

Trigo general

We have to find $\alpha = ?$

Given

$$\cos^4\alpha + \sin^4\alpha = \frac{7}{8}, \quad 0 < \alpha < 90^\circ$$

$$\cos^4\alpha + \sin^4\alpha = (\cos^2\alpha + \sin^2\alpha)^2 - 2\sin^2\alpha\cos^2\alpha =$$

$$= 1^2 - \frac{1}{2}(\sin 2\alpha)^2 = \frac{7}{8}$$

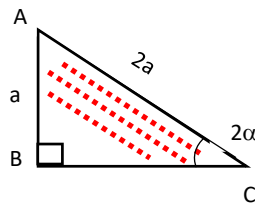
$$\frac{1}{2}(\sin 2\alpha)^2 = 1 - \frac{7}{8}$$

$$(\sin 2\alpha)^2 = \frac{1}{8} \cdot 2 = \frac{1}{4}$$

$$\sin 2\alpha = \frac{1}{2}$$

$$2\alpha = 30^\circ$$

$$\alpha = 15^\circ$$



Given (1) $\tan \alpha = \frac{1}{3}$

(2) $\beta = 2\alpha$

Find $x = ?$

$$\tan \beta = \tan 2\alpha = \frac{x}{3} = \frac{2 \cdot \frac{1}{3}}{1 - \frac{1}{9}}$$

$$\frac{x}{3} = \frac{2/3}{8/9} = \frac{2}{3} \cdot \frac{9}{8} = \frac{3}{4}, \quad \frac{x}{3} = \frac{6}{8} = \frac{3}{4}$$

$$x = \frac{9}{4} = 2\frac{1}{4}$$

