Going over Solving Trig Wksht

5. $2\cos^2 x + 3\cos x + 1 = 0$

$$2\left(\cos\left(\frac{4\pi}{3}\right)\right)^2 + 3\cos\frac{4\pi}{3} + 1 = 0$$

$$2\left(-\frac{1}{2}\right)^2 + 3\left(-\frac{1}{2}\right) + 1 = 0$$

$$2\cdot\frac{1}{4} - \frac{3}{2} + 1 = 0$$

$$\frac{1}{2} - \frac{3}{2} + 1$$

$$0 = 0 \quad \checkmark$$

$$2(\cos\pi)^2 + 3\cos\pi + 1 = 0$$

$$2(-1)^2 + 3(-1) + 1 = 0$$

$$2 - 3 + 1$$

$$0 = 0$$

24. $2\sin^2 x = 2 + \cos x$

$2\boxed{\sin^2 x} - \cos x - 2 = 0$

$2(1-\cos^2 x) - \cos x - 2 = 0$

$2 - 2\cos^2 x - \cos x - 2 = 0$

$-2\cos^2 x - \cos x = 0$

$-\cos x(2\cos x + 1) = 0$

$-\cos x = 0$	$2\cos x + 1 = 0$
$\cos x = 0$	$\cos x = -\frac{1}{2}$
$x = \frac{\pi}{2} + 2\pi n, \frac{3\pi}{2} + 2\pi n$	$x = \frac{2\pi}{3} + 2\pi n$
	$x = \frac{4\pi}{3} + 2\pi n$

37. $\boxed{\sec^2 x} + \tan x = 3$

$1 + \tan^2 x + \tan x - 3 = 0$

$\tan^2 x + \tan x - 2 = 0$

$y^2 + y - 2 = 0$

$(y+2)(y-1) = 0$

$(\tan x + 2)(\tan x - 1) = 0$

$\tan x = -2$

$\boxed{x = \tan^{-1} 2 + 2\pi n}$

$\tan x = 1$

$$\boxed{\begin{aligned} x &= \frac{\pi}{4} + 2\pi n \\ x &= \frac{5\pi}{4} + 2\pi n \end{aligned}}$$

28. $\sin(2x) = -\frac{\sqrt{3}}{2}$

$2x = \frac{4\pi}{3} + 2\pi n$

$x = \frac{2\pi}{3} + \pi n$

$2x = \frac{5\pi}{3} + 2\pi n$

$x = \frac{5\pi}{6} + \pi n$

20. $[0, 2\pi)$

$$\cos(2x)(2\cos x + 1) = 0$$

$\cos(2x) = 0$

$2x = \frac{\pi}{2} + 2\pi n$

$x = \frac{\pi}{4} + \pi n = \frac{\pi + 4\pi n}{4}$

$2x = \frac{3\pi}{2} + 2\pi n$

$x = \frac{3\pi}{4} + \pi n = \frac{3\pi + 4\pi n}{4}$

$2\cos x + 1 = 0$

$\cos x = -\frac{1}{2}$

$x = \frac{2\pi}{3}$

$x = \frac{4\pi}{3}$

n	$\frac{\pi + 4\pi n}{4}$	$\frac{3\pi + 4\pi n}{4}$
0	$\pi/4$	$3\pi/4$
1	$5\pi/4$	$7\pi/4$
2		

$[0, \frac{\cancel{2}8\pi}{4})$

38. $\csc^2 x - 4\cot x = -2$

$1+\cot^2 x - 4\cot x + 2 = 0$

$\cot^2 x - 4\cot x + 3 = 0$

$(\cot x - 3)(\cot x - 1) = 0$

$\cot x = 3$

$x = \cot^{-1}(3) + 2\pi n$

$\cot x = 1$

$x = \frac{\pi}{4} + 2\pi n$

$x = \frac{5\pi}{4} + 2\pi n$

You need to know by ♥

- Quotient
- Reciprocal
- Pythagorean

Power Reducing

Rewrite using only cosine to the first power.

$\cos^4 x$

$\cos^2 x \cdot \cos^2 x$

$$\left(\frac{1+\cos 2x}{2}\right)\left(\frac{1+\cos 2x}{2}\right)$$

$$\frac{1+2\cos(2x)+\cos^2(2x)}{4}$$

$$\frac{\left[1+2\cos(2x)+\left(\frac{1+\cos(4x)}{2}\right)\right]}{4} \cdot \frac{1}{4}$$

$$\frac{2}{2}\cdot\frac{1}{2\cdot 4}+\frac{4\cdot\cos(2x)}{2\cdot 4}+\frac{1}{8}+\frac{\cos(4x)}{8}$$

$$\frac{2+4\cos(2x)+1+\cos(4x)}{8}$$

$$\frac{3+4\cos(2x)+\cos(4x)}{8}$$

Try this:

Given: $\boxed{\begin{array}{l} \sin A = \frac{2}{3} \ \& \ \frac{\pi}{2} < A < \pi \\ \cos B = -\frac{3}{5} \ \& \ \pi < B < \frac{3\pi}{2} \end{array}}$

A. $\sin(A-B)$

B. $\cos(B+A)$

C. $\sin(2A)$

D. $\cos(2B)$

E. $\tan(2A)$

F. $\sin\left(\frac{A}{2}\right)$

G. $\cos\left(\frac{B}{2}\right)$

Answers on next pages!

