Review of Trigonometry II

1. State the restriction(s) for each in the domain $0 \le x \le 2\pi$.

   a. $\dfrac{1}{\sin x}$ b. $\sec x$ c. $\cot x$ d. $\dfrac{\csc x \cot x}{\sin x \tan x}$

2. Find the restrictions for $\dfrac{\sin x \cos x}{3\tan x + \sqrt{3}}$, $x \in \Re$.

3. Solve.

   a. $10\cos x = 6\cos x - \sqrt{12}$, $0 \le x \le 360°$ b. $3\sin x + 2 - \sqrt{3}\cos x = 2$, $0 \le x \le 2\pi$

4. Solve $6\sin x\cos^2 x + 11\sin x\cos x + 4\sin x = 0$, $0 \le x \le 360°$.

5. Solve $\sec\dfrac{1}{4}x + \sqrt{2} = 0$, $0 \le x \le 12\pi$.

6. Find the general solution for:

   a. $2\sin\theta + 1 = 0$ b. $\tan^2\theta - 1 = 0$

7. Find the general solution for:

   a. $\cot\theta = 0$ b. $\sin\left(\theta - \dfrac{\pi}{4}\right) = 0$

8. Prove $\cos^2 x\cos^2 y - \sin^2 x\sin^2 y + \sin^2 x\cos^2 y + \sin^2 y\cos^2 x = 1$.

9. Prove $\sec^2 x - \sec^2 y = \tan^2 x - \tan^2 y$.

10. Show that $1 + \tan^2 x = \sec^2 x$.

11. prove $\dfrac{1+\sin x}{\tan x} = \cot x + \cos x$.

12. Solve $\sec x \cot x - 2 = 0$. $0 \le x \le 810°$.

13. Describe the features of the graph of $\sin^2 x + \cos^2 x$.

14. Prove $\cot x - \cot 2x = \csc 2x$.

15. Use $x = \pi$ to show that $\sin 2x = 2 \sin x \cos x$.

16. Find the exact value of $\sin \dfrac{\pi}{12}$.

17. If $\sin A = -\dfrac{2}{3}$ and $\cos B = \dfrac{1}{5}$, where $\dfrac{\pi}{2} \le A \le \dfrac{3\pi}{2}$ and $\pi \le B \le 2\pi$, then the exact value of $\sin (A + B)$ is

Answers to Review of Trigonometry II

1a. $x = 0, \pi, 2\pi$ **b.** $x = \dfrac{\pi}{2}, \dfrac{3\pi}{2}$ **c.** $x = 0, \pi, 2\pi$ **d.** $x = 0, \pi, 2\pi, \dfrac{\pi}{2}, \dfrac{3\pi}{2}$

2. $x = \dfrac{5\pi}{6} + n\pi, n \in I$ **3a.** $x = 150°, 210°$ **b.** $\dfrac{\pi}{6}, \dfrac{7\pi}{6}$ **4.** $x = 0, 120°, 180°, 240°, 360°$

5. $x = 3\pi, 5\pi, 11\pi$ **6a.** $\dfrac{7\pi}{6} + 2n\pi, \dfrac{11\pi}{6} + 2n\pi, n \in I$ **b.** $\dfrac{\pi}{4} + \dfrac{n\pi}{2}, n \in I$

7a. $\dfrac{\pi}{2} + n\pi, n \in I$ **b.** $\dfrac{\pi}{4} + n\pi, n \in I$ **10.** $1 + \dfrac{\sin^2 x}{\cos^2 x}$, $\dfrac{\cos^2 x + \sin^2 x}{\cos^2 x}$, $\dfrac{1}{\cos^2 x}$,

12. 30°, 150°, 390°, 510°, 750° **13.** a horizontal line at $y = 1$ $(\sin^2 x + \cos^2 x = 1)$

15. $\sin 2\pi = 2 \sin \pi = 0 = 0$ **16.** $\dfrac{\sqrt{6} - \sqrt{2}}{4}$ **17.** $\dfrac{2\sqrt{30} - 2}{15}$