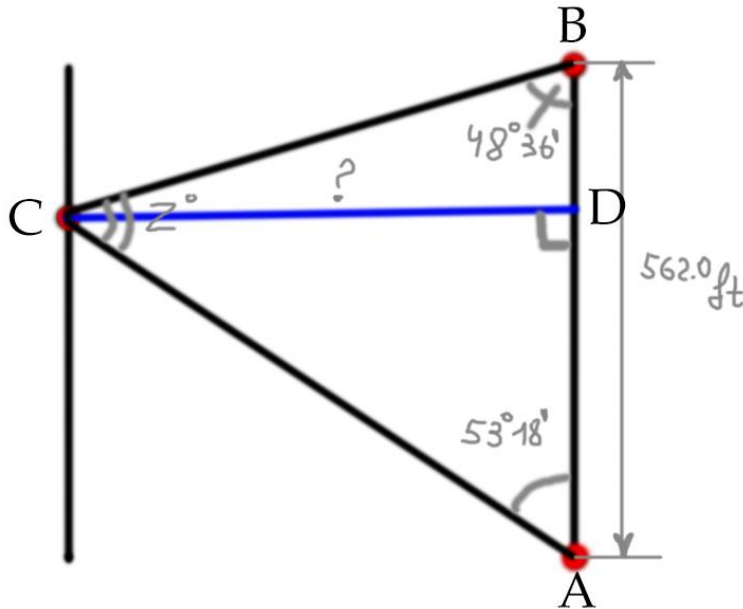


Answer on Question #58421 – Math – Trigonometry

Question

A LINE AB along one bank of a stream is 562.0 ft. long and C is a point on the opposite bank. The angle BAC is $53^{\circ}18'$ and the angle ABC is $48^{\circ}36'$. Find the width of the stream.



Solution

First of all, let's find z° angle. The sum of interior angles of any triangle is equal to 180° . (Notice that we will convert minutes to degrees).

$$\angle BAC = \angle A = 53^{\circ}18' = (53^{\circ}) \cdot \left(\frac{18}{60}\right)^{\circ} = 53.3^{\circ},$$

$$\angle ABC = \angle B = 48^{\circ}36' = (48^{\circ}) \cdot \left(\frac{36}{60}\right)^{\circ} = 48.6^{\circ},$$

$$\angle ACB = \angle C = 180 - \angle A - \angle B = 180 - 53.3^{\circ} - 48.6 = \mathbf{78.1^{\circ}}$$

Next we will use the SINE Law $\left(\frac{\sin \angle C}{AB} = \frac{\sin \angle B}{CA} = \frac{\sin \angle A}{CB}\right)$ to obtain CB:

$$\frac{\sin \angle C}{AB} = \frac{\sin \angle A}{CB},$$

$$CB = AB \cdot \frac{\sin \angle A}{\sin \angle C} = 562.0 \text{ ft} \cdot \frac{\sin(53.3^{\circ})}{\sin(78.1^{\circ})} \approx \mathbf{460.49 \text{ ft}},$$

Let's look at $\triangle CBD$ (right triangle). CD is our goal. We know $\angle B$ angle and hypotenuse CB , so let's use the definition of the sine function:

$$\sin \angle B = \frac{CD}{CB},$$

$$CD = CB \cdot \sin \angle B = 460.49 \text{ ft} \cdot \sin(48.6^\circ) \approx \mathbf{345.42 \text{ ft}}.$$

ANSWER: *Width of the stream is equal to 345.42 ft.*