

Sum and difference Angles

Find the exact value of each.

1) $\sin 254^\circ \cos 76^\circ + \cos 254^\circ \sin 76^\circ$

$-\frac{1}{2}$

2) $\sin 129^\circ \cos 81^\circ + \cos 129^\circ \sin 81^\circ$

$-\frac{1}{2}$

3) $\cos \frac{4\pi}{9} \cos \frac{\pi}{18} - \sin \frac{4\pi}{9} \sin \frac{\pi}{18}$

0

4) $\cos \frac{14\pi}{9} \cos \frac{13\pi}{18} + \sin \frac{14\pi}{9} \sin \frac{13\pi}{18}$

$-\frac{\sqrt{3}}{2}$

5) $\cos 100^\circ \cos 20^\circ - \sin 100^\circ \sin 20^\circ$

$-\frac{1}{2}$

6) $\cos 257^\circ \cos 107^\circ + \sin 257^\circ \sin 107^\circ$

$-.8660 = -\frac{\sqrt{3}}{2}$

7) $\cos \frac{7\pi}{18} \cos \frac{11\pi}{18} - \sin \frac{7\pi}{18} \sin \frac{11\pi}{18}$

-1

8) $\sin \frac{7\pi}{18} \cos \frac{\pi}{9} + \cos \frac{7\pi}{18} \sin \frac{\pi}{9}$

1

9) $\cos 462^\circ \cos 132^\circ + \sin 462^\circ \sin 132^\circ$

$-.8660 = -\frac{\sqrt{3}}{2}$

10) $\cos 91^\circ \cos 31^\circ + \sin 91^\circ \sin 31^\circ$

$\frac{1}{2}$

Use the sum and difference identities to find the exact value. Show your equation and work.

11) $\sin 75^\circ$

$\sin(30+45)$
 $\sin 30 \cos 45 + \cos 30 \sin 45$

$\left(\frac{1}{2}\right)\left(\frac{\sqrt{2}}{2}\right) + \left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}}{2}\right) = \frac{\sqrt{2} + \sqrt{6}}{4}$

12) $\sin 255^\circ$

$\sin(210+45)$
 $\sin 210 \cos 45 + \cos 210 \sin 45$

$\left(-\frac{1}{2}\right)\left(\frac{\sqrt{2}}{2}\right) + \left(-\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}}{2}\right) = \frac{-\sqrt{2} - \sqrt{6}}{4}$

13) $\cos -105^\circ$

$\cos(30-135)$
 $\cos 30 \cos 135 + \sin 30 \sin 135$

$\left(\frac{\sqrt{3}}{2}\right)\left(-\frac{\sqrt{2}}{2}\right) + \left(\frac{1}{2}\right)\left(\frac{\sqrt{2}}{2}\right) = \frac{-\sqrt{6} + \sqrt{2}}{4}$

14) $\sin -105^\circ$

$\sin(30-135)$
 $\sin 30 \cos 135 - \cos 30 \sin 135$

$\left(\frac{1}{2}\right)\left(-\frac{\sqrt{2}}{2}\right) - \left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}}{2}\right) = \frac{-\sqrt{2} - \sqrt{6}}{4}$

15) $\cos 285^\circ$

$\cos(240+45)$
 $\cos 240 \cos 45 - \sin 240 \sin 45$

$\left(-\frac{1}{2}\right)\left(\frac{\sqrt{2}}{2}\right) - \left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}}{2}\right) = \frac{-\sqrt{2} - \sqrt{6}}{4}$

16) $\cos 15^\circ$

$\cos(45-30)$
 $\cos 45 \cos 30 + \sin 45 \sin 30$

$\left(\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{3}}{2}\right) + \left(\frac{\sqrt{2}}{2}\right)\left(\frac{1}{2}\right) = \frac{\sqrt{6} + \sqrt{2}}{4}$

17) $\cos 195^\circ$

$\cos(135+60)$
 $\cos 135 \cos 60 - \sin 135 \sin 60$

$\left(-\frac{\sqrt{2}}{2}\right)\left(\frac{1}{2}\right) - \left(\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{3}}{2}\right) = \frac{-\sqrt{2} - \sqrt{6}}{4}$

18) $\cos 255^\circ$

$\cos(210+45)$
 $\cos 210 \cos 45 - \sin 210 \sin 45$

$\left(-\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}}{2}\right) - \left(-\frac{1}{2}\right)\left(\frac{\sqrt{2}}{2}\right) = \frac{-\sqrt{6} + \sqrt{2}}{4}$