Test 1

#2 $r = 25$ cm

a) $\theta = 1332^\circ$

$$s = r\theta = (\cancel{25}^{5})(\cancel{1332}^{\circ})\left(\frac{\pi}{\cancel{180}^{\circ}}\right) = 37.5\pi = 185\pi \text{ cm}$$

≈ 581.195 cm

$=$

GLAUCOMA

b) $A = \frac{1}{2}r^2\theta = \frac{1}{2}(25)^2(135^\circ)\left(\frac{\pi}{180^\circ}\right)$

$$\frac{(\cancel{625}^{125})(\cancel{135}^{15})\pi}{2(\cancel{180}^{4})} = \boxed{\frac{1875\pi}{8} \text{ cm}^2}$$ Yes

$(736.3107782 \text{ cm}^2)$ Not quite

$\sec^4\left(\frac{\pi x}{32}\right) - 4 = 0$

$\sec^4\left(\frac{\pi x}{32}\right) = 4$

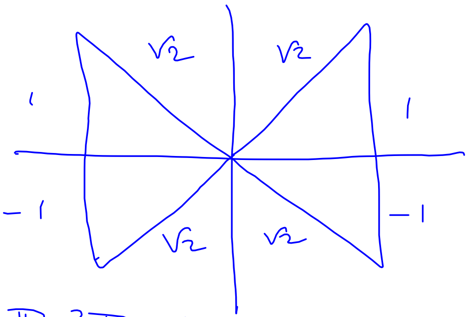
$\sqrt[4]{A^4} = |A|$

$\sqrt[4]{\sec^4\left(\frac{\pi x}{32}\right)} = \sqrt[4]{4} = 4^{\frac{1}{4}} = \left(2^2\right)^{\frac{1}{4}} = 2^{\frac{2}{4}} = 2^{\frac{1}{2}} = \sqrt{2}$

$\left|\sec\left(\frac{\pi x}{32}\right)\right| = \sqrt{2}$

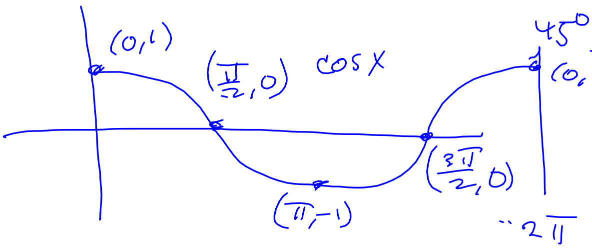
$\sec\left(\frac{\pi x}{32}\right) = \pm\sqrt{2}$

$\boxed{\cos\left(\frac{\pi x}{32}\right) = \pm\frac{1}{\sqrt{2}}}$



want $\cos\left(\frac{\pi x}{32}\right) = \pm\frac{1}{\sqrt{2}}$ $\quad \frac{\pi x}{32} = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

$45^\circ, 135^\circ, 225^\circ, 315^\circ$

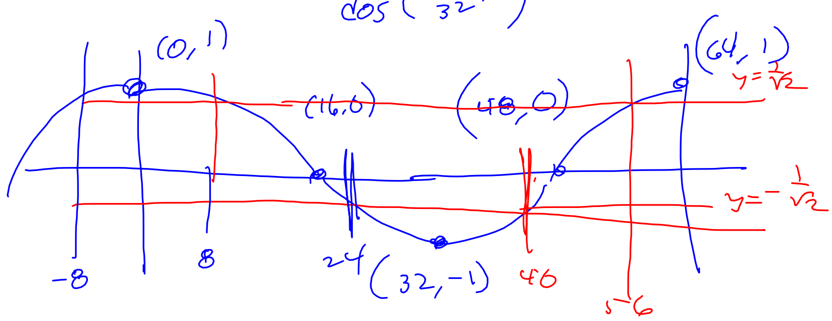


$\cos\left(\frac{\pi}{32}x\right)$

$x \longmapsto \frac{32}{\pi}x$

$\frac{\pi}{2}\cdot\frac{32}{\pi} = 16$

$\pi\cdot\frac{32}{\pi} = 32$



$\frac{\pi}{32}x = \frac{\pi}{4}$

$x = 8$

$\frac{\pi}{32}x = \frac{3\pi}{4} \Longrightarrow x = 24$

$\frac{\pi}{32}x = \frac{5\pi}{4} \Longrightarrow x = 40$

$\frac{\pi}{32}x = \frac{7\pi}{4} \Longrightarrow x = 56$

$\{8 + 16n \mid n \in \mathbb{Z}\}$ captures all of the solutions

62, 78, 16, 88, 59, 64, 35, 42,
61, 59, 15, 92

There will be a Test 1 Re-Take opportunity towards the end of the semester.

