ch 4.3 DAY 2

$y = \sin\theta$

$x = \cos\theta$

$\tan\theta = \dfrac{\sin\theta}{\cos\theta}$

$\sec\theta = \dfrac{1}{\cos\theta}$

$\csc\theta = \dfrac{1}{\sin\theta}$

$\cot\theta = \dfrac{1}{\tan\theta}$

$\cot = \dfrac{1}{\frac{\sin\theta}{\cos\theta}} = \dfrac{\cos\theta}{\sin\theta}$

Simplifying Trig EXPRESSIONS

$$\frac{1}{\sin\left(-\frac{2\pi}{3}\right)+\cos^2\left(\frac{11\pi}{6}\right)}$$

$$= \frac{1}{\sin\left(\frac{4\pi}{3}\right)+\left[\cos\left(\frac{11\pi}{6}\right)\right]^2}$$

$$= \frac{1}{-\frac{\sqrt{3}}{2}+\left(\frac{\sqrt{3}}{2}\right)^2}$$

$$= \frac{1}{-\frac{\sqrt{3}}{2}\left(\frac{2}{2}\right)+\frac{3}{4}}$$

$$= \frac{1}{\frac{-2\sqrt{3}+3}{4}}$$

$$= \frac{4}{-2\sqrt{3}+3}$$

$\cos^2\theta$ the same as $(\cos\theta)^2$

$\cos\theta^2 \leftarrow$ squaring the angle

$1 \div \frac{-2\sqrt{3}+3}{4}$

$1 \times \frac{4}{-2\sqrt{3}+3}$

multiply by the conjugate.

$(a+b)(a-b)$

a^2-b^2

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

$$\frac{3\sqrt{6}}{5\sqrt{2}}$$

$$= \frac{-8\sqrt{3}-12}{(-2\sqrt{3})^2-(3)^2}$$

$$= \frac{-8\sqrt{3}-12}{4(3)-9}$$

$$= \frac{-8\sqrt{3}-12}{3}$$

$$\frac{\cot(-60^\circ)\cos(300^\circ)}{\csc(-240^\circ)}$$

$$\frac{\cot(300^\circ)\cos(300^\circ)}{\csc(120^\circ)}$$

$$=\frac{\left(\frac{\cos 300^\circ}{\sin 300^\circ}\right)\ \frac{\cos(300^\circ)}{1}}{\frac{1}{\sin(120^\circ)}}$$

$$=\frac{\left(\frac{\frac{1}{2}}{\frac{-\sqrt{3}}{2}}\right)\cdot\left(\frac{\frac{1}{2}}{1}\right)}{\frac{1}{\frac{\sqrt{3}}{2}}}$$

$$\frac{\left(\frac{1}{-\sqrt{3}}\right)\cdot\left(\frac{1}{2}\right)}{\frac{2}{\sqrt{3}}}$$

$$=\frac{\frac{-1}{2\sqrt{3}}}{\frac{2}{\sqrt{3}}}\quad=\frac{-1}{2\sqrt{3}}\div\frac{2}{\sqrt{3}}$$

$$=\frac{-1}{2\cancel{\sqrt{3}}_{1}}\times\frac{\cancel{\sqrt{3}}^{1}}{2}$$

$$=\frac{-1}{4}$$

3.) Find the numerical value of each expression. If the answ
then write it in simplest radical form.

a.) $\dfrac{4}{2 - \cos 30^\circ}$

b.) $\dfrac{-3}{4\cos 180^\circ + 2\sin 45^\circ}$

c.) $\dfrac{\cos 300^\circ}{\sin 30^\circ - \sin(-45^\circ)}$

d.) $\dfrac{\sin(-90^\circ) - \cos^2(120^\circ)}{\cos 45^\circ - \sin 330^\circ}$

e.) $\dfrac{\dfrac{1}{\sin 90^\circ}}{\cos^2(-210^\circ) + \sin 60^\circ}$

f.) $\dfrac{(\sin 30^\circ)^2}{\cos 30^\circ} - 4\left(\dfrac{\cos 60^\circ}{\sin(-60^\circ)}\right)$

