

$$\frac{\tan(\pi - \alpha) + \tan(\pi + \alpha)}{\pi}$$

$$\frac{\tan(\pi - \alpha) - \tan(\pi + \alpha)}{\pi} = \frac{-\tan \alpha - (-\tan \alpha)}{\pi} = 0$$

$$\frac{\tan(\frac{\pi}{4} - \alpha) + \tan(\frac{\pi}{4} + \alpha)}{\tan(\pi - \alpha) - \tan(\pi + \alpha)} = \frac{\cot \alpha}{-2 \tan \alpha}$$

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

$$\frac{\sin^4 \alpha + \cos^4 \alpha + 4 \sin^2 \alpha \cos^2 \alpha + \sin^4 \alpha + \cos^4 \alpha - 2 \cos^2 \alpha \sin^2 \alpha}{\sin^4 \alpha - \cos^4 \alpha}$$

$$\Rightarrow \cos^2 \alpha < \frac{1}{4}$$

$$\tan \alpha < \frac{1}{2} < \frac{\pi}{4}$$

$$\frac{\sin^4 \alpha + \cos^4 \alpha + 4 \sin^2 \alpha \cos^2 \alpha + \sin^4 \alpha + \cos^4 \alpha - 2 \cos^2 \alpha \sin^2 \alpha}{\sin^4 \alpha - \cos^4 \alpha} = \frac{4 \sin^2 \alpha \cos^2 \alpha}{\cos^4 \alpha} = 4 \tan^2 \alpha$$

$$\cos^2 \alpha < \frac{1}{4}$$

$$\tan \alpha < \frac{1}{2}$$

$$\cos(4\pi/5) = \cos^2(2\pi/5) = \frac{1 + \cos(4\pi/5)}{2} = \cos^2(2\pi/5) = \frac{1 + \sqrt{\frac{1 + \sqrt{5}}{2}}}{2}$$

$$\sin(4\pi/5) = \sin^2(2\pi/5)$$

$$\frac{1 - \cos(4\pi/5)}{2} = \sin^2(2\pi/5) = \frac{1 - \sqrt{\frac{1 + \sqrt{5}}{2}}}{2}$$