

Geometry II

SUMMARY KEYWORDS

rectangle, pythagoras theorem, triangle, equal, squared, problem, length, economics, area, angle, side, short, class, social welfare, perimeter, pythagorean theorem, answer, width, multiply, rewrite

SPEAKER

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We've been given some information about a rectangle, we know that the perimeter of this rectangle is 112 units. And we're being asked to find the length of side $v w$. So this side right here, it says, write your answer without variables. So we need to solve for, we need to solve for y . Now, the perimeter is equal to two times the width of the rectangle, multiplied by the length of the rectangle. a rectangle has two sides with the same width two sides with the same length. Now Oh, excuse me, I made a mistake. I think I said it correctly, but I didn't write it correctly. And that's two times out. So we've got two widths plus two length is equal to the perimeter of the rectangle. Now we know that the perimeter is equal to 112. And we know that the side $x w$ is equal to five y minus one. And we know that the side $v w$ is equal to four y plus three. Now we're going to multiply out the brackets. And we end up with $10 y$ minus two plus eight y plus six, and that whole thing is equal to 112. Now combining like terms, could I have 18 one plus four. And that's like minus four on both sides, we've got 108 is equal to 18. Why? Now I know that y is going to end up being equal to 108 over 18. What can we do with that? Well, they're both even numerator and denominator. So I'm just going to divide both by two. Now I've got 54 over nine. And when I divide 54, over nine, I noticed that 54 is equal to nine times six. And so I can rewrite this as six. So we've got y is equal to six. Now, what's the length $v w$, it's going to be equal to four y plus three, which means it must be equal to four times six, plus three, which means it's equal to 24 plus three or 27. Saw the length of the side, $v w$ is equal to 27. Now let's go into ALEKS and see if we've got the right answer. Here we are in ALEKS. Here's the question we were looking at. All I have to do is type in 27. And I will click the check button. And we got the right answer. So we just have to remember what a rectangle the properties of a rectangle and we can use, manipulate the equation to find out the length of one side. Pythagorean theorem. So we do use this in economics, we often use this and undergraduate economics when we're trying to simplify social welfare calculations. Won't you probably have no idea what that means. But you're probably going to come across the Pythagorean theorem in your micro economics class, also, possibly in your econometrics class, where you can use a geometric approach to statistical analysis. So let's take a look what is Pythagoras theorem, it really just says that the first short side of the triangle squared plus the other short side squared is equal to The long side or the high pot news square. So an easier way to remember it is the short side squared plus the short side squared is equal to the long side squared. Now let's take a look at a problem. So we've got a Pythagoras theorem here, we've got a right triangle, and we're being asked to find find the side length x . So we know that the long side squared is equal to the short side squared plus the other short side squared, multiply this out, we get 100 is equal to 64 plus x square x squared is equal to 36. And x is equal to six. Here's another question with triangles. So we're being asked to find the area of the triangle below. Well,

if I draw a triangle, like that, notice that it's half the area of a rectangle, it's half the area of a rectangle. And so the formula here for the area of a triangle is just one half times the base times the height. Or similarly to with Pythagoras theorem, it's one half the first short side times the second short side, and we don't need the high pot news to get the area of the rectangle. So what is the area this rectangle? Well, it's going to be one half, times 12 times 16. And if I want to calculate this without a calculator, I could rewrite it as 12 times eight, make the largest number a little bit smaller. And if I wanted to fully factor this thing out, I could have three times four, times four, times two. And maybe I'll go three times four, that gives me 12. For 12, sets 4848 times to the area, this rectangle is 96. Our last problem, we'll look at the angle measure of a triangle, and very simply all triangles. Angles sum to 180 degrees. And so that makes answering this problem really quite simple. We want to know what this x value is the angle of this corner up here, it's going to be equal to x plus 68 degrees plus 30 degrees, it's going to be equal to 180 degrees. And so x is just going to be equal to 82 degrees. Angles not something we use very much in economics. But if you're interested, here's a start for a with some other problems in the ALEKS geometry module.