Answer on Question #42402 – Math - Geometry

Problem

Solve the triangle.

B = 73°, b = 15, c = 8

Help me please

Solution.

The Law of Sines gives $\frac{\sin B}{b} = \frac{\sin C}{c} \Rightarrow \sin C = \sin B \times \frac{c}{b} = \sin 73° \times \frac{8}{15} \approx 0.9563 \times \frac{8}{15} \approx 0.5100.$

Then we have 2 cases:

$C = \sin^{-1} 0.5100 \approx 30.6638°$ or $C = 180° - \sin^{-1} 0.5100 \approx 180° - 30.6638° = 149.3362°.$

In the second case, $B + C = 149.3362° + 73° = 222.3362° > 180° = A + B + C,$ contradiction.

Thus, $C = 30.6638°$. Since $A + B + C = 180°$, we have $A = 180° - 73° - 30.6638° = 76.3362°.$

Then, from the Law of Sines,

$$\frac{\sin B}{b} = \frac{\sin A}{a} \Rightarrow a = \sin A \frac{b}{\sin B} = \sin 76.3362° \frac{15}{\sin 73°} \approx 0.9717 \frac{15}{0.9563} \approx 15.2416.$$

So, the answer is $C = 30.6638°,\ A = 76.3362°, a = 15.2416.$