Common Trigonometry Mistakes

Solving an Equation

The Goal

Solve the following equation for x:

$$\sin^2(x) = \frac{3}{4}$$

The Mistake

Find the mistake:

$$\sin^2(x) = \frac{3}{4} \implies \sin(x) = \frac{\sqrt{3}}{2} \implies x = \frac{\pi}{3} + 2k\pi, \frac{2\pi}{3} + 2k\pi$$

Need a hint? Look carefully at the red part:

$$\sin^2(x) = \frac{3}{4} \implies \sin(x) = \frac{\sqrt{3}}{2} \implies x = \frac{\pi}{3} + 2k\pi, \frac{2\pi}{3} + 2k\pi$$

The Correction

$$\sin^2(x) = \frac{3}{4} \implies \sin(x) = \pm\frac{\sqrt{3}}{2} \implies x = \frac{\pi}{3} + 2k\pi, \frac{2\pi}{3} + 2k\pi, \frac{4\pi}{3} + 2k\pi, \frac{5\pi}{3} + 2k\pi$$

$$\left(\text{or } x = \frac{\pi}{3} + k\pi, \frac{2\pi}{3} + k\pi\right)$$

An Explanation

Don't forget the negative square root of c when solving $X^2 = c$.
(In this example X = sin(x) and c = 3/4.)

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