

PC A-Level Trig EOS WS #2

1. $\cos^2 x - \sin^2 x + 3\cos x - 1 = 0$

$\cos^2 x - (1 - \cos^2 x) + 3\cos x - 1 = 0$

$2\cos^2 x + 3\cos x - 2 = 0$

$(2\cos x - 1)(\cos x + 2) = 0$

$2\cos x = 1$

$\cos x = -2$

$\cos x = \frac{1}{2}$



$\left[\frac{\pi}{3}, \frac{5\pi}{3} \right]$

2. $2\sin x \cos x = 2\sin x$

$2\sin x \cos x - 2\sin x = 0$

$2\sin x (\cos x - 1) = 0$

$2\sin x = 0$

$\cos x - 1 = 0$

$\sin x = 0$

$\boxed{0, \pi}$

$\cos x = 1$

$\boxed{0}$

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3. $\tan^2 x - \sec^2 x = 1$

$$\tan^2 x - (\tan^2 x + 1) - 1 = 0$$

$$-2 = 0$$

no soln.

4. $3\sin x \cos^2 x + \sin^3 x = \sin x$

$$\sin^3 x + 3\sin x \cos^2 x - \sin x = 0$$

$$\sin x (\sin^2 x + \underline{\underline{3\cos^2 x - 1}}) = 0$$

$$\sin x (\sin^2 x + 3(1 - \sin^2 x) - 1) = 0$$

$$\sin x (\sin^2 x + 3 - 3\sin^2 x - 1) = 0$$

$$\sin x (-2\sin^2 x + 2) = 0$$

$$-2\sin x (\sin^2 x + 1) = 0$$

$$-2\sin x = 0$$

$$\sin x = 0$$

$$\boxed{0, \pi}$$

$$\sin^2 x - 1 = 0$$

$$\sin^2 x = 1$$

$$\sin x = \pm 1$$

$$\boxed{\frac{\pi}{2}, \frac{3\pi}{2}}$$

WS # 2

$$5. \quad 3\sin^3 x = \sin x \cos^2 x$$

$$3\sin^3 x - \sin x \cos^2 x = 0$$

$$\sin x (3\sin^2 x - \cos^2 x) = 0$$

$$\sin x (3\sin^2 x - (1 - \sin^2 x)) = 0$$

$$\sin x (4\sin^2 x - 1) = 0$$

$$\sin x = 0$$



$$0, \pi$$

$$4\sin^2 x - 1 = 0$$

$$\sin^2 x = \frac{1}{4}$$

$$\sin x = \pm \frac{1}{2}$$

$$\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$$

WS #2

(5) 6. $3\cos^2 x - 5\cos x = 1 + 3\sin^2 x$

$$3\cos^2 x - 5\cos x - 3\sin^2 x - 1 = 0$$

$$3\cos^2 x - 5\cos x - 3(1 - \cos^2 x) - 1 = 0$$

$$3\cos^2 x - 5\cos x - 3 + 3\cos^2 x - 1 = 0$$

$$6\cos^2 x - 5\cos x - 4 = 0$$

~~Factorizing the equation~~

~~Factorizing the equation~~
 $(2\cos x + 1)(3\cos x - 4) = 0$

$$2\cos x + 1 = 0$$

$$\cos x = -\frac{1}{2}$$

$$3\cos x - 4 = 0$$

$$\cos x = \frac{4}{3}$$

$$\frac{4}{3} > 1$$

$$\frac{2\pi}{3} \quad \frac{4\pi}{3}$$

$$\frac{2\pi}{3}, \frac{4\pi}{3}$$

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

$$\cos^2 x - (1 - \cos^2 x) - 2\cos x + 1 = 0$$

$$2\cos^2 x - 1 - 2\cos x + 1 = 0$$

$$2(\cos^2 x - \cos x) = 0$$

