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Solve Problems Using Percents

Percents are your friend. Think of all the cool things percents do for you. They save you money, and they tell you how well you are doing in school. Learn how you can solve problems with percents in this video lesson.

The Awesome Percent

Percents are awesome! Why are they awesome, you ask? Because they can tell me whether I will save loads of money or whether I have aced an exam. A **percent**, you may recall, literally means 'per one hundred.' You can also think of a percent as a part of a whole. When solving problems, working with percents can be a challenge. But, let me show you a systematic approach that you can take to these problems so that they don't become confusing.

To begin, let me show you some of the typical problems you may encounter. You might see some problems like these:

What is 75 percent of 30?

What percentage is 60 out of 130?

I call problems like these straightforward ones because you can pretty much translate them directly into math symbols. Keep watching, and I'll show you how.

You might see slightly more complex problems, such as this one:

If a certain shoe has been discounted by 55% and the original price is $218, what is the amount you will end up paying for the shoe after the discount?

I'll also show you how to think about these problems so you can solve them easily, so keep watching.

Before I explain how to do these problems, I want to tell you about the shortcuts that you should remember so that you can quickly translate your word problems into math problems.

The Shortcuts

The first shortcut is that when you see a phrase such as 'a percentage of something,' that 'of' translates into multiplication. So, if you see a problem such as '75 percent of 20,' you should immediately translate that into 75 percent times 20.

The second shortcut requires you to see the details in your problem. If you see a phrase such as 'a number out of another number' or 'a number of another number,' this 'of' translates into division. So, if you see something like '65 out of 80,' you would write it mathematically as 65 / 80, or 65 divided by 80.

Just to recap, if you see 'a percent of something,' you should write out the problem as the percent times the something. But, if you saw 'something of something else,' then you would write it as something divided by something else. Remember these hints, because they can be a real lifesaver during tests. Now, let's see how we can use these shortcuts to solve the straightforward problems.

Straightforward Problems

Let's say that our problem is this one:

What is 75 percent of 30?

We can see the phrase 'a percent of something,' so we know that this 'of' means multiplication. We go ahead and rewrite the word problem into something mathematical that we can use. We write 75 percent times 30, but we can't just leave the percentage like that. We need to rewrite the percentage as a decimal. To change the number from a percentage to a decimal, all we need to do is move the decimal point two places to the left. So, 75 percent becomes 0.75. Our problem is now 0.75 * 30. This we can easily figure out. Our answer is 22.5. So, 75 percent of 30 is equal to 22.5.

Before trying another problem, I want to briefly talk about the usefulness and awesomeness of fractions. We can think of this problem as telling us the number of questions we would have to get right in order to pass a test. If our test had 30 questions, then to get a passing score of 75 percent, we would need to get at least 22.5 questions right. If our teacher didn't give half scores, that means we would need to get at least 23 questions right.

Okay, let's try another problem:

What percentage is 60 out of 130?

Does this 'of' mean multiplication or division? Well, we have a number out of another number, so this 'of' means division. We rewrite our problem as 60 / 130. Ah, much better. We can easily solve this one and get our answer. After dividing, we find that our answer is 0.46. This is a decimal, but our problem is looking for a percentage. We will need to translate our decimal into a percentage. We do that by moving the decimal point two places to the right. Doing so, we get 46 percent. So, that means that 60 out of 130 is 46 percent.

Here again, if our test had 130 questions, and we only got 60 answers right, then that means our score is only 46 percent. We can use our knowledge of percentages and how to solve percentage problems to figure out if we are likely to get a good score or not by the number of answers we think we are getting right as we're taking a test. Let's move on to more complex problems.

More Complex Word Problems

We are looking at a test, and we see this problem:

If a certain shoe has been discounted by 55 percent and the original price is $218, what is the amount you will end up paying for the shoe after the discount?

This looks long, but with some logical thinking on our part, we can successfully tackle problems like this one. After reading this problem carefully, the first thing we want to do is to figure out exactly what they want. In this problem, what they want us to do is tell them how much we will end up spending. So, they are not asking for the amount that was discounted. If that is the case, then they are not interested in the 55 percent but in the percentage that will make the 55 percent whole.

To figure that out, we will take the 55 and subtract it from 100 since 100 percent is the whole. So, 100 - 55 is 45 or 45 percent. So, our actual problem is 45 percent of 218. Now this looks like a straightforward problem.

We see the phrase '45 percent of 218,' so we know we can write it as 45 percent times 218. Again, we can't leave the percent like that; we need to rewrite it as a decimal. We remember that to switch from a percent to a decimal, we move the decimal point two spaces to the left. So, now our problem is 0.45 * 218. Our answer, then, is 98.1, or $98.10. What this tells us is that if a pair of $218 shoes is on sale at 55 percent off, then that means we are paying 45 percent of the $218, which is $98.10 - a pretty good deal.

The most important part that I want you to take away from this is that you really need to think about what the problem is asking you to do. Sometimes, the problem wants you to calculate the discount or the amount you would save; other times it can ask you what you would end up paying. If the problem had asked for the discount, we would have had 55 percent of $218 as our problem.

Lesson Summary

To summarize, a **percent** is a part of a whole and literally means 'per one hundred.' When working with them in solving problems, there are two shortcuts you should remember. The first one is when you see a phrase such as 'a percent of a number,' the 'of' translates to multiplication. For example, 45 percent of 80 translates into 45 percent times 80. The second shortcut is that when you see a phrase such as 'a number out of another number,' the 'of' here means division. For example, the phrase '124 out of 516' translates into 124 / 516, or 124 divided by 516. And finally, to solve problems involving percentages, you first need to figure out what is being asked of you, and then you can go about translating your problem into math.

Learning Outcomes

Reviewing this lesson could enable you to:

- Demonstrate two shortcuts for solving percent problems
- Solve simple and complex word problems involving percentages
- Switch between percents and decimals