Chapter 5 Review

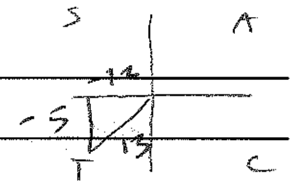
Can YOU do these problems?

Question 1

- Use the given values to evaluate all six trig functions:

$$\tan x = \frac{5}{12}, \sec x < 0$$

$\cos < 0$



$\sin x = -\frac{5}{13}$ $\quad$ $\csc x = -13/5$

$\cos x = -\frac{12}{13}$ $\quad$ $\sec x = -13/12$

$\tan x = 5/12$ $\quad$ $\cot = 12/5$

Question 2

- Use a half-angle formula to determine the EXACT value of

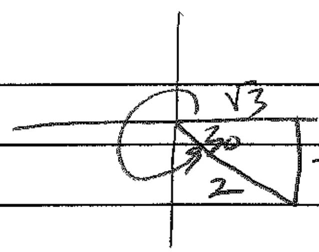
$$\tan 165^\circ$$

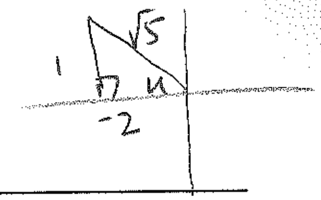
$$= \tan \frac{330}{2} = \frac{1-\cos 330}{\sin 330}$$

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

$$= -(2-\sqrt{3})$$

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





Question 3

- Using a double angle formula, find the EXACT values of sin2u and cos2u given that

$$\cos u = \frac{-2}{\sqrt{5}}, \; \frac{\pi}{2} < u < \pi$$

$\sin 2u = 2\sin u \cos u = 2\left(\frac{1}{\sqrt{5}}\right)\left(\frac{-2}{\sqrt{5}}\right) = -\frac{4}{5}$

$\cos 2u = \cos^2 u - \sin^2 u$
$= \left(-\frac{2}{\sqrt{5}}\right)^2 - \left(\frac{1}{\sqrt{5}}\right)^2$
$= \frac{4}{5} - \frac{1}{5} = 3/5$

Question 4

- Simplify down to ONE trig function or numerical value

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

$= -\cot x$

Question 5

- Write the expression as the sine, cosine, or tangent of the angle. You do not have to find the value!

$$\sin 60° \cos 55° - \cos 60° \sin 55°$$

$\sin(60-55) = \sin 5°$

Question 6

- Simplify down to ONE trig function or numerical value

$$\sin\beta\tan\beta + \cos\beta$$

$\sin \frac{\sin}{\cos} + \cos$

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

$\sec\beta$

Question 7

- Use a half-angle formula to **simplify** the expression:

$$-\sqrt{\frac{1+\cos 10x}{2}}$$

$= \cos \frac{10x}{2}$

$\cos 5x$

Question 8

- Prove the following identities- be sure to only work ONE side of the equation!

$$\frac{\cos^2\alpha - 4}{\cos\alpha - 2} = \cos\alpha + 2$$

$\frac{(\cos\alpha+2)\cancel{(\cos\alpha-2)}}{\cancel{\cos\alpha-2}}$

$= \cos\alpha + 2$ ✓

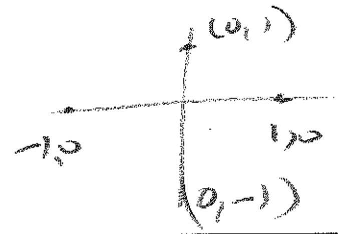
Question 9

- **Verify** the identity using a sum or difference formula:

$$\sin(x - \tfrac{3\pi}{2}) = \cos x$$

$\sin x \cos \frac{3\pi}{2} - \cos x \sin \frac{3\pi}{2}$

$= \quad -\cos x(-1) = \cos x$ ✓



Question 10

- Prove the following identities- be sure to only work ONE side of the equation!