$$2\cos x (\cos x - 1) = 0$$

$$2\cos x = 0$$

$$\cos x - 1 = 0$$

$$\cos x = 0$$

$$\cos x = 1$$

$$\frac{\pi}{2}, \frac{3\pi}{2}, 0$$

$$8. \quad 1 + \cos x = 2\sin^2 x$$

$$1 + \cos x - 2\sin^2 x = 0$$

$$1 + \cos x - 2(1 - \cos^2 x) = 0$$

$$1 + \cos x - 2 + 2\cos^2 x = 0$$

$$2\cos^2 x + \cos x - 1 = 0$$

$$(2\cos x - 1)(\cos x + 1) = 0$$

$$\cos x = \frac{1}{2} \quad \cos x = -1$$

$$\frac{\pi}{3}, \frac{5\pi}{3} \quad \pi$$

WS 12

9. $\sin^2 x - 3\cos x - 1 = 0$

$$1 - \cos^2 x - 3\cos x - 1 = 0$$

$$-\cos^2 x - 3\cos x = 0$$

$$-\cos x (\cos x + 3) = 0$$

$$-\cos x = 0$$

$$\cos x = -3$$

$$\cos x = 0$$



$$\frac{\pi}{2}, \frac{3\pi}{2}$$

10. $\sqrt{3} \csc^2 x + 2 \csc x = 0$

$$\csc x (\sqrt{3} \csc x + 2) = 0$$

$$\csc x = 0$$

$$\csc x = -\frac{2}{\sqrt{3}}$$

$$\frac{1}{\sin x} = 0$$

$$\frac{1}{\sin x} = -\frac{2}{\sqrt{3}}$$



$$\sin x = -\frac{\sqrt{3}}{2}$$

$$\frac{\pi}{3}, \frac{4\pi}{3}$$

$$11. \quad 4 \tan x + 2 \sin x \cos x = 0$$

$$4 \frac{\sin x}{\cos x} + \frac{2 \sin x \cos^2 x}{\cos x} = 0$$

$$2 \sin x (2 + \cos^2 x) = 0$$

$$2 \sin x = 0 \quad \cos^2 x = -2$$

$$\sin x = 0$$

$$0, \pi$$

$$12. \quad \sin^2 x - \tan x \cos^2 x = 0$$

$$\sin^2 x - \frac{\sin x \cos^2 x}{\cos x} = 0$$

$$\sin^2 x - \sin x \cos x = 0$$

$$\sin x (\sin x - \cos x) = 0$$

$$\sin x = 0$$

$$0, \pi$$

$$\sin x = \cos x$$

$$\frac{\pi}{4}, \frac{5\pi}{4}$$

WS #2

13. $\sqrt{3} \tan^2 x + 2 \tan x - \sqrt{3} = 0$

☺ $(\sqrt{3} \tan x - 1)(\tan x + \sqrt{3}) = 0$

$$\tan x = \frac{1}{\sqrt{3}}$$

$$\tan x = -\sqrt{3}$$

$$\tan x = \frac{\sqrt{3}}{3}$$

$\frac{\pi}{3}$ fam
in Q2
Q4

$\frac{\pi}{6}$ fam
in Q1, Q3

$$\frac{\pi}{6}, \frac{7\pi}{6}$$

$$\frac{2\pi}{3}, \frac{5\pi}{3}$$

WS #2

$$14. \quad 2\sin^4 x - 2\cos^4 x = 1$$

😊

$$2(\sin^4 x - \cos^4 x) - 1 = 0$$

$$2[\sin^2 x + \cos^2 x][\sin^2 x - \cos^2 x] - 1 = 0$$

$$2(1)(\sin^2 x - \cos^2 x) - 1 = 0$$

$$2[\sin^2 x - (1 - \sin^2 x)] - 1 = 0$$

$$2[2\sin^2 x - 1] - 1 = 0$$

$$4\sin^2 x - 3 = 0$$

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

$$\sin x = \pm \frac{\sqrt{3}}{2}$$

$\frac{\pi}{3}$ fam

$\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$