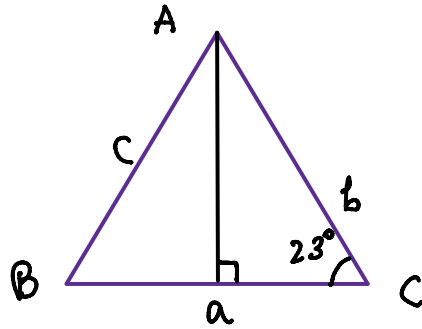


Question. In $\triangle ABC$, AD is the altitude from A. Given $b > c$, $\angle C = 23^\circ$ and $AD = \frac{abc}{b^2 - c^2}$, then $\angle B$ is equal to: [IIT 1994, 2]

Solution.



$$\begin{aligned} \cos B &= \frac{c^2 + a^2 - b^2}{2ac} \\ &= \frac{a^2}{2ac} - \frac{b}{2} \left(\frac{b^2 - c^2}{abc} \right) \\ &= \frac{a}{2c} - \frac{b}{2AD} \\ &= \frac{\sin A}{2 \sin C} - \frac{1}{2 \sin C} \end{aligned}$$

{ Using Sine Law }
& $\sin C = \frac{AD}{b}$

$$2 \sin C \cdot \cos B = \sin A - 1$$

$$\Rightarrow \sin(B+C) - \sin(B-C) = \sin\{\pi - (B+C)\} - 1$$

$$\Rightarrow \cancel{\sin(B+C)} - \sin(B-C) = \cancel{\sin(B+C)} - 1$$

$$\Rightarrow \sin(B - 23^\circ) = 1$$

$$\Rightarrow \boxed{B = 113^\circ} \quad \underline{\underline{\text{Ans}}}$$