# (c) Compound Angles ✓

$\sin(A+B) = \sin A\cos B + \cos A\sin B$

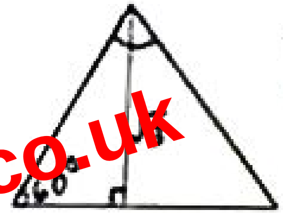
$\sin(A-B) = \sin A\cos B - \cos A\sin B$

$\cos(A+B) = \cos A\cos B - \sin A\sin B$

$\cos(A-B) = \cos A\cos B + \sin A\sin B$

$\tan(A+B) = \dfrac{\tan A + \tan B}{1 - \tan A\tan B}$

$\tan(A-B) = \dfrac{\tan A - \tan B}{1 + \tan A\tan B}$




$\cos 60° = \frac{1}{2}$

$\sin 60° = \frac{\sqrt{3}}{2}$

$\tan 60° = \frac{\sqrt{3}}{1} = \sqrt{3}$

$\sin 30° = \frac{1}{2}$

$\cos 30° = \frac{\sqrt{3}}{2}$

$\tan 30° = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$



Example:

1) Prove that $2\cos(\theta - \frac{\pi}{3}) = \cos\theta + \sqrt{3}\sin\theta$

$\text{LHS} = 2\cos(\theta - \frac{\pi}{3})$

$= 2[\cos\theta\cos(\frac{\pi}{3}) + \sin\theta\sin(\frac{\pi}{3})]$

$= 2[\frac{1}{2}\cos\theta + \frac{\sqrt{3}}{2}\sin\theta]$

$= \cos\theta + \sqrt{3}\sin\theta$

2) Find all angles between 0° and 360° which satisfy equation $3\cos(x+30°) = 4\sin x$

$3\cos(x+30°) = 4\sin x$

$3[\cos x\cos 30° - \sin x\sin 30°] = 4\sin x$

$\frac{3\sqrt{3}}{2}\cos x = \frac{11}{2}\sin x$

$\dfrac{3\sqrt{3}/2}{11/2} = \dfrac{\sin x}{\cos x} \Rightarrow \tan x = \dfrac{3\sqrt{3}}{11}$

$\therefore \alpha = \tan^{-1}\left(\frac{3\sqrt{3}}{11}\right)$

$= 25.28°$

| S | A |
|---|---|
| T | C |

$\therefore x = 25.28°, 205.28°$

$= 25.3°, 205.3°$

(1 d.p)