

Ch 5 - Analytic Trig

1) $\tan \theta = \frac{5}{6}$ $\cot \theta = \frac{6}{5}$ $\sec \theta = \frac{\sqrt{61}}{6}$ $\cos = \frac{6}{\sqrt{61}}$
 $\cos \theta < 0$ $\csc \theta = \frac{\sqrt{61}}{5}$ $\sin = \frac{5\sqrt{61}}{61}$
 \sqrt{x} $(\frac{5}{6})^2 + 1 = \sec^2 \theta$ $(\frac{6}{5})^2 + 1 = \csc^2 \theta$
 $\frac{41}{36} = \sec^2 \theta$ $\frac{61}{25} = \csc^2 \theta$

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

3)

a) $\sin \theta \sec \theta = \tan \theta$
 $\sin \theta \frac{1}{\cos \theta} =$
 $\tan \theta = \tan \theta$

b) $\sec^2 x \tan^2 x + \sec^2 x = \sec^4 x$
 $\sec^2 x (\tan^2 x + 1) =$
 $\sec^2 x \sec^2 x =$
 $\sec^4 x =$

c) $\frac{\csc \alpha + \sec \alpha}{\sin \alpha + \cos \alpha} = \cot \alpha + \tan \alpha$
 $\frac{\frac{1}{\sin \alpha} + \frac{1}{\cos \alpha}}{\sin \alpha + \cos \alpha} = \frac{\cos \alpha}{\sin \alpha} + \frac{\sin \alpha}{\cos \alpha}$
 $\frac{\frac{\cos \alpha + \sin \alpha}{\sin \alpha \cos \alpha}}{\sin \alpha + \cos \alpha} = \frac{\cos^2 \alpha + \sin^2 \alpha}{\sin \alpha \cos \alpha}$
 $\frac{\cos \alpha + \sin \alpha}{\sin \alpha \cos \alpha} \cdot \frac{1}{\sin \alpha + \cos \alpha} = \frac{1}{\sin \alpha \cos \alpha}$
 $\frac{1}{\sin \alpha \cos \alpha}$

d) X e) $\cos(\pi - \theta) + \sin(\frac{\pi}{2} + \theta) = 0$
 $\cos \pi \cos \theta + \sin \pi \sin \theta + \sin \frac{\pi}{2} \cos \theta + \cos \frac{\pi}{2} \sin \theta$
 $(-1) \cos \theta + 0 + 1(\cos \theta) + 0$
 $0 = 0$

$$f) (\sin x + \cos x)^2 = 1 + \sin 2x$$

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

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

$$1 + \sin 2x =$$

$$4) \tan 105' = \frac{\tan 45 + \tan 60}{1 - \tan 45 \tan 60} = \frac{1 + \sqrt{3}}{1 - \sqrt{3}}$$

$$\frac{1 + \sqrt{3}}{1 - \sqrt{3}} \cdot \frac{(1 + \sqrt{3})}{(1 + \sqrt{3})} = \frac{1 + 2\sqrt{3} + 3}{1 - 3} = \frac{4 + 2\sqrt{3}}{-2} = \boxed{-2 - \sqrt{3}}$$

$$5) a) \tan^2 x + \tan x = 0$$

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

$$\tan x = 0 \quad \tan x = -1$$

$$x = 0, \pi \quad x = \frac{3\pi}{4}, \frac{7\pi}{4}$$

$$b) \sin 2\alpha - \cos \alpha = 0$$

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

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

$$\cos \alpha = 0 \quad \sin \alpha = \frac{1}{2}$$

$$\alpha = \frac{\pi}{2}, \frac{3\pi}{2} \quad \alpha = \frac{\pi}{6}, \frac{5\pi}{6}$$

$$c) 4 \cos^2 x - 3 = 0$$

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

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

$$d) \csc^2 x - \csc x - 2 = 0$$

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

$$\csc x = 2 \quad \csc x = -1$$

$$x = \frac{\pi}{6}, \frac{5\pi}{6} \quad x = \frac{3\pi}{2}$$