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$$\cos\left(2\alpha+\frac{\pi}{3}\right)-\operatorname{sen}\left(2\alpha+\frac{\pi}{6}\right)=-2\sqrt{3}\operatorname{sen}\alpha\cos\alpha \qquad -2\sqrt{3}\operatorname{sen}\alpha\cos\alpha$$

$$\cos 2\alpha\cos\frac{\pi}{3}-\operatorname{sen}2\alpha\operatorname{sen}\frac{\pi}{3}-\operatorname{sen}2\alpha\cos\frac{\pi}{6}-\cos 2\alpha\operatorname{sen}\frac{\pi}{6}=$$

$$\frac{\cos(2\alpha+2\alpha)}{2}-\frac{\sqrt{3}\operatorname{sen}(\alpha+2\alpha)}{2}-\frac{\sqrt{3}(\operatorname{sen}2\alpha)}{2}-\frac{\cos(2\alpha+2\alpha)}{2}=-2\sqrt{3}\operatorname{sen}\alpha\cos\alpha$$

$$-\frac{2\sqrt{3}\operatorname{sen}(\alpha+2\alpha)}{2}=-2\sqrt{3}\operatorname{sen}\alpha\cos\alpha$$

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$\cos 3\alpha \Rightarrow \cos(2\alpha+\alpha) = \cos 2\alpha \cos\alpha - \operatorname{sen} 2\alpha \operatorname{sen}\alpha =$

$= \cos\alpha(\cos^2\alpha - \operatorname{sen}^2\alpha) - \operatorname{sen}\alpha(2\operatorname{sen}\alpha\cos\alpha) =$

$= \cos^3\alpha - \cos\alpha\operatorname{sen}^2\alpha - 2\operatorname{sen}^2\alpha\cos\alpha =$

$\cos^2\alpha + \operatorname{sen}^2\alpha = 1$

$\cos^2\alpha = 1 - \operatorname{sen}^2\alpha$

$= \cos^3\alpha - 3\cos\alpha\operatorname{sen}^2\alpha =$

$= \cos\alpha(\cos^2\alpha - 3\operatorname{sen}^2\alpha) =$

$= \cos\alpha(\cos^2\alpha - 3 + 3\cos^2\alpha) =$

$= 4\cos^3\alpha - 3\cos\alpha$

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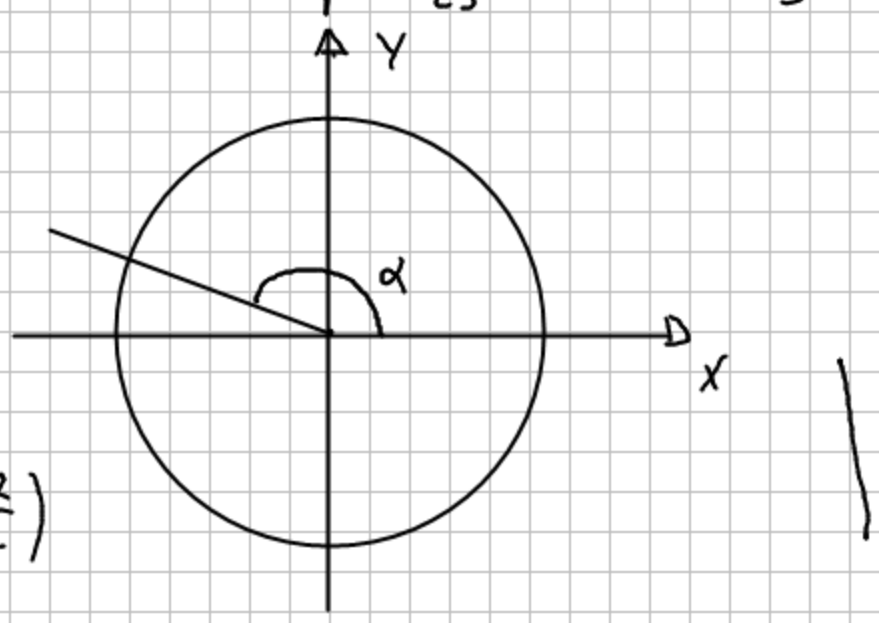
$\operatorname{sen}\alpha = \frac{3}{5} \quad \frac{\pi}{2} < \alpha < \pi$

