Double Angle Identities (6.2) p306 day 4

right place

vs

right major

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8. Determine the exact value of each trigonometric expression.

a) $\cos 75°$ b) $\tan 165°$

c) $\sin \frac{7\pi}{12}$ d) $\cos 195°$

e) $\csc \frac{\pi}{12}$ f) $\sin\left(-\frac{\pi}{12}\right)$

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20ab

use $\sin \frac{\pi}{12}$

$= \frac{\sqrt{6}-\sqrt{2}}{4}$

$\therefore \csc = \frac{4}{\sqrt{6}-\sqrt{2}}$

9. On the winter solst... the power, P, in wa... sun on each square...

20. If $\angle A$ and $\angle B$ are both... $\sin A = \frac{4}{5}$ and $\cos B =$ ... of the following,

a) $\cos(A - B)$

b) $\sin(A + B)$

c) $\cos 2A$

d) $\sin 2A$

i) Whitehorse, ...

ii e) $\csc\frac{\pi}{12} = \csc\left(\frac{4\pi}{12} - \frac{3\pi}{12}\right)$

iii $= \csc\left(\frac{\pi}{3} - \frac{\pi}{4}\right)$

c) E: $= 1 \div \sin\left(\frac{\pi}{3} - \frac{\pi}{4}\right)$

A $= 1 \div \left[\sin\left(\frac{\pi}{3}\right)\cos\left(\frac{\pi}{4}\right) - \cos\left(\right.\right.$

fr $= 1 \div \left[\left(\frac{\sqrt{3}}{2}\right)\left(\frac{1}{\sqrt{2}}\right) - \left(\frac{1}{2}\right)\left(\frac{1}{\sqrt{2}}\right)\right.$

$= 1 \div \left[\frac{\sqrt{3}-1}{2\sqrt{2}}\right]$

$= \frac{2\sqrt{2}}{\sqrt{3}-1}$ or $\frac{(2\sqrt{2})(\sqrt{3}+1)}{(\sqrt{3}-1)(\sqrt{3}+1)}$

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what conclusion can you draw from this?

Test with $\theta = \frac{\pi}{3}$ to see if $\sec\theta - \sin\theta\tan\theta = \sin\theta$ is an identity

LS: $\sec\frac{\pi}{3} - \sin\frac{\pi}{3}\tan\frac{\pi}{3}$

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

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

$= \frac{1}{2}$

RS: $= \sin\frac{\pi}{3}$

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

not an identity

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ex1: Use the sum identities to develop a formula for

$\sin 2\theta$, $\cos 2\theta$, $\tan 2\theta$

$\sin 2\theta = \sin(\theta + \theta)$

$= \sin\theta\cos\theta + \sin\theta\cos\theta$

$\boxed{= 2\sin\theta\cos\theta}$

$xy + xy$
$2xy$

$\cos 2\theta = \cos(\theta + \theta)$

$= \cos\theta\cos\theta - \sin\theta\sin\theta$

$\boxed{= \cos^2\theta - \sin^2\theta}$

$\sin 2\theta \neq 2\sin\theta$

or

$= 1 - \sin^2\theta - \sin^2\theta$

$\boxed{= 1 - 2\sin^2\theta}$

or

$= \cos^2\theta - (1 - \cos^2\theta)$

$= \cos^2\theta - 1 + \cos^2\theta$

$\boxed{= 2\cos^2\theta - 1}$

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ex2: Express as a single function.

$2\sin\frac{\pi}{12}\cos\frac{\pi}{12}$

$= \sin 2\left(\frac{\pi}{12}\right)$

$\boxed{= \sin\frac{\pi}{6}}$

$1 - 2\sin^2 22.5°$

$= \cos 2(22.5°)$

$\boxed{= \cos 45°}$

1c
2c
4a

$\frac{\tan\frac{\pi}{3} - \tan\frac{\pi}{4}}{1 + \tan\frac{\pi}{3}\tan\frac{\pi}{4}}$

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ex3: Prove $\frac{1 + \cos 2x}{\sin 2x} = \cot x$

LS: $= \frac{1 + \cos 2x}{\sin 2x}$

$= \frac{\cancel{1} + 2\cos^2 x - \cancel{1}}{2\sin x\cos x}$

$= \frac{\cancel{2}\cos^{\cancel{2}} x}{\cancel{2}\sin x\cancel{\cos x}}$

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

RS: $= \frac{\cos x}{\sin x}$

LS = RS

QED

5ab

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ex4: Given that $\tan A = \frac{4}{3}$ and $\cos B = \frac{12}{13}$ evaluate

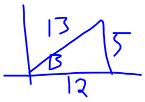
$\cos(A+B)$

$= \cos A \cos B - \sin A \sin B$

$= \left(\frac{3}{5}\right)\left(\frac{12}{13}\right) - \left(\frac{4}{5}\right)\left(\frac{5}{13}\right)$

$= \frac{36}{65} - \frac{20}{65}$

$\boxed{= \frac{16}{65}}$



$\sin 2B$

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$\csc\theta = \frac{1}{\sin\theta}$

$\sec\theta = \frac{1}{\cos\theta}$

$\cot\theta = \frac{1}{\tan\theta}$

$\tan\theta = \frac{\sin\theta}{\cos\theta}$

$\cot\theta = \frac{\cos\theta}{\sin\theta}$

Lots of formulas

$\sin^2\theta + \cos^2\theta = 1$ $\quad \cos^2\theta = 1 - \sin^2\theta$

$1 + \tan^2\theta = \sec^2\theta$

$1 + \cot^2\theta = \csc^2\theta$

$\sin(A \pm B) = \sin A\cos B \pm \cos A \sin B$

$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$

$\cancel{\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}}$ not 2021

$\sin 2x = 2\sin x \cos x$

$\cos 2x = \cos^2 x - \sin^2 x$

$= 2\cos^2 x - 1$

$= 1 - 2\sin^2 x$

$\cancel{\tan 2x = \frac{2\tan x}{1 - \tan^2 x}}$

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HW: p306#5cd

identities #10, 12

identities 9