

1. $(\sec \theta - \tan \theta)(1 + \sin \theta)$

$$\left(\frac{1}{\cos \theta} - \frac{\sin \theta}{\cos \theta}\right)(1 + \sin \theta)$$

change to sin/cos

$$\left(\frac{1 - \sin \theta}{\cos \theta}\right)(1 + \sin \theta)$$

common denominator

$$\frac{(1 - \sin^2 \theta)}{\cos \theta}$$

multiply

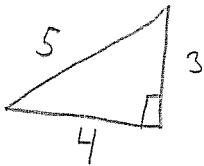
$$\frac{\cos^2 \theta}{\cos \theta}$$

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

$$\boxed{\cos \theta}$$

2.

$$\tan \theta = -\frac{3}{4}$$



$$\cos \theta = -\frac{4}{5}$$

$$\boxed{\sec \theta = -\frac{5}{4}}$$

3.

$$\frac{\sec^2 \theta}{\tan \theta + \cot^2 \theta \tan \theta}$$

$$\frac{\sec^2 \theta}{\tan \theta (1 + \cot^2 \theta)}$$

$$\frac{\sec^2 \theta}{\tan \theta \csc^2 \theta}$$

$$\sin^2 + \cos^2 = 1$$

$$1 + \cot^2 = \csc^2$$

Factor

3. (cont.)

$$\frac{\sin^2 \theta}{\tan \theta \cos^2 \theta}$$

change to sin/cos

$$\frac{\tan^2 \theta}{\tan \theta}$$

$$\frac{\sin}{\cos} = \tan$$

$$\boxed{\tan \theta}$$

divide

4.

$$\sin \theta + \cos \theta \tan \theta$$

$$\sin \theta + \cos \theta \frac{\sin \theta}{\cos \theta}$$

change to sin/cos

$$\sin \theta + \sin \theta$$

Divide

$$2 \sin \theta$$

Add

5.

$$\frac{1 + \tan^2 x}{\sec x} = \sin^2 x + \frac{1}{\sec^2 x}$$

$$1 + \tan^2 = \sec^2$$

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

$$\frac{1}{\sec^2} = \cos^2$$

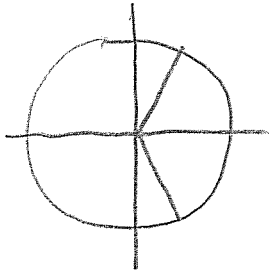
$$\sin^2 + \cos^2 = 1$$

$$\sec x = 1$$

$$\boxed{\cos x = 1}$$

$$\cos = \frac{1}{\sec}$$

6. $\sin(285^\circ) = -\sin(75^\circ) = -\sin(45+30)$



$$= -[\sin 45 \cos 30 + \cos 45 \sin 30]$$

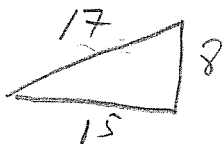
$$= -\left[\frac{\sqrt{2}}{2} \frac{\sqrt{3}}{2} + \frac{\sqrt{2}}{2} \frac{1}{2}\right]$$

$$= \boxed{\frac{-\sqrt{6} - \sqrt{2}}{4}}$$

7.

$$\sin(\alpha - \beta) = \sin \alpha \cos \beta - \cos \alpha \sin \beta = \left(\frac{8}{17}\right)\left(\frac{24}{25}\right) - \left(\frac{15}{17}\right)\left(\frac{7}{25}\right)$$

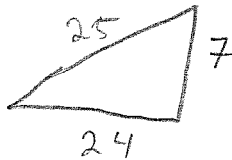
$$\cos \alpha = \frac{15}{17}$$



$$\sin \alpha = \frac{8}{17}$$

$$\cot \beta = \frac{24}{7}$$

$$\tan \beta = \frac{7}{24}$$



$$\cos \beta = \frac{24}{25}$$

$$\sin \beta = \frac{7}{25}$$

$$\frac{192 - 105}{425} = \boxed{\frac{87}{425}}$$

8.