I wouldn't mess with it, unless I still really needed it at the end. We drop the worst test from your grade, fwiw.

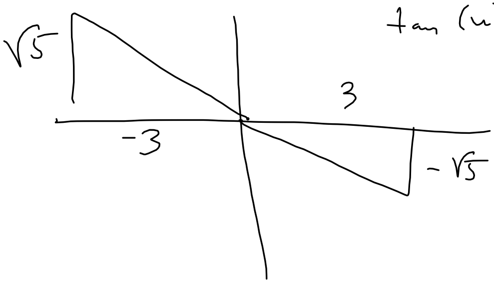
No, David. Don't re-take it.

Just don't.

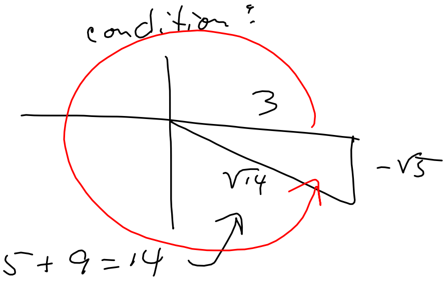
Please, no.

3. (10 pts) Find $\sin\left(\frac{u}{2}\right)$, $\cos\left(\frac{u}{2}\right)$, and $\tan\left(\frac{u}{2}\right)$, given that $\tan(u) = -\frac{\sqrt{5}}{3}$ and $\cos(u) > 0$. Assume $0 < u < 2\pi$. Give final answers in simplified radical form.

$\tan(u) = -\frac{\sqrt{5}}{3}$



Add $\cos(u) > 0$ condition:



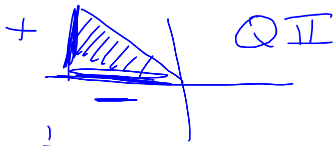
$5 + 9 = 14$

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

$= +\sqrt{\frac{1 - 3/\sqrt{14}}{2}}$

$270^\circ < u < 360^\circ$

$135^\circ < \frac{u}{2} < 180^\circ$



$\frac{1 - \frac{3}{\sqrt{14}}}{2} = \frac{\frac{14}{14} - \frac{3\cdot\sqrt{14}}{14}}{\frac{2}{1}} = \frac{14 - 3\sqrt{14}}{14}\cdot\frac{1}{2}$

STOP! PAIN!

$= \frac{14 - 3\sqrt{14}}{28}$

$\Rightarrow \boxed{\sqrt{\frac{14-3\sqrt{14}}{28}}} = \frac{\sqrt{14-3\sqrt{14}}}{\sqrt{7\cdot 4}} = \frac{\sqrt{14-3\sqrt{14}}}{2\sqrt{7}}$

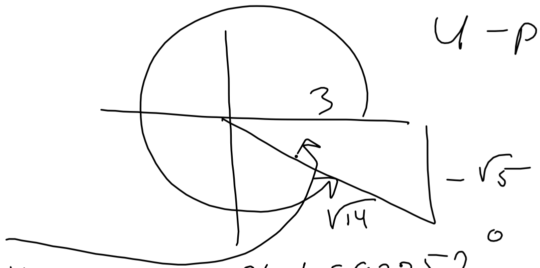
$= \frac{\sqrt{(14-3\sqrt{14})(7)}}{2\sqrt{7\cdot 7}} = \frac{\sqrt{98 - 21\sqrt{14}}}{14}$

