

Tough Nut to Crack – Trigonometry Problem

To be submitted by 8pm Monday 9th February 2015.

The prize is a mathematics book yet to be decided.

Determine the *first error* in the following derivation:

$$\cos^2(x) = 1 - \sin^2(x)$$

This implies that

$$\cos(x) = \sqrt{1 - \sin^2(x)}$$

Adding 1 and squaring gives

$$\left[1 + \cos(x)\right]^2 = \left[1 + \sqrt{1 - \sin^2(x)}\right]^2$$

At $x = \frac{2\pi}{3}$ we have

$$\left[1 - \frac{1}{2}\right]^2 = \left[1 + \sqrt{1 - \frac{3}{4}}\right]^2$$

$$\frac{1}{4} = \left[1 + \frac{1}{2}\right]^2$$

$$1 = 9$$

You need to give reasons why there is an error.

The solution needs to be word processed and emailed to me at

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The criteria for winning the prize is order of priority are

- 1) The correct answers.
- 2) The best presented answers.