol. For example, 74% in decimal form would be 0.74, and 160% in decimal form would be 1.6.

What about a number like 0.045%? What would this be a fraction? Note that this is a percent! Don’t be fooled all because it’s a small number. To properly convert, we need to move the decimal point two places to the left and drop the percent symbol. Hence 0.045% is equivalent to 0.00045.

PRACTICE

1) Convert $\frac{13}{20}$ to a percentage.

2) Convert $\frac{1}{10}\%$ as a decimal.

3) Convert 250% to a fraction.

§2 Sales Tax And Discounts

Simply put, the sales tax on an item is the tax rate times the cost of the item. You must convert the percent to a decimal when performing the calculations!! Basically what we are doing is finding a certain percentage of an item’s cost. This same principle can be applied to tipping and discounts as well!
In Clark County, the tax rate is 8.1%. Let’s say a ticket to ride the High Roller at the LINQ costs $21.00. How much do you need to pay in taxes?

To find the sales tax amount, we simply multiply the tax rate times the cost of the item, and remember to convert the percent to a decimal. Hence the tax amount is $1.70. We always round dollar amounts to nearest hundredth. We can then calculate the total price to pay by adding the tax to the cost of the item. The final answer is $22.70.

A similar question is to find the discount on an item. For example, say a TV that is normally $450 is now on sale for 20% off. What is the discount amount and the sale price? The discount amount is equal to the discount rate times the original price. Hence the discount amount is \(450 \cdot 0.20 = 90\). Hence the discount amount is $90, and the sales price is then $360.

PRACTICE

4) If a shirt normally $40 is now on sale for 15% off, find the discount amount and the sale price.

§3 Percent And Change

Percent increase and decrease can get a little tricky. Basically, if a quantity changes, we can find the percent that the quantity has changed.

Percent increase (fraction form) = amount of increase divided by the original amount. Convert this answer to a decimal.

Percent decrease (fraction form) = amount of decrease divided by the original amount. Convert this answer to a decimal.

The thing to remember, the percent change is always based on the original amount!

For example, let’s say a certain math class had 35 students initially enrolled, but now has 29. What is the percent change? Since we know that the amount of decrease is 6 students, and the original amount of students is 35, we can find the percent decrease by dividing 6/35. The answer in decimal form is 0.1714, so as a percent the answer is 17.14%.

Let’s try another one. Let’s say the price of a show ticket went from $50 to $100. What is the percent increase? It may be tempting to say that the percent increase is 200%, but it’s not the answer. We should actually do the math!

The amount of increase is $50. The original amount is $100. Hence the percent increase in decimal form is $50/$50, or 1! Hence the percent increase is 100%.

PRACTICE

5) The price of a cell phone last year was $199. This year its $299. Find the percent increase.

6) The price of a suit went down from $800 to $200. Find the percent decrease.