Another method for determining $\pm$ in

$\pm\sqrt{\frac{1-\cos(u)}{2}}$ & $\pm\sqrt{\frac{1+\cos(u)}{2}}$

$\tan u = -\frac{\sqrt{5}}{3}$ $\quad \cos(u) > 0$

u-pic

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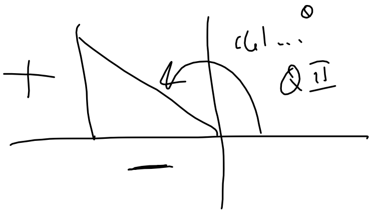
   -.6405223127
tan⁻¹(-√(5)/3)
   -36.6992252
Ans+360
   323.3007748
Ans/2
   161.6503874
```

$^{\circ} \approx \frac{u}{2}$

$\approx 36.6992252^{\circ}$

$360^{\circ} - 36...^{\circ} \approx$



$\frac{u}{2}$-pic

$\sin\frac{u}{2} = +\sqrt{\frac{1-\frac{3}{\sqrt{14}}}{2}}$

$\cos\left(\frac{u}{2}\right) = -\sqrt{\frac{1+\frac{3}{\sqrt{14}}}{2}}$

Angle Sum $\sin(u+v) = \sin u \cos v + \sin v \cos u$

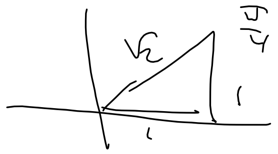
$\cos(u+v) = \cos u \cos v - \sin u \sin v$

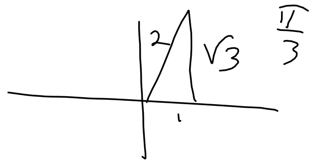
$\sin\left(\frac{7\pi}{12}\right)$

$7 = 1+6 = 2+5 = 3+4$

$\frac{7\pi}{12} = \frac{3\pi}{12} + \frac{4\pi}{12} = \frac{\pi}{4} + \frac{\pi}{3}$

$\sin\left(\frac{7\pi}{12}\right) = \sin\left(\frac{\pi}{4}+\frac{\pi}{3}\right) = \sin\frac{\pi}{4}\cos\frac{\pi}{3} + \sin\frac{\pi}{3}\cos\frac{\pi}{4}$





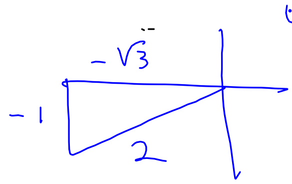
$= \frac{1}{\sqrt{2}}\cdot\frac{1}{2} + \frac{\sqrt{3}}{2}\cdot\frac{1}{\sqrt{2}} = \boxed{\frac{1+\sqrt{3}}{2\sqrt{2}}} = \frac{\sqrt{2}(1+\sqrt{3})}{\sqrt{2}(2\sqrt{2})}$

$= \frac{\sqrt{2}+\sqrt{2}\sqrt{3}}{4} = \boxed{\frac{\sqrt{2}+\sqrt{6}}{4}}$

Use $\frac{1}{2}$-angle

$\frac{7\pi}{12} = \frac{1}{2}\cdot\frac{7\pi}{6}$

$\frac{7\pi}{6}\cdot\frac{180^\circ}{\pi} = 210^\circ$

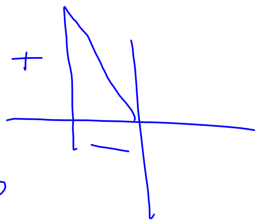


$u = \frac{7\pi}{6}$

$\cos u = \frac{-\sqrt{3}}{2}$

$\Rightarrow \sin\left(\frac{7\pi}{12}\right) = \pm\sqrt{\frac{1-\cos\frac{7\pi}{6}}{2}}$

$\frac{7\pi}{12}$



$\frac{7\pi}{12}\cdot\frac{180^\circ}{\pi} = 105^\circ$

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

$= \sqrt{\frac{\frac{2}{2}-\frac{\sqrt{3}}{2}}{2}} = \sqrt{\frac{2-\sqrt{3}}{4}}$

$= \boxed{\frac{\sqrt{2-\sqrt{3}}}{2} = \sin\left(\frac{7\pi}{12}\right)}$

$f(\cos(x)) = 4\cos^3 x - 4\cos^2 x - 3\cos x + 3$ = Next Time $f(\cos(2x))$