$$\cos\left(\frac{\pi}{2} - \theta\right) = \cos \frac{\pi}{2} \cos \theta + \sin \frac{\pi}{2} \sin \theta$$

$$= (0) \cos \theta + (1) \sin \theta = \boxed{\sin \theta}$$

9.

$$\sec \theta = 4$$

$$\sin \theta = \frac{1}{4}$$

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

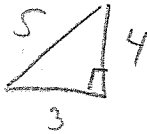
$$= 1 - 2\left(\frac{1}{4}\right)^2 = 1 - \frac{2}{16}$$

$$= \boxed{\frac{7}{8}}$$

10.

$$\cos \theta = \frac{3}{5} \quad \text{QIV}$$

$$\sin \theta = -\frac{4}{5}$$



$$\sin 2\theta = 2 \sin \theta \cos \theta$$

$$= 2 \left(\frac{3}{5} \right) \left(-\frac{4}{5} \right)$$

$$= \boxed{\frac{-24}{25}}$$

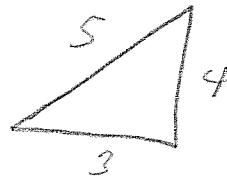
11.

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

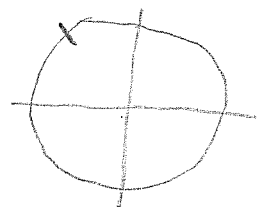
$$= \frac{2 \left(\frac{4}{3} \right)}{1 - \left(\frac{4}{3} \right)^2} = \frac{\frac{8}{3}}{\frac{9-16}{9}}$$

$$= \frac{\frac{8}{3}}{\frac{-7}{9}} = \frac{8}{3} \cdot \frac{9}{-7} = \boxed{\frac{-24}{7}}$$

$$\sin \theta = -\frac{4}{5} \quad \text{QIII}$$



$$\tan \theta = +\frac{4}{3}$$



12.

$$\cos(67.5) = \cos\left(\frac{135}{2}\right)$$

$$\cos 135 = -\frac{\sqrt{2}}{2}$$

$$\cos\left(\frac{\alpha}{2}\right) = \pm \sqrt{\frac{1 + \cos \alpha}{2}} = \pm \sqrt{\frac{1 - \frac{\sqrt{2}}{2}}{2}} = \sqrt{\frac{2 - \sqrt{2}}{4}}$$

$$= \boxed{\frac{\sqrt{2 - \sqrt{2}}}{2}}$$

13.

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

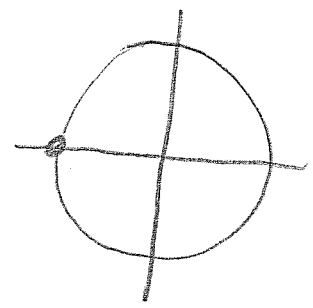
$$2 \cos x - (1 - \cos^2 x) + 2 = 0$$

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

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

$$\cos x = -1 \quad \boxed{x = \pi}$$

$0 < x < 2\pi$



14.

$$2 \cos^2 x = \sqrt{3} \cos x$$

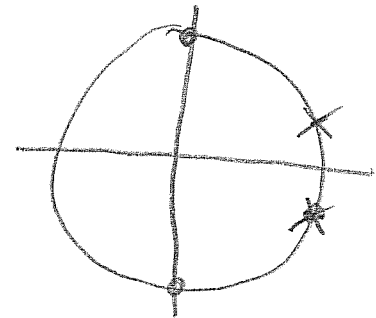
$$2 \cos^2 x - \sqrt{3} \cos x = 0$$

$$\cos x (2 \cos x - \sqrt{3}) = 0$$

$0 < x < 2\pi$

$$\cos x = 0 \quad \cos x = \frac{\sqrt{3}}{2}$$

$$\boxed{x = \frac{\pi}{2}, \frac{3\pi}{2} \quad x = \frac{\pi}{6}, \frac{11\pi}{6}}$$

