

Sum & Difference Identities:

- $\sin(x \pm y) = \sin x \cos y \pm \cos x \sin y$
- $\cos(x \pm y) = \cos x \cos y \mp \sin x \sin y$
- $\tan(x \pm y) = \frac{\tan x \pm \tan y}{1 \mp \tan x \tan y}$

Sep 14-2:26 PM

Ex: Find the exact value

① $\sin 195^\circ$
 $= \sin(45^\circ + 150^\circ) = \sin 45^\circ \cos 150^\circ + \cos 45^\circ \sin 150^\circ$
 $= \frac{\sqrt{2}}{2} \left(-\frac{\sqrt{3}}{2} \right) + \frac{\sqrt{2}}{2} \left(\frac{1}{2} \right)$
 $= \frac{-\sqrt{6}}{4} + \frac{\sqrt{2}}{4}$
 $= \frac{-\sqrt{6} + \sqrt{2}}{4}$

Sep 14-2:52 PM

② $\tan(-105^\circ)$
 $\tan(120^\circ - 225^\circ)$
 $= \frac{\tan 120^\circ - \tan 225^\circ}{1 + \tan 120^\circ \tan 225^\circ}$
 $= \frac{-\sqrt{3} - 1}{1 + (-\sqrt{3})(1)} = \frac{-\sqrt{3} - 1}{1 - \sqrt{3}}$
 $\frac{(-\sqrt{3} - 1)(1 + \sqrt{3})}{(1 + \sqrt{3})(1 + \sqrt{3})} = \frac{-\sqrt{3} - 3 - 1 - \sqrt{3}}{1 - 3}$
 $= \frac{-2\sqrt{3} - 4}{-2}$
 $= \sqrt{3} + 2$

Sep 14-3:02 PM

③ $\cos 255^\circ$
 $\frac{-\sqrt{6} + \sqrt{2}}{4}$

⑤ $\sin 95^\circ \cos 55^\circ + \cos 95^\circ \sin 55^\circ$
 $\sin x \cos y + \cos x \sin y$
 $\sin(x + y)$
 $\sin(95 + 55)$
 $\sin 150^\circ = \frac{1}{2}$

Sep 14-3:11 PM