Sum & Difference Identities

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

$$\cos(30^\circ + 60^\circ) = \cos 30^\circ \cos 60^\circ - \sin 30^\circ \sin 60^\circ$$
$$90^\circ$$
$$0 = \frac{\sqrt{3}}{2} \cdot \frac{1}{2} - \frac{1}{2} \cdot \frac{\sqrt{3}}{2}$$

$$\sin(A+B) = \sin A \cos B + \cos A \sin B$$
$$\sin(A-B) = \sin A \cos B - \cos A \sin B$$
$$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$
$$\tan(A-B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

T or F

F $\sin 70^\circ = \dfrac{\sin 20^\circ \cos 50^\circ - \cos 20^\circ \sin 50^\circ}{\sin(20^\circ - 50^\circ) = \sin(-30^\circ)}$

T $\tan 110^\circ = \dfrac{\tan 80^\circ + \tan 30^\circ}{1 - \tan 80^\circ \tan 30^\circ} = \tan(80^\circ + 30^\circ)$

$\tan 110^\circ$

Evaluate. (Answer is a #)

$\sin \frac{5\pi}{4} \cos \frac{\pi}{2} - \cos \frac{5\pi}{4} \sin \frac{\pi}{2}$

$\sin\left(\frac{5\pi}{4} - \frac{\pi}{2}\right)$

$\sin\left(\frac{5\pi}{4} - \frac{2\pi}{4}\right)$

$\sin \frac{3\pi}{4}$

$\pi/4$

$+\frac{\sqrt{2}}{2}$

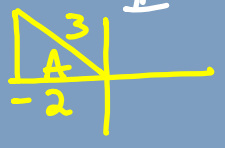
Find $\cos(A+B)$ given $\tan A = -\frac{\sqrt{5}}{2} = \frac{y}{x}$ $\csc B = -\frac{3}{1} = \frac{r}{y}$

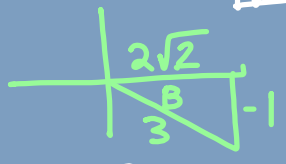
$\frac{\pi}{2} < A < \pi$ (II) and $\frac{3\pi}{2} < B < 2\pi$ (IV)

$5 + 4 = r^2$

$9 = r^2$

$3 = r$





$x^2 + 1 = 9$

$\sqrt{x^2} = \sqrt{8}$

$x = \pm 2\sqrt{2}$

$\cos(A+B) = \frac{x}{r}\cos A \cos B - \frac{y}{r}\sin A \sin B$

$\left(-\frac{2}{3}\right)\left(\frac{2\sqrt{2}}{3}\right) - \left(\frac{\sqrt{5}}{3}\right)\left(\frac{-1}{3}\right)$

$= -\frac{4\sqrt{2}}{9} + \frac{\sqrt{5}}{9}$

$= -\frac{4\sqrt{2} + \sqrt{5}}{9}$

Verify. $\dfrac{\sin(A+B)}{\sin(x+y)} = \dfrac{\sin(x+y)}{\cos x \cos y} = \tan x + \tan y$

$$\frac{\sin x \cos y + \cos x \sin y}{\cos x \cos y} = \frac{\cos y}{\cos y}\frac{\sin x}{\cos x} + \frac{\sin y}{\cos y}\frac{\cos x}{\cos x}$$

$$= \frac{\cos y \sin x + \sin y \cos x}{\cos x \cos y}$$

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