

HW #16 Examples - Sum & Difference Formula

Use the angle sum identity to find the exact value of each.

1) $\sin 285^\circ = \sin(240^\circ + 45^\circ)$

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

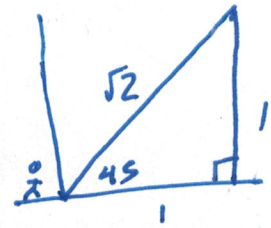
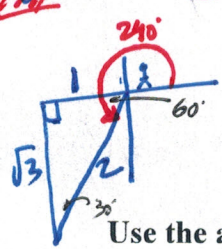
$\sin(240^\circ + 45^\circ) = \sin 240^\circ \cdot \cos 45^\circ + \cos 240^\circ \cdot \sin 45^\circ$

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

$= -\frac{\sqrt{6}}{4} + -\frac{\sqrt{2}}{4}$

$= \frac{-\sqrt{6} - \sqrt{2}}{4}$

S/A
C



2) $\sin \frac{19\pi}{12} = \sin 295^\circ = \sin(330^\circ - 45^\circ)$

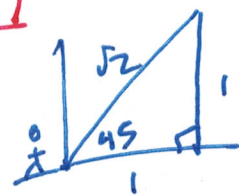
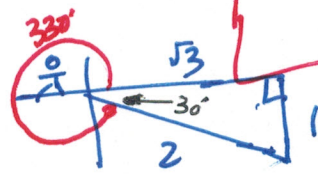
$\sin(A-B) = \sin A \cdot \cos B - \cos A \cdot \sin B$

$= \sin 330^\circ \cdot \cos 45^\circ - \cos 330^\circ \cdot \sin 45^\circ$

$= -\frac{1}{2} \cdot \frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2}$

$= -\frac{\sqrt{2}}{4} - \frac{\sqrt{6}}{4}$

$= \frac{-\sqrt{2} - \sqrt{6}}{4}$



Use the angle difference identity to find the exact value of each.

3) $\cos 15^\circ = \cos(60^\circ - 45^\circ)$

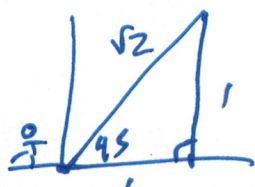
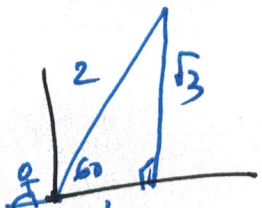
$\cos(A-B) = \cos A \cdot \cos B + \sin A \cdot \sin B$

$= \cos 60^\circ \cdot \cos 45^\circ + \sin 60^\circ \cdot \sin 45^\circ$

$= \frac{1}{2} \cdot \frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2}$

$= \frac{\sqrt{2}}{4} + \frac{\sqrt{6}}{4}$

$= \frac{\sqrt{2} + \sqrt{6}}{4}$



4) $\cos -\frac{7\pi}{12} = \cos(-105^\circ) = \cos(-60^\circ + -45^\circ)$

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

$= \cos(-60^\circ) \cdot \cos(-45^\circ) - \sin(-60^\circ) \cdot \sin(-45^\circ)$

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

$= \frac{\sqrt{2}}{4} - \frac{\sqrt{6}}{4}$

$= \frac{\sqrt{2} - \sqrt{6}}{4}$