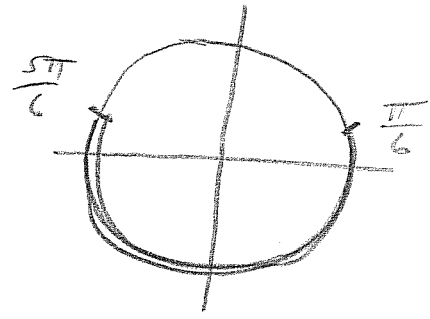


15.

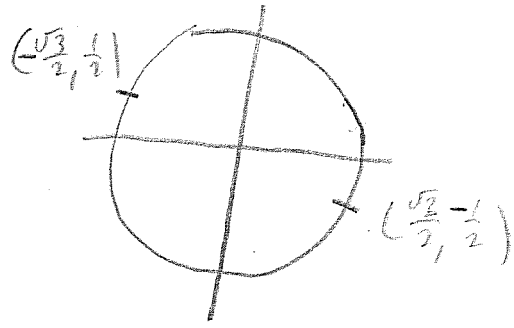
$$2 \sin x + 1 < 0$$

$$\sin x < -\frac{1}{2}$$

$$\boxed{0 \leq x < \frac{\pi}{6} \quad \frac{5\pi}{6} < x < 2\pi}$$



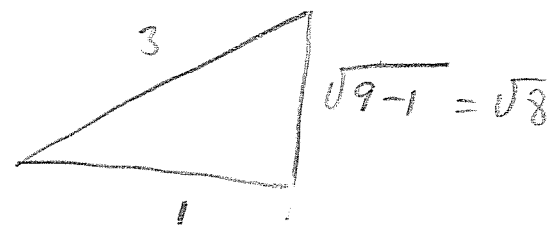
16. $\sqrt{3} \tan x = -1$
 $\tan x = -\frac{1}{\sqrt{3}}$
 $\tan x = -\frac{\sqrt{3}}{3}$



$$x = \frac{5\pi}{6}$$

$$x = \frac{11\pi}{6}$$

17. $\cos \theta = -\frac{1}{3}$
 $\sin = \frac{\sqrt{8}}{3}$



$$\cot = \frac{-\frac{1}{3}}{\frac{\sqrt{8}}{3}} = -\frac{1}{\sqrt{8}} = -\frac{\sqrt{8}}{8} = -\frac{\sqrt{4}\sqrt{2}}{8} = \boxed{-\frac{\sqrt{2}}{4}}$$

18. $\sin x \cot x = \frac{1}{3}$
 ~~$\sin x$~~ $\frac{\cos x}{\sin x} = \frac{1}{3}$

$\cos x = \frac{1}{3}$

$$19. \sin(\pi + \theta) = -\sin \theta$$

sin of sum

$$\sin \pi \cos \theta + \cos \pi \sin \theta = \sin \theta$$

eval.

$$(0) \cos \theta + (-1)(\sin \theta) = -\sin \theta$$

$$\boxed{-\sin \theta = -\sin \theta}$$

20.

$$\cos^2 x = \sec^2 x - \tan^2 x - \sin^2 x$$

$$= \tan^2 x + 1 - \tan^2 x - \sin^2 x$$

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

$$\boxed{\cos^2 x = \cos^2 x}$$

$$\begin{aligned} \sin^2 + \cos^2 &= 1 \\ 1 + \cot^2 \cos^2 & \\ \tan^2 + 1 &= \sec^2 \end{aligned}$$

21.

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

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

expand
binomial

$$\boxed{1 - 2 \sin x \cos x = 1 - 2 \sin x \cos x}$$

$$\sin^2 + \cos^2 = 1$$