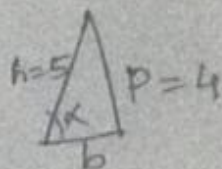


$$A. \sin \alpha = \frac{4}{5}, \alpha \text{ in I}^{\text{st}} \text{ quadrant}$$

$$\cot \beta = -\frac{3}{2}, \beta \text{ in II}^{\text{nd}} \text{ quadrant}$$

$$\tan \beta = \frac{1}{\cot \beta} = \frac{1}{-3/2} = -\frac{2}{3}$$



$$\sin \alpha = \frac{p}{h} = \frac{4}{5}$$

using pythagoras law

$$h^2 = b^2 + p^2$$

$$5^2 = b^2 + 4^2$$

$$25 = b^2 + 16$$

$$b^2 = 25 - 16 = 9$$

$$b = \sqrt{9} = 3$$

$$\therefore \tan \alpha = \frac{p}{b} = \frac{4}{3}$$

$$\tan(\alpha + \beta) = \frac{\tan \alpha + \tan \beta}{1 - \tan \alpha \tan \beta} = \frac{\frac{4}{3} + \left(-\frac{2}{3}\right)}{1 - \frac{4}{3} \times \left(-\frac{2}{3}\right)}$$

$$= \frac{\frac{4}{3} - \frac{2}{3}}{1 + \frac{8}{9}} = \frac{\frac{2}{3}}{\frac{9+8}{9}} = \frac{2}{3} \times \frac{9}{17}$$

$$= \frac{6}{17}$$

$$\therefore \tan(\alpha + \beta) = \frac{6}{17}$$

2 Find the exact value of the expression

$$\sin \left[\cos^{-1} \left(\frac{\sqrt{6}}{3} \right) + \tan^{-1} \left(-\frac{3}{4} \right) \right]$$

Ans

Let $\cos^{-1} \left(\frac{\sqrt{6}}{3} \right) = \alpha$ then $\cos \alpha = \frac{\sqrt{6}}{3}$

and $\sin \alpha = \sqrt{1 - \cos^2 \alpha} = \sqrt{1 - \frac{6}{9}} = \sqrt{\frac{3}{9}} = \frac{\sqrt{3}}{3}$

Let $\tan^{-1} \left(-\frac{3}{4} \right) = \beta$ then we have $\tan \beta = \left(-\frac{3}{4} \right)$

and,

$$\cos \beta = \frac{1}{\sec \beta} = \frac{1}{\sqrt{1 + \tan^2 \beta}} = \frac{1}{\sqrt{1 + \frac{9}{16}}} = \frac{4}{5}$$

and,

$$\sin \beta = \tan \beta \times \cos \beta = \left(-\frac{3}{4} \right) \times \frac{4}{5} = \left(-\frac{3}{5} \right)$$

Hence, $\sin \left[\cos^{-1} \left(\frac{\sqrt{6}}{3} \right) + \tan^{-1} \left(-\frac{3}{4} \right) \right]$

$$= \sin \alpha \cos \beta + \cos \alpha \sin \beta$$

$$= \frac{\sqrt{3}}{3} \times \frac{4}{5} + \frac{\sqrt{6}}{3} \times \left(-\frac{3}{5} \right)$$

$$= \frac{4\sqrt{3}}{15} - \frac{3\sqrt{6}}{15}$$

$$= \frac{4\sqrt{3} - 3\sqrt{6}}{15}$$

3 Road cone :

Ans

Given, $\angle A = 32^\circ$, Find AP? Assume AP = x

$$\angle B = 112^\circ \quad (\because 180^\circ - 68^\circ)$$

From angle property of triangle, $\angle P = 180^\circ - \angle A + \angle B$

Also,

$$\angle P = 36^\circ$$

$$\frac{2}{\sin 36^\circ} = \frac{x}{\sin 112^\circ}$$

$$\Rightarrow x = 3.15 \text{ ft}$$

SHOT ON REDMI 7
AI DUAL CAMERA

the steel cord is 3.15 feet