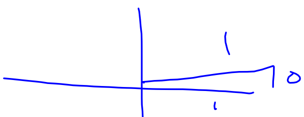
$= 4\cos^2 x\,[\cos x - 1] - 3[\cos x - 1]$

$= (\cos x - 1)(4\cos^2 x - 3) = 0$

$f(\cos x)$

$\Rightarrow \cos x - 1 = 0$ $\qquad 4\cos^2 x - 3 = 0$

$\cos x = 1$ $\qquad 4\cos^2 x = 3$



$\boxed{x = 0 = 0^\circ}$

$\cos^2 x = \frac{3}{4}$

$\cos x = \pm\sqrt{\frac{3}{4}} = \pm\frac{\sqrt{3}}{2}$

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

$a = 4, b = 0, c = -3$

$b^2 - 4ac = 0^2 - 4(4)(-3)$

$= 48$

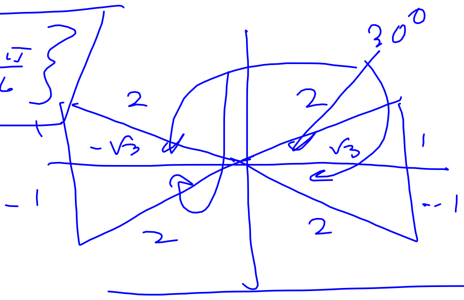
$= 4\sqrt{3}$

2 | 48
2 | 24
2 | 12
2 | 6
3

$x = \frac{0 + 4\sqrt{3}}{2(4)}$

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

$\boxed{x \in \left\{0, \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}\right\}}$



$$\boxed{\begin{aligned} x &= \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6} \\ &= 30^\circ, 150^\circ, 210^\circ, 330^\circ \end{aligned}}$$

$$6\tan(2x) - 6\cot x \qquad 6\,\frac{\sin(2x)}{\cos(2x)} - 6\,\frac{\cos x}{\sin x}$$

$$= 6\left[\frac{2\tan x}{1-\tan^2 x}\right] - 6\cot x$$

$\cos(2x) \neq 0$ or we gots problems

$$= \frac{12\tan x}{1-\tan^2 x}\cdot\frac{\sin x}{\sin x} - 6\,\frac{\cos x}{\sin x}\cdot\frac{(1-\tan^2 x)}{1-\tan^2 x}$$

$$= \frac{12\sin x\tan x - 6\cos x + 6\cos x\tan^2 x}{(\sin x)(1-\tan^2 x)} = 0$$

$$\boxed{\frac{A}{B} = 0 \Rightarrow A = 0}$$

$$\Rightarrow 12\sin x\tan x - 6\cancel{x}\cos x + 6\cos x\tan^2 x = 0$$

$$\Rightarrow 12\sin x\left(\frac{\sin x}{\cos x}\right) - 6\cos x + 6\cos x\left(\frac{\sin^2 x}{\cos^2 x}\right)$$

$$= \frac{12\sin^2 x}{\cos x} + \frac{6\sin^2 x}{\cos x} - 6\cos x$$

$$= \frac{18\sin^2 x}{\cos x} - (6\cos x)\left(\frac{\cos x}{\cos x}\right)$$

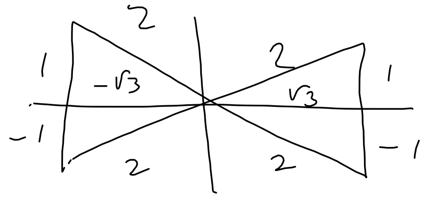
$$= \frac{18\sin^2 x - 6\cos^2 x}{\cos x} = \frac{18(1-\cos^2 x) - 6\cos^2 x}{\cos x} = 0$$

$$\Rightarrow 18 - 24\cos^2 x = 0$$

$$\Rightarrow 24\cos^2 x = 18$$

$$\cos^2 x = \frac{18}{24} = \frac{3}{4}$$

$$\cos x = \pm\frac{\sqrt{3}}{2}$$



$$x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$$

$$\sin x - \cos x = 0$$
$$\sin x = \cos x$$
$$\tan x = 1$$