Trig Review – Compound Angles and Double Angles

#1 Determine the exact trig ratio for each of the following (show ALL of your work):

(a) $2\cos^2\left(\frac{3\pi}{8}\right)-1$

(b) $\cos\left(\frac{7\pi}{3}\right)\cos\left(\frac{2\pi}{3}\right)+\sin\left(\frac{7\pi}{3}\right)\sin\left(\frac{2\pi}{3}\right)$

(c) $1-2\sin^2\left(\frac{-5\pi}{8}\right)$

(d) $\dfrac{\tan\left(\frac{7\pi}{12}\right)-\tan\left(\frac{\pi}{4}\right)}{1+\tan\left(\frac{7\pi}{12}\right)\tan\left(\frac{\pi}{4}\right)}$

(e) $\dfrac{2\tan 105^\circ}{1-\tan^2 105^\circ}$

(f) $\csc(195^\circ)$

#2 If $\cos(2x)=\frac{-2}{3}$, where $2x\in\left[\frac{\pi}{2},\pi\right]$ then determine $\sin x$.

#3 If $\tan\theta=\frac{12}{5}$, $\pi\le\theta\le\frac{3\pi}{2}$ and $\cos\alpha=\frac{4}{5}$, $\frac{3\pi}{2}\le\alpha\le 2\pi$ then determine :

(a) $\sin(\theta-\alpha)$ (b) $\sec\theta-\cot\alpha$ (c) the principal angles θ and α where $\theta\in[0,2\pi]$ and $\alpha\in[0,2\pi]$

Answers : **#1** (a) $\frac{-\sqrt{2}}{2}$ (b) $\frac{1}{2}$ (c) $\frac{-\sqrt{2}}{2}$ (d) $\sqrt{3}$ (e) $\frac{\sqrt{3}}{3}$ (f) $-\sqrt{2}-\sqrt{6}$ **#2** $\frac{\sqrt{30}}{6}$ **#3** (a) $\frac{-63}{65}$ (b) $\frac{-19}{15}$
(c) $\theta=4.32rads$ and $\alpha=5.64rads$

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