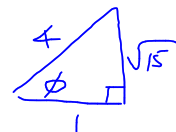
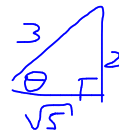


$$8a) \quad \cos = \frac{4}{5}$$

$$\begin{aligned} \cos 2\alpha &= 2\cos^2\alpha - 1 \\ &= 2\left(\frac{4}{5}\right)^2 - 1 \end{aligned}$$

$$9c) \sin \theta = \frac{2}{3}$$

$$\cos \phi = \frac{1}{4}$$

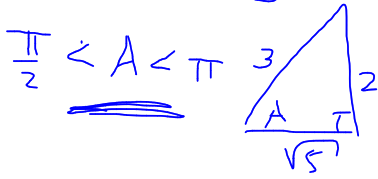


$$\begin{aligned} \cos(\theta - \phi) &= \cos \theta \cos \phi + \sin \theta \sin \phi \\ &= \left(\frac{\sqrt{5}}{3}\right)\left(\frac{1}{4}\right) + \left(\frac{2}{3}\right)\left(\frac{\sqrt{15}}{4}\right) \\ &= \frac{\sqrt{5} + 2\sqrt{15}}{12} \\ &= \frac{\sqrt{5}(1 + 2\sqrt{3})}{12} \end{aligned}$$

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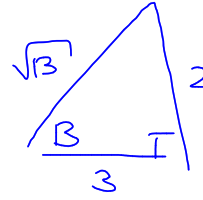
$$\sin A = \frac{2}{3}$$

$$\frac{\pi}{2} < A < \pi$$



$$\tan B = \frac{2}{3}$$

$$\pi < B < \frac{3\pi}{2}$$



$$\cos(A+B) = \cos A \cos B - \sin A \sin B$$

$$= \left(-\frac{\sqrt{5}}{3}\right) \left(-\frac{3}{\sqrt{3}}\right) - \left(\frac{2}{3}\right) \left(-\frac{2}{\sqrt{3}}\right)$$

$$= \frac{3\sqrt{5} + 4}{3\sqrt{3}}$$

$$\begin{aligned} 13c) \cot 285^\circ &= \cot 105^\circ \\ &= \cot(60 + 45) \end{aligned}$$

$$= \frac{1 - \tan 60 \tan 45}{\tan 60 + \tan 45}$$

$$= \frac{1 - \sqrt{3}}{\sqrt{3} + 1}$$

$$16a) \frac{2\sin(x-y)}{\cos(x+y) - \cos(x-y)} = \cot x - \cot y$$

$$\begin{aligned} \frac{2\sin(x-y)}{\cos(x+y) - \cos(x-y)} &= \frac{2(\sin x \cos y - \cos x \sin y)}{-2\sin x \sin y} \\ &= \frac{\cos x}{\sin x} - \frac{\cos y}{\sin y} \\ &= \cot x - \cot y \end{aligned}$$

16b)

$$\frac{\sin(\theta + \phi)}{\cos(\theta - \phi)} = \frac{\tan \theta + \tan \phi}{1 + \tan \theta \tan \phi}$$

$$\begin{aligned} \frac{\sin(\theta + \phi)}{\cos(\theta - \phi)} &= \frac{\sin \theta \cos \phi + \cos \theta \sin \phi}{\cos \theta \cos \phi + \sin \theta \sin \phi} \\ &= \frac{\frac{\sin \theta \cos \phi}{\cos \theta \cos \phi} + \frac{\cos \theta \sin \phi}{\cos \theta \cos \phi}}{\frac{\cos \theta \cos \phi}{\cos \theta \cos \phi} + \frac{\sin \theta \sin \phi}{\cos \theta \cos \phi}} \\ &= \frac{\tan \theta + \tan \phi}{1 + \tan \theta \tan \phi} \end{aligned}$$

17a)

$$\sin(A+B)\sin(A-B) = \sin^2 A - \sin^2 B$$

$$\sin(A+B)\sin(A-B) = (\sin A \cos B + \cos A \sin B)(\sin A \cos B - \cos A \sin B)$$

$$= \sin^2 A \cos^2 B - \cos^2 A \sin^2 B$$

$$= \sin^2 A (1 - \sin^2 B) - (1 - \sin^2 A) \sin^2 B$$

$$= \sin^2 A - \sin^2 A \sin^2 B - \sin^2 B + \sin^2 A \sin^2 B$$

$$= \underline{\sin^2 A - \sin^2 B}$$

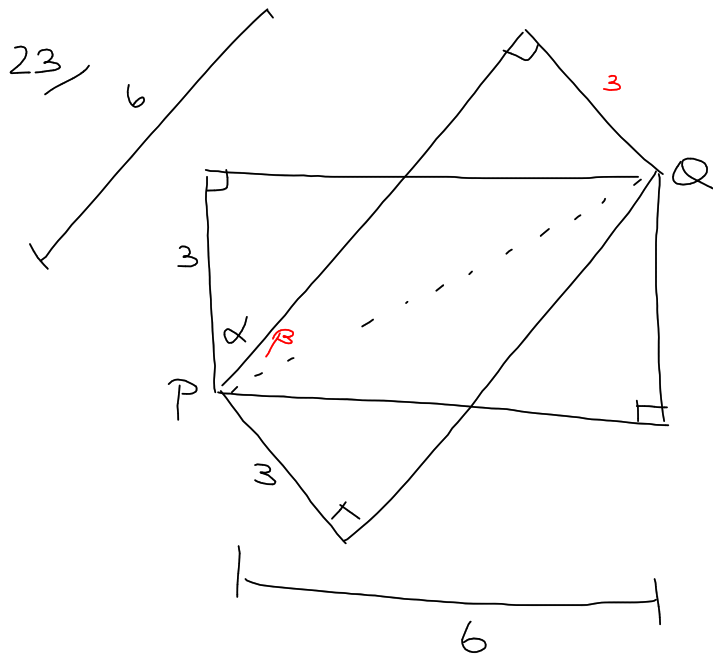
$$17b) \sin^2 75^\circ - \sin^2 15^\circ$$

$$= \sin 90^\circ \sin 60^\circ$$

$$= (1) \left( \frac{\sqrt{3}}{2} \right)$$

$$= \frac{\sqrt{3}}{2}$$





$$\tan \alpha = \frac{3}{4}$$

$$\tan \beta = \frac{1}{2}$$

$$\tan(\alpha + \beta) = 2$$

$$2 = \frac{\tan \alpha + \tan \beta}{1 - \tan \alpha \tan \beta}$$

$$2 = \frac{\tan \alpha + \frac{1}{2}}{1 - \frac{1}{2} \tan \alpha}$$

$$2 = \frac{2 \tan \alpha + 1}{2 - \tan \alpha}$$

$$4 - 2 \tan \alpha = 2 \tan \alpha + 1$$

$$4 \tan \alpha = 3$$

$$\tan \alpha = \frac{3}{4}$$