Using a sum/difference formula find:

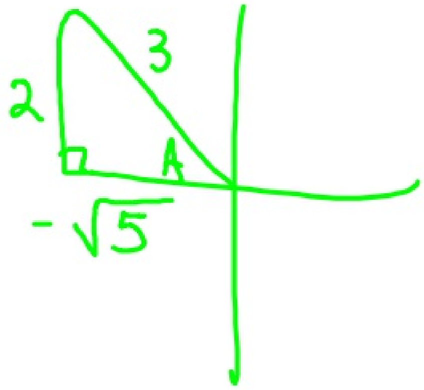
A. $\sin(105°)$ B $\cos(75°)$ subt.

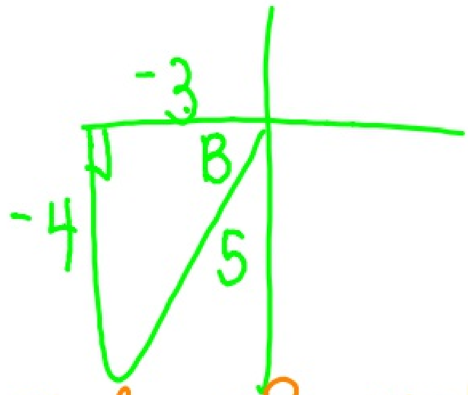
$\sin(135° - 30°)$

$\sin 135° \cos 30° - \sin 30° \cos 135°$

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

$\frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4}$ $\frac{\sqrt{6}+\sqrt{2}}{4}$





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

$$\left(\frac{2}{3}\right)\left(\frac{-3}{5}\right) - \left(\frac{-4}{5}\right)\left(\frac{-\sqrt{5}}{3}\right)$$

$$\frac{-6}{15} - \frac{4\sqrt{5}}{15}$$

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

$$\left(\frac{-3}{5}\right)\left(\frac{-\sqrt{5}}{3}\right) - \left(\frac{-4}{5}\right)\left(\frac{2}{3}\right)$$

$$\frac{3\sqrt{5}}{15} + \frac{8}{15}$$

C. $\sin(2A) = 2\sin A \cos A$

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

$$\frac{-4\sqrt{5}}{9}$$

D. $\cos(2B) = 1 - 2\sin^2 B$

$$= 1 - 2\left(-\frac{4}{5}\right)^2$$

$$= 1 - \frac{2}{1}\left(\frac{16}{25}\right)$$

$$= 1 - \frac{32}{25}$$

$$= \frac{25-32}{25}$$

$$= \frac{-7}{25}$$

E. $\tan(2A) = \dfrac{2\tan A}{1-\tan^2 A}$

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

$$= \frac{\frac{-4}{\sqrt{5}}}{\frac{5}{5}-\frac{4}{5}}$$

$$= \frac{\frac{-4}{\sqrt{5}}}{\frac{1}{5}}$$

$$= \frac{-4}{\sqrt{5}} \cdot \frac{5}{1}$$

$$= -\frac{20}{\sqrt{5}}$$

F. $\sin\left(\frac{A}{2}\right) = \pm\sqrt{\frac{1-\cos A}{2}}$

$$\sin\left(\frac{A}{2}\right) = \sqrt{\frac{1-\cos A}{2}}$$

$$= \sqrt{\frac{\frac{3}{3} + \left(+\frac{\sqrt{5}}{3}\right)}{2}}$$

$$\sqrt{\frac{\frac{3+\sqrt{5}}{3}}{2}}$$

$$\sqrt{\frac{3+\sqrt{5}}{3} \cdot \frac{1}{2}}$$

$$\sqrt{\frac{3+\sqrt{5}}{6}}$$

G

$$\cos\frac{B}{2} = \pm\sqrt{\frac{1+\cos B}{2}}$$

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

$$= -\sqrt{\frac{\frac{2}{5}}{2}} = -\sqrt{\frac{\cancel{2}}{5}\cdot\frac{1}{\cancel{2}}}$$

$$-\sqrt{\frac{1}{5}}$$