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How to Solve Problems with Money

Money matters, and knowing how much things cost will be useful no matter where you go. In this lesson, we'll learn the steps for solving word problems involving money.

Money Matters

Did you ever go to a carnival? This is the kind of place where you probably want to bring plenty of cash. You'll need it for the cotton candy, corndogs and tilt-a-whirl, though hopefully not in that order.

In this lesson, we're going to take a trip through a carnival while learning about solving **money word problems**, which are simply story-based questions that involve money calculations.

The process for solving these problems involves a few short steps. First, read the problem. Read the whole thing. Think of it like a book. If you never finished *How the Grinch Stole Christmas*, you'd presume it was a surprisingly dark kid's book. Likewise, with word problems, you need to know all the details to solve it.

Second, identify the question. Word problems can be straightforward, but they can also be confusing. They can start with the question, end with it, or put it somewhere in the middle. After reading the entire problem, look for what is being asked.

Third, identify the known and unknown things. Let's say you're trying to find out how much five carnival tickets cost, if each one is $2. That's your question. What don't you know? The total cost. What do you know? Each ticket is $2, and five were purchased. So you have two known pieces and one unknown, which you might label with a variable.

Fourth, look for key words. Key words? These are words that tell you what the operator is. Is it a multiplication problem? Division? Make sure you perform the correct operation. This is also a good mantra for surgeons.

And fifth, solve the problem. It makes sense that we end with this, right? OK, let's practice!

Sample Problem #1

Here's our first problem: At the carnival, Rivers buys 14 hot dogs. Each hot dog costs $4. How much did Rivers spend on hot dogs?

First, we should ignore the health implications of eating 14 hot dogs. Also, $4 for a carnival hot dog? Really?

Once we get past all that, let's get to our real steps for solving. We already did step one, reading the problem in its entirety. Step two is to identify the question. It helpfully has a question mark. We want to know how much money Rivers spent on his hot dogs.

OK, step three: identify the known and unknown things. We know each hot dog is a ridiculous $4. And how many did he buy? A gut-busting 14. What don't we know? The total cost. Let's call that *x*.

What about key words? What's our operator? Well, the 'how much' implies that we're looking for a total. So this is a multiplication problem.

On to step five! Solve the problem. To find out his total cost, we multiply 14 times 4. 14 * 4 = *x*. Well, 14 * 4 is 56, so Rivers spent $56 on hot dogs. Let's hope he didn't go on a roller coaster after all that.

Sample Problem #2

That wasn't so tough, right? Well, they can be harder. Here's another one: Amber wants to play skee ball, which requires one quarter per play. She has a total of $2.05 and that includes a mix of quarters and dimes. If she has four more quarters than dimes, how many quarters does she have?

Who wouldn't want to maximize skee ball time, right? OK, what do we want to know? The total number of quarters. What do we know? Amber has $2.05 total, and she has four more quarters than dimes. We're going to be adding quarters and dimes, so this problem involves addition. That's our operator.

With a problem involving mixed forms of currency, it's helpful to set up a chart like this:

	Number	**Value**	**Total**
dimes	*x*	.10	.10*x*
quarters	*x* + 4	.25	.25(*x* + 4)

So we have rows for each of our coins, dimes and quarters. In the number column, we label dimes as *x*. Why? Because we know we have four more quarters than dimes. So if dimes are *x*, then quarters are *x* + 4. Then, we do the values. Dimes are what? 10 cents. Quarters are 25 cents. Then, we have .10*x* dimes and .25(*x* + 4) quarters.

Now we set up our equation to solve the problem. We know that $.10x + .25(x + 4) = 2.05$. That's our dimes plus our quarters totaling our $2.05. All this for skee ball.

First, let's multiply both sides by 100. So $10x + 25(x + 4) = 205$. Then, distribute the 25 to get $25x + 100$. We subtract 100 from both sides, so 205 becomes 105. We can add $10x$ to $25x$ to get $35x$. So $35x = 105$. Divide by 35, and $x = 3$.

Are we done? No. What is x? X is the number of dimes. What do we want to know? The number of quarters. The quarters are $x + 4$, so there are 3 + 4, or seven quarters. That's seven rounds of skee ball for Amber!

Sample Problem #3

Let's try one more. After a day at the carnival, Isabelle has $5.45 in her coin purse. If she has five more nickels than dimes and twice as many quarters than dimes, how many of each type of coin does she have?

Maybe you're asking yourself, 'Why does she know these random facts about her coins, but not how many of each type she has?' Or maybe, 'Why does this matter?' Or even, 'Why didn't she play more skee ball?' These are all good questions. Maybe she put them in stacks, so it's easy to see one stack is four coins higher. Maybe she needs exact change for the bus fare home. Alas, we'll never know why she didn't play more skee ball.

Anyway, we read the problem, and we know the question. We want to know how many of each type of coin she has. Let's document what we know with a chart.

	Number	**Value**	**Total**
nickels	$x + 5$	.05	$.05(x + 5)$
dimes	x	.10	$.10x$
quarters	$2x$	.25	$.25(2x)$

Ok, a little more complicated this time. That's what happens when you get various bits of change back after funnel cake, ice cream, more funnel cake, and whatnot. Hey, don't judge us for double dipping on the funnel cake. That stuff is awesome.

Anyway, nickels, dimes and quarters. Dimes are our x. We have five more nickels than dimes, so that's $x + 5$. And we have twice as many quarters as dimes, so $2x$ for quarters. Nickels are 5 cents, dimes are 10 and quarters are 25.

Our equation looks like this: $.05(x + 5) + .10x + .25(2x) = 5.45$. Again, multiply by 100. So $5(x + 5) + 10x + 25(2x) = 545$. Let's distribute a bit to get $5x + 25 + 10x + 50x = 545$. $5x + 10x + 50x$ is $65x$. 545 - 25 is 520. And 520 divided by 65? That's 8. What is 8? 8 is x. What is x? Dimes. So 8 dimes.

How many nickels? 8 + 5, which is 13. And quarters? 2 * 8, which is 16. So 16 quarters, 8 dimes and 13 nickels. Let's check that. How much is 16 quarters? $4. Eight dimes is 80 cents. 13 nickels? That's 65 cents. Add that up, and it's $5.45. Is that what Isabelle has? It is! Maybe she should go back for more funnel cake...

Lesson Summary

To summarize, we learned about money word problems. These are story problems involving calculations with money.

To solve these problems, we followed a few steps. First, we read the entire problem. Then we identified the question. Next, we figured out what we did and didn't know. When dealing with multiple forms of currency, we use a chart to help us. We looked for key words to help guide us, then we solved the problem.

Now it's time for the bumper cars. Or the Ferris wheel. Or maybe a corndog. So many choices...

Learning Outcomes

After this lesson, you should be able to:

- List the steps involved in solving money word problems
- Use those steps to solve mathematical word problems involving money