

Video 4.3A Transcript - Area of an Oblique Triangle

This video presentation is to demonstrate how to find the area of an oblique triangle. Recall, to find the area of a triangle, the formula we know from basic geometry class is half times base of the triangle times the height of the triangle, where the height is required. What if we do not know the height of a triangle? How can we still go about finding the area? For example, if I draw a triangle where I only give you two sides: twenty-four on one side of the triangle... uh... well let's put twenty-four down here, and put ten on the left side of the triangle. Give you two sides of a triangle, rather than give you a height. Instead I'm going to give you an angle. Let's call this angle sixty-two degrees. So, if you find the area, we can use this formula: area equal to half times b times c times the sine of angle A. The b and c are the sides of a triangle, and capital letter A is the angle that I'm giving you: sixty-two degrees. So, if I will label this as angle A, this is angle B, the top vertex as angle C. Then ten will be side b. Twenty-four will be side c. So now, without the height, if I know two sides of a triangle and I know one angle that's included between the two sides, I can still find the area. So, the area will be half times side b is ten times side c is twenty-four times the sine of sixty-two degrees. We can set the calculator in the degree mode and type in this whole thing into the calculator; the area will be about one hundred six.

What if I do not give you an angle? Instead I give you three sides of a triangle. So, for example, if I have this side is eight, this side is eight, and this is a six (an isosceles triangle). Only giving you three sides, to find the formula we will use the Heron's Formula for areas of a triangle. Heron's Formula states that the area will equal the square root of s, times s minus a, times s minus b, times s minus c where s is equal to half its perimeter. That means s is half of the perimeter of this triangle. That'll be half times side a plus side b plus side c. The first thing we need to find is to find s before we can use this formula. So, s got to equal to half times side a plus side b plus side c: half the perimeter of this triangle. Excuse me, side c is six. If we put this in a calculator all at one time it will tell me the s is equal to eleven. Once I find s, I can use the formula. So, the area of this isosceles triangle will be square root of eleven, times eleven minus eight, times eleven minus eight, times eleven minus six. If I put the entire square root into the calculator, it will give me approximately about twenty-two as an area. So, we can use the Heron's Formula to find the area where the problem gives only three sides of a triangle, or we can use area of an oblique triangle here if I'm given two sides and an included angle. I can use this formula to find the angle. That will conclude this video presentation.