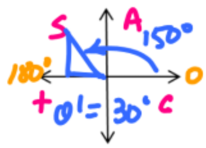
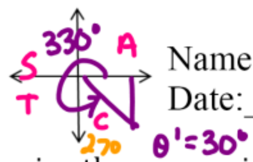
Saturday, March 17, 2018
10:06 AM

Precalculus
CH.5 Test Review #1





Name: KEY
Date:__________ Period:______

1. Find the exact value of the following by using the appropriate sum or difference formula.

a) $\sin 195^\circ = \sin(150^\circ + 45^\circ)$

$= \sin 150^\circ \cos 45^\circ + \cos 150^\circ \sin 45^\circ$

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

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

b) $\cos(330^\circ - 45^\circ)$

$= \cos 330^\circ \cos 45^\circ + \sin 330^\circ \sin 45^\circ$

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

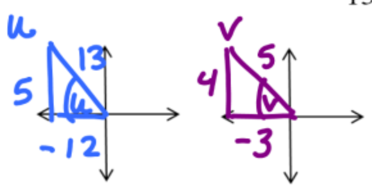
$= \frac{\sqrt{6}}{4} + \frac{-\sqrt{2}}{4} = \boxed{\frac{\sqrt{6}-\sqrt{2}}{4}}$

2. Express as the sine, cosine, or tangent of a single angle:

$\sin 140^\circ \cos 50^\circ + \cos 140^\circ \sin 50^\circ = \boxed{\sin 190^\circ}$

3. Find the exact value of:

$\sin(u - v)$ given that $\sin u = \frac{5}{13}$ and $\cos v = -\frac{3}{5}$ (u *and* v are both in Q II)



$\sin(u-v) = \sin u \cos v - \cos u \sin v$

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

$= \frac{-15}{65} + \frac{48}{65} = \boxed{\frac{33}{65}}$

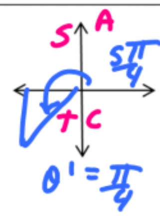
4. Verify the identity:

$\cos\left(\frac{5\pi}{4} - x\right) = -\frac{\sqrt{2}}{2}(\cos x + \sin x)$

$= \cos \frac{5\pi}{4} \cos x + \sin \frac{5\pi}{4} \sin x$

$= \left(-\frac{\sqrt{2}}{2}\right) \cos x + \left(-\frac{\sqrt{2}}{2}\right) \sin x$

$= -\frac{\sqrt{2}}{2}(\cos x + \sin x)$ ✓



5. Find all solutions in the interval $[0, 2\pi)$:

$\sin\left(x + \frac{\pi}{6}\right) - \sin\left(x - \frac{\pi}{6}\right) = \frac{1}{2}$

$\cancel{\sin x \cos \frac{\pi}{6}} + \cos x \sin \frac{\pi}{6} - \left[\cancel{\sin x \cos \frac{\pi}{6}} - \cos x \sin \frac{\pi}{6}\right] = \frac{1}{2}$

$2 \cos x \sin \frac{\pi}{6} = \frac{1}{2}$

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

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

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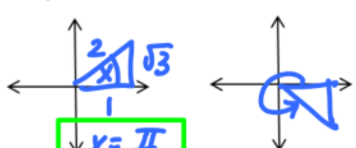
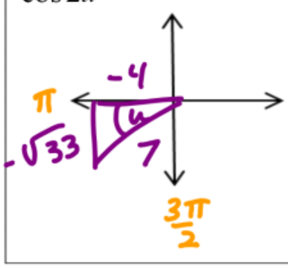


$\boxed{x = \frac{\pi}{3}}$ $\boxed{x = \frac{5\pi}{3}}$

6. Given $\cos u = -\frac{4}{7}$; $\pi < u < \frac{3\pi}{2}$, find the exact value of:

$\cos 2u$



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

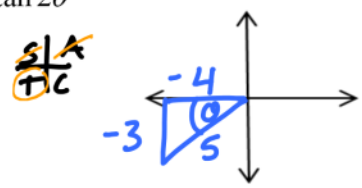
$= \left(-\frac{4}{7}\right)^2 - \left(\frac{\sqrt{33}}{7}\right)^2 = \frac{16}{49} - \frac{33}{49}$

$= \boxed{-\frac{17}{49}}$

7. Given $\tan\theta = \frac{3}{4}$; and $\sin\theta < 0$, find the exact value of:

pos neg

$\tan 2\theta$



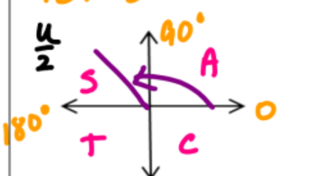
$= \frac{2\tan\theta}{1-\tan^2\theta} = \frac{2\left(\frac{3}{4}\right)}{1-\left(\frac{3}{4}\right)^2} = \frac{\frac{3}{2}}{1-\frac{9}{16}} = \frac{\frac{3}{2}}{\frac{7}{16}}$

$= \frac{3}{\cancel{2}_1} \cdot \frac{\cancel{16}^8}{7} = \boxed{\frac{24}{7}}$

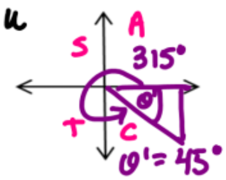
8. Use a half-angle formula to find the exact value of :

$\cos 157^\circ 30'$

$157^\circ 30' \times 2 = 315^\circ$



* cos neg in QII



$\cos\left(\frac{315^\circ}{2}\right) = -\sqrt{\frac{1+\cos 315^\circ}{2}} = -\sqrt{\frac{1+\frac{\sqrt{2}}{2}}{2}}$

$= -\sqrt{\frac{\frac{2+\sqrt{2}}{2}}{2}} = -\sqrt{\frac{2+\sqrt{2}}{2}\cdot\frac{1}{2}}$

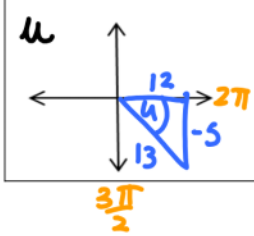
$= \boxed{-\frac{1}{2}\sqrt{2+\sqrt{2}}}$

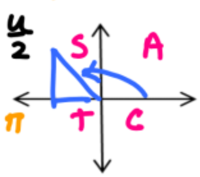
9. Given $\sin u = -\frac{5}{13}$; $\frac{3\pi}{2} < u < 2\pi$, find the exact value of:

$\cos\frac{u}{2}$

$\frac{1}{2}\left(\frac{3\pi}{2} < \frac{u}{2} < \frac{2\pi}{2}\right)$

$\frac{3\pi}{4} < \frac{u}{2} < \pi$





* cosine is neg in QII

$= -\sqrt{\frac{1+\cos u}{2}}$

$= -\sqrt{\frac{1+\frac{12}{13}}{2}} = -\sqrt{\frac{\frac{25}{13}}{2}} = -\sqrt{\frac{25}{13}\cdot\frac{1}{2}}$

$= -\frac{\sqrt{25}}{\sqrt{26}} = -\frac{5}{\sqrt{26}}\cdot\frac{\sqrt{26}}{\sqrt{26}} = \boxed{-\frac{5\sqrt{26}}{26}}$