Compound Angles

FORMULAS GIVEN:

$\sin(x+y) = \sin x\cos y + \cos x\sin y$ $\cos(x+y) = \cos x\cos y - \sin x\sin y$ $\tan(x+y) = \dfrac{\tan x + \tan y}{1 - \tan x \tan y}$

Question #1

Prove that: $\cos\left(\dfrac{3\pi}{2} + \theta\right) = \sin\theta$ **[app 3 marks]**

Question #2

Use your knowledge of compound angles to simplify the following expression: **[app 3 marks]**

$$\cos(a-b) - \cos(a+b)$$

Question #3

Find the exact value of the following: **[app 6 marks]**

a) $\cos\dfrac{7\pi}{15}\cos\dfrac{\pi}{5} - \sin\dfrac{7\pi}{15}\sin\dfrac{\pi}{5}$

b) $\dfrac{\tan\dfrac{5\pi}{18} - \tan\dfrac{10\pi}{9}}{1 + \tan\dfrac{5\pi}{18}\tan\dfrac{10\pi}{9}}$

Question #4

Using an appropriate compound angle formula, find the exact value of the following: **[app 8 marks]**

a) $\tan\dfrac{7\pi}{12}$

b) $\cos\left(-\dfrac{\pi}{12}\right)$

Question #5

If $\cos\theta = \dfrac{-5}{13}$,where $\dfrac{\pi}{2} < \theta < \pi$ and if $\tan\alpha = \dfrac{4}{3}$, where $\pi < \alpha < \dfrac{3\pi}{2}$ then evaluate the following:

[app 8 marks]

a) $\sin(\theta - \alpha)$

b) $\sec(\theta + \alpha)$

Question #6

If $\sin\theta = \dfrac{2}{3}$ where $\dfrac{\pi}{2} < \theta < \pi$ then evaluate $\tan 2\theta$. **[app 4 marks]**