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

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

$= \sin x \tan x$ ✓

Question 11

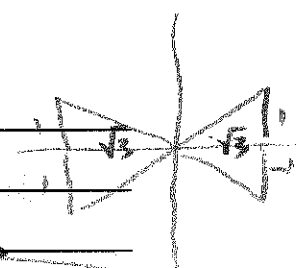
- Find **all** solutions to the given equation between 0 and 2π.

$$4\tan^2 u - 1 = \tan^2 u$$

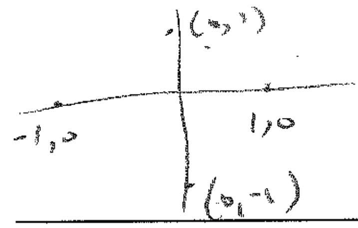
$3\tan^2 u = 1$

$\tan^2 u = \frac{1}{3}$

$\tan u = \pm \frac{1}{\sqrt{3}}$



$u = \pi/6, \; 5\pi/6, \; 7\pi/6, \; 11\pi/6$



Question 12

- Find **all** solutions to the given equation between 0 and 2π.

$$4\cos^2\theta = 2\cos\theta$$

$4\cos^2\theta - 2\cos\theta = 0$

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

$2(\cos 2\theta) = 0$

$2\theta = \pi/2,\ 3\pi/2$

$\theta = \pi/4,\ 3\pi/4$

Question 13

- Find **all** solutions to the given equation between 0 and 2π.

$$2\sin^2 x - 3\sin x = -1$$

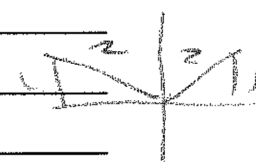
$2\sin^2 x - 3\sin x + 1 = 0$

$(2\sin x - 1)(\sin x - 1) = 0$

$\sin x = \frac{1}{2}$ $\quad$ $\sin x = 1$

$x = \pi/6,\ 5\pi/6$

$x = \pi/2$



Question 14

Find the EXACT value of cos(u – v) using a sum or difference formula, given that

$$\sin u = \frac{3}{4} \ \textit{and} \ \cos v = \frac{-5}{13}$$

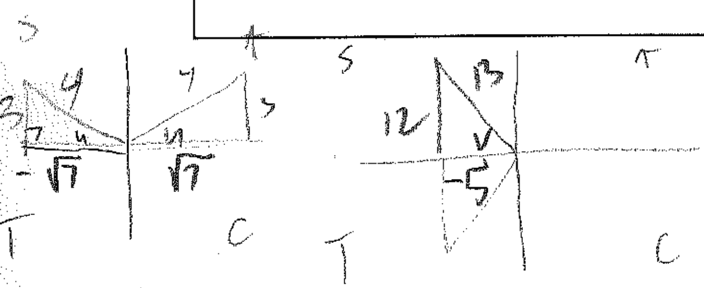
same Q ?

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

$= \frac{-\sqrt{17}}{4}\cdot\frac{-5}{13} + \frac{3}{4}\cdot\frac{12}{13}$

$= \frac{5\sqrt{17}}{52} + \frac{36}{52} = \frac{180\sqrt{17}}{52}$

$= \frac{90\sqrt{17}}{26} = \frac{45\sqrt{17}}{13}$



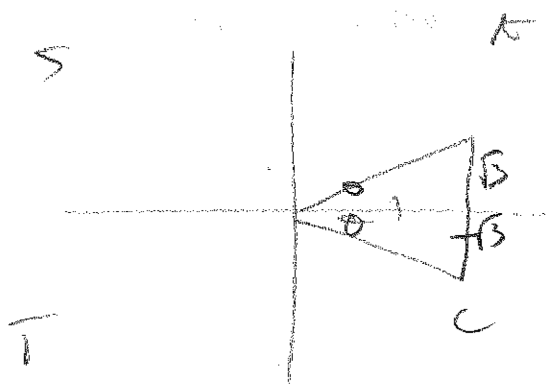
Question 15

- Find **all** solutions to the given equation between 0 and 2π.

$$4\cos\theta = 1 + 2\cos\theta$$

$2\cos\theta = 1$

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



$\theta = \frac{\pi}{3},\ 5\pi/3$