Answer on Question #48679 – Math – Trigonometry

Find the exact value by using a half-angle identity.

cosine of five pi divided by twelve.

Solution:

We need to find the exact value of the

$$\cos\frac{5\pi}{12}$$

Using a half-angle identity:

$$\cos\frac{5\pi}{12} = \cos\frac{\frac{5\pi}{6}}{2} = \pm\sqrt{\frac{1}{2}\left(1 + \cos\frac{5\pi}{6}\right)}$$

We know that $\cos\frac{5\pi}{6} = -\frac{\sqrt{3}}{2}$

$$\cos\frac{5\pi}{12} = \pm\sqrt{\frac{1}{2}\left(\frac{2}{2} - \frac{\sqrt{3}}{2}\right)}$$

$$\cos\frac{5\pi}{12} = \pm\sqrt{\frac{1}{2}\left(\frac{2 - \sqrt{3}}{2}\right)}$$

$$\cos\frac{5\pi}{12} = \pm\sqrt{\frac{2 - \sqrt{3}}{4}}$$

$$\cos\frac{5\pi}{12} = \pm\frac{\sqrt{2 - \sqrt{3}}}{2}$$

$\frac{5\pi}{12}$ is in quadrant 1 so we choose the «+» sign because cosine is positive there

$$\cos\frac{5\pi}{12} = \frac{\sqrt{2 - \sqrt{3}}}{2}$$

Answer: $\cos\frac{5\pi}{12} = \frac{\sqrt{2-\sqrt{3}}}{2}$