Then ch 4.3 pg201 # 4-9

3 a) $\dfrac{4}{2-\cos 30^\circ}$ $\quad \dfrac{4}{2-\frac{\sqrt{3}}{2}} = \dfrac{4}{\frac{4}{2}-\frac{\sqrt{3}}{2}} = \dfrac{4}{\frac{4-\sqrt{3}}{2}}$

$$\frac{4}{1} \div \frac{4-\sqrt{3}}{2} \Rightarrow \frac{4}{1} \times \frac{2}{4-\sqrt{3}} = \frac{8}{4-\sqrt{3}}\left(\frac{4+\sqrt{3}}{4+\sqrt{3}}\right)$$

$$= \frac{32+8\sqrt{3}}{16-\sqrt{9}} = \boxed{\frac{32+8\sqrt{3}}{13}}$$

b) $\dfrac{-3}{4\cos 180^\circ + 2\sin 45^\circ} = \dfrac{-3}{4(-1)+2(\sqrt{2}/2)} = \dfrac{-3}{-4+\sqrt{2}}$

$$= \frac{-1}{-1}\left(\frac{3}{4-\sqrt{2}}\right) = \frac{3}{4-\sqrt{2}}\left(\frac{4+\sqrt{2}}{4+\sqrt{2}}\right) = \frac{12+3\sqrt{2}}{16-2} = \boxed{\frac{12+3\sqrt{2}}{14}}$$

c) $\dfrac{\cos 300^\circ}{\sin 30^\circ - \sin(-45^\circ)} = \dfrac{1/2}{1/2 \pm (\pm\sqrt{2}/2)} = \dfrac{1/2}{\frac{1+\sqrt{2}}{2}} = \dfrac{1}{2} \div \dfrac{1+\sqrt{2}}{2}$

$$\frac{1}{2} \times \frac{2}{1+\sqrt{2}} = \frac{1}{1+\sqrt{2}}\left(\frac{1-\sqrt{2}}{1-\sqrt{2}}\right) = \frac{1-\sqrt{2}}{1-2} = \frac{1-\sqrt{2}}{-1} = \boxed{-(1-\sqrt{2})}$$

d) $\dfrac{\sin(-90^\circ) - \cos^2(120^\circ)}{\cos 45^\circ - \sin(330^\circ)} = \dfrac{(-1) - \left(-\frac{1}{2}\right)^2}{\frac{\sqrt{2}}{2} - \left(\frac{-1}{2}\right)} = \dfrac{-1 - \frac{1}{4}}{\frac{\sqrt{2}+1}{2}}$

$\dfrac{-5}{4} \div \dfrac{\sqrt{2}+1}{2} \Rightarrow \dfrac{-5}{4} \times \dfrac{2}{\sqrt{2}+1} = \dfrac{-5}{2\sqrt{2}+2}\left(\dfrac{2\sqrt{2}-2}{2\sqrt{2}-2}\right)$

$\dfrac{-10\sqrt{2}+10}{4\sqrt{4}-4} = \dfrac{-10\sqrt{2}+10}{4} = \boxed{\dfrac{-5\sqrt{2}+5}{2}}$

e) $\dfrac{\frac{1}{\sin 90^\circ}}{\cos^2(-210^\circ) + \sin 60^\circ}$

$= \dfrac{1}{\left(\frac{-\sqrt{3}}{2}\right)^2 + \frac{\sqrt{3}}{2}}$

$= \dfrac{1}{\frac{3}{4} + \frac{2\sqrt{3}}{4}}$

$= \dfrac{1}{\frac{3+2\sqrt{3}}{4}}$

$= \dfrac{4}{3+2\sqrt{3}}$

$= \left(\dfrac{4}{3+2\sqrt{3}}\right)\left(\dfrac{3-2\sqrt{3}}{3-2\sqrt{3}}\right)$

$= \dfrac{12-8\sqrt{3}}{9-4(3)}$

$= \dfrac{12-8\sqrt{3}}{-3}$

$= \dfrac{-12+8\sqrt{3}}{3}$

f) $\frac{(\sin 30°)^2}{\cos 30°} - 4\left(\frac{\cos 60°}{\sin(-60°)}\right) = \frac{(1/2)^2}{\sqrt{3}/2} - 4\left(\frac{1/2}{-\sqrt{3}/2}\right)$

$\left(\frac{1}{4} \times \frac{2}{\sqrt{3}}\right) - \left(2 \times \frac{2}{-\sqrt{3}}\right) = \frac{1}{2\sqrt{3}} + \frac{4}{\sqrt{3}} \Rightarrow \frac{1}{2\sqrt{3}} + \frac{8}{2\sqrt{3}}$

$\frac{9}{2\sqrt{3}}\left(\frac{\sqrt{3}}{\sqrt{3}}\right) = \frac{9\sqrt{3}}{2\sqrt{9}} = \frac{9\sqrt{3}}{6} = \boxed{\frac{3\sqrt{3}}{2}}$