$$
\begin{aligned}
& \text { SUM }+ \text { DIFFERENCE IDENTITIES } \\
& \hline \cos (A+B)=\cos A \cos B-\sin A \sin B \\
& \cos \left(30^{\circ}+60^{\circ}\right)=\cos 30^{\circ} \cos 60^{\circ}-\sin 30^{\circ} \sin 60^{\circ} \\
& 0=\frac{\sqrt{3}}{2} \cdot \frac{1}{2}-\frac{1}{2} \cdot \frac{\sqrt{3}}{2} \\
& \cos \left(30^{\circ}+60^{\circ}\right)=\cos 30^{\circ}+\cos 60^{\circ} \\
& \cos 90^{\circ}=\sqrt{3} / 2+1 / 2 \\
& 0
\end{aligned}
$$

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$$

$$
\begin{aligned}
\sin 70^{\circ} & =\sin 20^{\circ} \cos 50^{\circ}-\cos 20^{\circ} \sin 50^{\circ} \\
& =\sin \left(20^{\circ}-50^{\circ}\right)
\end{aligned}
$$

$T \tan 110^{\circ}=\frac{\tan 80^{\circ}+\tan 30^{\circ}}{1-\tan 80^{\circ} \tan 30^{\circ}}$
(1) $\tan 60^{\circ}=\tan 100^{\circ}-\tan 40^{\circ}$

$$
\tan \left(80^{\circ}+30^{\circ}\right)
$$

Evaluate. (Answer is a \#\%)

$$
\begin{aligned}
& \sin \frac{5 \pi}{4} \cos \frac{\pi}{2}-\cos \frac{5 \pi}{4} \sin \frac{\pi}{2} \\
& =\sin (A-B) \\
& =\sin \left(\frac{5 \pi}{4}-\frac{\pi}{2}\right) \\
& =\sin \left(\frac{5 \pi}{4}-\frac{2 \pi}{4}\right) \\
& =\sin \frac{3 \pi}{4} \pi / 4 \\
& =+\frac{\sqrt{2}}{2}
\end{aligned}
$$

Find $\cos (A+B)$ given $\tan A=-\frac{\sqrt{5} y}{2 x} \csc B=\frac{-3}{1} \frac{r}{y}$

$$
\begin{aligned}
& \frac{\pi}{2}<A<\pi \text { and } \frac{3 \pi}{2}<B<2 \pi \\
& \cos (A+B)=\frac{\frac{x}{c^{2}}}{\cos } \cos B-\frac{y}{5} \sin A \sin B \\
& =\left(\frac{-2}{3}\right)\left(\frac{2 \sqrt{2}}{3}\right)-\left(\frac{\sqrt{5}}{3}\right)\left(\frac{-1}{3}\right) \\
& \sqrt{5} \operatorname{La}_{-2}^{3} \\
& (\sqrt{5})^{2}+(-2)^{2}=r^{2} \\
& \begin{aligned}
5+4 & =r^{2} \\
9 & =r^{2}
\end{aligned} \\
& \begin{array}{l}
9=r \\
3=r
\end{array} \\
& =-\frac{4 \sqrt{2}}{9}+\frac{\sqrt{5}}{9} \\
& =\frac{-4 \sqrt{2}+\sqrt{5}}{9} \\
& x^{2}+1=9 \\
& \sqrt{x^{2}}=\sqrt{8} \\
& x \leq 2 \sqrt{2}
\end{aligned}
$$

Verify.

$$
\frac{\sin (x+y)}{\cos x \cos y}=\tan x+\tan y
$$

$$
\begin{aligned}
\frac{\sin x \cos y+\cos x \sin y}{\cos x \cos y} & =\frac{\sin x \cos y}{\cos x \cos y}+\frac{\sin y \cos x}{\cos y \cos x} \\
& =\frac{\sin x \cos y+\sin y \cos x}{\cos x \cos y}
\end{aligned}
$$

Aut \# $63 \quad \cos \left(\frac{\pi}{2}+x\right)=-\sin x$

$$
\begin{aligned}
& \cos \frac{\pi}{2} \cos x-\sin \frac{\pi}{2} \sin x=-\sin x \\
& 0 \cdot \cos x-
\end{aligned}
$$

