Review Chapter#7

Name $\underline{\text{Answer Key (1)}}$

Period#__

1. Simplify $\csc x \cdot \cos x \cdot \sin x$

$$\frac{1}{\cancel{\sin x}} \cdot \frac{\cos x}{1} \cdot \frac{\cancel{\sin x}}{1} = \boxed{\cos x}$$

2. Prove $\cos x \cdot \csc x \cdot \tan x = 1$ (11)

$$\cancel{\cos x} \cdot \frac{1}{\cancel{\sin x}} \cdot \frac{\cancel{\sin x}}{\cancel{\cos x}} = \boxed{1}$$

**Use your addition and subtraction formulas

3. $\sin 15°$ $\quad \sin(s-t) = \sin s \cdot \cos t - \cos s \cdot \sin t$

$$\sin(\overset{s}{45} - \overset{t}{30}) = \sin 45° \cdot \cos 30° - \cos 45° \cdot \sin 30°$$

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

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

4. $\sin 30° \cos 15° + \cos 30° \sin 15°$

$$\sin(s+t) = \sin s \cdot \cos t + \cos s \cdot \sin t$$

$$s = 30 \quad t = 15$$

$$\sin(30+15) = \sin 45° = \boxed{\frac{\sqrt{2}}{2}}$$

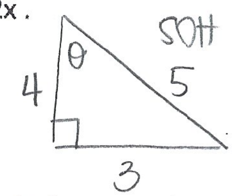
5. Prove $\tan\left(\frac{\pi}{2} - x\right) = \cot x$

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

$$= \frac{1 \cdot \cos x - \cancel{0 \cdot \sin x}}{\cancel{0 \cdot \cos x} + 1 \cdot \sin x} = \frac{\cos x}{\sin x} = \boxed{\cot x}$$

6. Find sin 2x and cos 2x.

Given $\sin x = \frac{3}{5}$ $\begin{matrix} O \\ H \end{matrix}$



SOH CAH TOA

$$a^2 + b^2 = c^2$$

$$a^2 + 3^2 = 5^2$$

$$a^2 + 9 = 25$$

$$-9 \quad -9$$

$$\sqrt{a^2} = \sqrt{16}$$

$$a = 4$$

$$\sin 2x = 2 \cdot \sin x \cdot \cos x$$

$$= 2 \cdot \frac{3}{5} \cdot \frac{4}{5} = \boxed{\frac{24}{25}}$$

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

$$\left(\frac{4}{5}\right)^2 - \left(\frac{3}{5}\right)^2 = \frac{16}{25} - \frac{9}{25} = \boxed{\frac{7}{25}}$$

$$\sin x = \frac{3}{5}$$

$$\cos x = \frac{4}{5}$$

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

7. Use your half-angle formulas. $\quad \sin\left(\frac{u}{2}\right) = \pm\sqrt{\frac{1-\cos u}{2}}$

$\sin 22.5°$

$$\sin\left(\frac{45}{2}\right) = \sqrt{\frac{1-\cos 45°}{2}}$$

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

flip

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

**Use your product-sum formulas.

8. $\cos \overset{u}{3x} \cos \overset{v}{5x}$

$$\cos u \cos v = \frac{1}{2}\left[\cos(u+v) + \cos(u-v)\right]$$

$$= \frac{1}{2}\left[\cos(3x+5x) + \cos(3x-5x)\right]$$

$$= \frac{1}{2}\left[\cos(8x) + \cos(-2x)\right] = \boxed{\frac{1}{2}\left[\cos(8x) + \cos(2x)\right]}$$

9. $2\sin \overset{u}{37.5°} \sin \overset{v}{7.5°}$

$$\sin u \cdot \sin v = \frac{1}{2}\left[\cos(u-v) - \cos(u+v)\right]$$

$$= \cancel{2} \cdot \frac{1}{\cancel{2}}\left[\cos(37.5-7.5) - \cos(37.5+7.5)\right]$$

$$= \cos(30°) - \cos(45°) = \frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2} = \boxed{\frac{\sqrt{3}-\sqrt{2}}{2}}$$

**Use your sum-product formulas.

10. $\cos \overset{x}{6x} - \cos \overset{y}{4x}$

$$\cos x - \cos y = -2\sin\frac{x+y}{2}\sin\frac{x-y}{2}$$

$$= -2\sin\frac{6x+4x}{2}\sin\frac{6x-4x}{2}$$

$$= \boxed{-2\sin(5x)\sin(x)}$$

11. $\sin \overset{x}{75°} - \sin \overset{y}{15°}$

$$\sin x - \sin y = 2\cos\frac{x+y}{2}\sin\frac{x-y}{2}$$

$$= 2\cos\frac{75+15}{2}\sin\frac{75-15}{2}$$

$$= 2\cos(45°)\sin(30°)$$

$$= \cancel{2} \cdot \frac{\sqrt{2}}{\cancel{2}} \cdot \frac{1}{2} = \boxed{\frac{\sqrt{2}}{2}}$$

12. $2\sin x + \cancel{1} = 0$

$\quad\quad\quad\;\; \cancel{-1} \;\; -1$

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

$\sin x = -\frac{1}{2} \longrightarrow \left(\frac{\sqrt{3}}{2}, -\frac{1}{2}\right) \quad \left(-\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$

$\boxed{\frac{11\pi}{6} + 2k\pi} \quad \boxed{\frac{7\pi}{6} + 2k\pi}$

13. $(2\sin x + \sqrt{3})(2\cos x - 1) = 0$

$2\sin x + \cancel{\sqrt{3}} = 0$

$\quad\quad \cancel{-\sqrt{3}} \;\; -\sqrt{3}$

$\frac{\cancel{2}\sin x}{\cancel{2}} = \frac{-\sqrt{3}}{2}$

$\sin x = -\frac{\sqrt{3}}{2}$

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

$\boxed{\frac{5\pi}{3} + 2k\pi} \quad \boxed{\frac{4\pi}{3} + 2k\pi}$

$2\cos x - \cancel{1} = 0$

$\quad\quad \cancel{+1} \;\; +1$

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

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

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

$\boxed{\frac{\pi}{3} + 2k\pi} \quad \cancel{\frac{5\pi}{3}}$