$\operatorname{sen}^2\alpha + \cos^2\alpha = 1$

$\cos^2\alpha = 1 - \operatorname{sen}^2\alpha$

$\cos\alpha = -\sqrt{1 - \frac{9}{25}} \Rightarrow \cos\alpha = -\frac{4}{5}$

$\cos\alpha = -\frac{4}{5}$



$\frac{3}{5} = \operatorname{sen}\alpha$

$\operatorname{sen}\alpha = \operatorname{sen}\left(\frac{\alpha}{2} + \frac{\alpha}{2}\right) = \operatorname{sen}\left(\frac{2\alpha}{2}\right)$

$\operatorname{sen} 2\left(\frac{\alpha}{2}\right) = 2\operatorname{sen}\frac{\alpha}{2}\cos\frac{\alpha}{2} = 2\operatorname{sen}\frac{\alpha}{2} \cdot \sqrt{\frac{\cos\alpha + 1}{2}} =$

$\frac{\alpha}{2} = A$

$\operatorname{sen}\frac{\alpha}{2} = + \sqrt{\frac{\operatorname{sen}^2\alpha}{\frac{\cos\alpha + 1}{2}}}$

$\cos\alpha = \cos 2\left(\frac{\alpha}{2}\right) = \cos^2\frac{\alpha}{2} - \operatorname{sen}^2\frac{\alpha}{2} = 2\cos^2\frac{\alpha}{2} - 1$

$\operatorname{sen}\frac{\alpha}{2} = \frac{\frac{3}{5}}{\sqrt{\frac{2}{5}}} = \frac{3}{5} \cdot \sqrt{\frac{5}{2}} \Rightarrow \frac{3\sqrt{5}}{5\sqrt{2}}$

$\cos^2\frac{\alpha}{2} = + \frac{\cos\alpha + 1}{2}$

$\operatorname{Sen}\frac{\alpha}{2} = \frac{3}{\sqrt{10}}$

$\cos\frac{\alpha}{2} = \sqrt{\frac{-\frac{4}{5} + 1}{2}} = \sqrt{\frac{1}{10}}$

$\operatorname{tg}\frac{\alpha}{2} = \frac{\operatorname{sen}\frac{\alpha}{2}}{\cos\frac{\alpha}{2}} = \frac{\frac{3}{\sqrt{10}}}{\frac{1}{\sqrt{10}}} = 3$

$\operatorname{ctg}\frac{\alpha}{2} = \frac{1}{3}$

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$\operatorname{tg}\left(\frac{\pi}{2} + \frac{\alpha}{2}\right)$

$\operatorname{cosec}\alpha = \frac{5}{4} \qquad \boxed{\frac{\pi}{2} < \alpha < \pi}$

$\operatorname{cosec}\alpha = \frac{1}{\operatorname{sen}\alpha}$

$\cos\alpha = \cos 2\left(\frac{\alpha}{2}\right) = \cos^2\frac{\alpha}{2} - \operatorname{sen}^2\frac{\alpha}{2} =$

$2\cos^2\frac{\alpha}{2} - 1$

$\operatorname{sen}\alpha = \frac{4}{5}$

$\cos^2\frac{\alpha}{2} = \frac{\cos\alpha + 1}{2}$

$\cos^2\alpha + \operatorname{sen}^2\alpha = 1$

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

$\cos^2\alpha = 1 - \frac{16}{25} = \frac{9}{25} \Rightarrow \cos\alpha = -\frac{3}{5}$

$\frac{\pi}{4} < \frac{\alpha}{2} < \frac{\pi}{2}$

$\cos\frac{\alpha}{2} = \pm\sqrt{\frac{-\frac{3}{5} + 1}{2}} = \pm\sqrt{\frac{2}{10}} = \pm\sqrt{\frac{1}{5}}$

$\operatorname{sen}\frac{\alpha}{2} = \sqrt{1 - \frac{1}{5}} = \operatorname{Sen}\frac{\alpha}{2} = \sqrt{\frac{4}{5}}$