Friday, February 23, 2018
6:28 PM

Name: KEY Date: Period:

**Verifying Identities (5.2) & Solving Trig Equations (5.3) Review Do Now**

**SHOW ALL WORK ON A SEPARATE SHEET OF PAPER**

1.) Find a) the general solutions and b) the solutions on the interval $[0,2\pi)$ of

$$\cos x\left(\sqrt{2}\cos 3x + 1\right) = 0$$

2.) Solve $\cot^3 x - \cot^2 x - 3\cot x + 3 = 0$ on the interval $[0,2\pi)$

3.) Solve $\sec^2 x + 2\tan x - 4 = 0$ on the interval $[0,2\pi)$

4.) Verify the identity: $\frac{1}{1-\sin x} - \frac{1}{1+\sin x} = 2\tan x\sec x$

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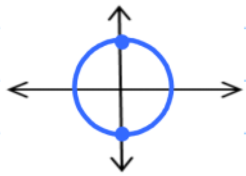
1.) Find a) the general solutions $\cos x\left(\sqrt{2}\cos 3x+1\right)=0$

$\cos x = 0$



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

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

* can combine to $\frac{\pi}{2}+\pi n$

$\sqrt{2}\cos 3x+1=0$

$\sqrt{2}\cos 3x=-1$

$\cos 3x=-\frac{1}{\sqrt{2}}$

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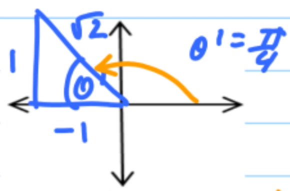
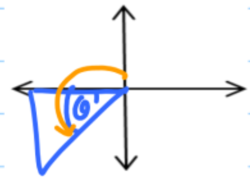



$\frac{1}{3}(3x)=\left(\frac{3\pi}{4}+2\pi n\right)\frac{1}{3}$ $\qquad$ $\frac{1}{3}(3x)=\left(\frac{5\pi}{4}+2\pi n\right)\frac{1}{3}$

$\boxed{x=\frac{3}{3}\frac{\pi}{4}+\frac{2\pi n}{3}}\cdot\frac{4}{4}$ $\qquad$ $\boxed{x=\frac{5\pi}{12}+\frac{2\pi n}{3}}\cdot\frac{4}{4}$

$\frac{3\pi}{12}+\frac{8\pi}{12}$ $\qquad$ $\frac{5\pi}{12}+\frac{8\pi}{12}$

b) the solutions on the interval $[0,2\pi)$

$\boxed{\frac{\pi}{2},\ \frac{3\pi}{2},\ \frac{\pi}{4},\ \frac{11\pi}{12},\ \frac{19\pi}{12},\ \frac{5\pi}{12},\ \frac{13\pi}{12},\ \frac{21\pi}{12}}$

2.) Solve $\cot^3 x-\cot^2 x-3\cot x+3=0$ on the interval $[0,2\pi)$

* factor by grouping

$\cot^2 x(\cot x-1)-3(\cot x-1)=0$

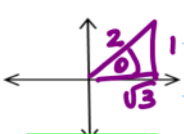
$(\cot^2 x-3)(\cot x-1)=0$

$\cot^2 x-3=0$

$\sqrt{\cot^2 x}=\sqrt{3}$

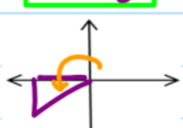
$\cot x=\pm\sqrt{3}$

$\frac{a}{o}$




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

$\boxed{x=\frac{5\pi}{6}}$



$\boxed{x=\frac{7\pi}{6}}$

$\boxed{x=\frac{11\pi}{6}}$

$\cot x-1=0$

$\cot x=1$

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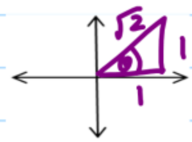
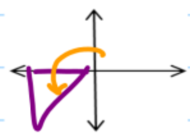



$\boxed{x=\frac{\pi}{4}}$



$\boxed{x=\frac{5\pi}{4}}$

3.) Solve $\sec^2 x + 2\tan x - 4 = 0$ on the interval $[0, 2\pi)$

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

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

$(\tan x + 3)(\tan x - 1) = 0$ $\qquad (x+3)(x-1) = 0$

$\tan x + 3 = 0$

$\tan x = -3$

$\tan^{-1}(-3) = x$

$x \approx -1.2490$

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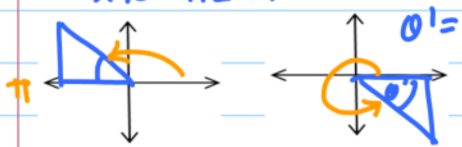

$\theta' = 1.249$

$x = \pi - 1.249$ $\qquad x = 2\pi - 1.249$

$\boxed{x = 1.8925}$ $\qquad \boxed{x = 5.0342}$

$\tan x - 1 = 0$

$\tan x = 1$

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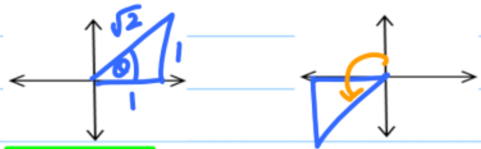

$\boxed{x = \frac{\pi}{4}}$ $\qquad \boxed{x = \frac{5\pi}{4}}$

4.) Verify the identity: $\frac{(1+\sin x)}{(1+\sin x)}\frac{1}{1-\sin x} - \frac{1}{1+\sin x}\frac{(1-\sin x)}{(1-\sin x)} = 2\tan x \sec x$

$\frac{1+\sin x}{(1+\sin x)(1-\sin x)} - \frac{1-\sin x}{(1+\sin x)(1-\sin x)} =$

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

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

$2\,\frac{\sin x}{\cos x} \cdot \frac{1}{\cos x} =$

$2\tan x \sec x$ ✓