1. Use sum and difference formulas to simplify each expression.

A. $\sin 42° \cos 17° - \cos 42° \sin 17°$ $\sin 25°$

B. $\cos 94° \cos 18° + \sin 94° \sin 18°$ $\cos 76°$

C. $\sin(\pi/5)\cos(\pi/2) + \sin(\pi/2)\cos(\pi/5)$ $\sin \frac{7\pi}{10}$

D. $\sin 3x \cos x - \cos 3x \sin x$ $\sin 2x$

E. $\dfrac{\tan 19° + \tan 47°}{1 - \tan 19° \tan 47°}$ $\tan 66°$

F. $\dfrac{\tan\frac{\pi}{5} - \tan\frac{\pi}{3}}{1 + \tan\frac{\pi}{5}\tan\frac{\pi}{3}}$ $\tan\left(\frac{-2\pi}{15}\right)$

2. Find the EXACT value of each expression.

A. $\sin 105°$ $\dfrac{\sqrt{6}+\sqrt{2}}{4}$

B. $\cos\left(\dfrac{7\pi}{12}\right)$ $\dfrac{\sqrt{2}-\sqrt{6}}{4}$

C. $\tan 15°$ $\dfrac{\sqrt{3}-1}{1+\sqrt{3}} = -\sqrt{3}+2$

D. $\tan\left(\dfrac{11\pi}{12}\right)$ $\dfrac{-\sqrt{3}+1}{1+\sqrt{3}} = \sqrt{3}-2$

E. $\sin\left(-\dfrac{\pi}{12}\right)$ $\dfrac{-\sqrt{6}+\sqrt{2}}{4}$

3. Prove: $\dfrac{\sin(A+B)}{\cos A \cos B} = \tan A + \tan B$

$\dfrac{\sin A\cos B + \cos A \sin B}{\cos A \cos B} \Rightarrow \dfrac{\sin A \cancel{\cos B}}{\cos A \cancel{\cos B}} + \dfrac{\cancel{\cos A}\sin B}{\cancel{\cos A}\cos B}$

$\Rightarrow \tan A + \tan B$

4. Prove: $\sin(\pi+\theta) = -\sin\theta$

$\sin\pi\cos\theta + \cos\pi\sin\theta$

$0\cdot\cos\theta + -1\sin\theta$

$-\sin\theta$

5. Prove: $\tan(\pi-\theta) = -\tan\theta$

$\dfrac{\tan\pi - \tan\theta}{1+\tan\pi\tan\theta} \Rightarrow \dfrac{0-\tan\theta}{1+0\cdot\tan\theta} \Rightarrow \dfrac{-\tan\theta}{1} \Rightarrow -\tan\theta$

6. Given $\sin x = \dfrac{3}{5}$ *for* $0 < x < \dfrac{\pi}{2}$ *and* $\cos y = \dfrac{2}{\sqrt{5}}$ *for* $-\dfrac{\pi}{2} < y < 0$, find:

a. $\sin(x+y)$ $\dfrac{2}{5\sqrt{5}} = \dfrac{2\sqrt{5}}{25}$

b. $\sin(x-y)$ $\dfrac{2}{\sqrt{5}} = \dfrac{2\sqrt{5}}{5}$

c. $\cos(x+y)$ $\dfrac{11}{5\sqrt{5}} = \dfrac{11\sqrt{5}}{25}$