Calculus 12
Trigonometry Review

A. **Find the exact value of each ratio. Do not use a calculator.**

1) $\sin 0$ 2) $\sin\frac{\pi}{6}$ 3) $\sin\frac{\pi}{4}$ 4) $\sin\frac{\pi}{3}$ 5) $\sin\frac{\pi}{2}$

6) $\cos 0$ 7) $\cos\frac{\pi}{6}$ 8) $\cos\frac{\pi}{4}$ 9) $\cos\frac{\pi}{3}$ 10) $\cos\frac{\pi}{2}$

11) $\tan 0$ 12) $\tan\frac{\pi}{6}$ 13) $\tan\frac{\pi}{4}$ 14) $\tan\frac{\pi}{3}$ 15) $\tan\frac{\pi}{2}$

16) $\csc\frac{2\pi}{3}$ 17) $\sin\frac{3\pi}{4}$ 18) $\sin\pi$ 19) $\csc\frac{7\pi}{6}$ 20) $\sin\frac{5\pi}{3}$

21) $\cos\frac{2\pi}{3}$ 22) $\sec\frac{3\pi}{4}$ 23) $\cos\pi$ 24) $\cos\frac{7\pi}{6}$ 25) $\sec\frac{5\pi}{3}$

26) $\cot\frac{2\pi}{3}$ 27) $\tan\frac{3\pi}{4}$ 28) $\cot\pi$ 29) $\tan\frac{4\pi}{3}$ 30) $\tan\frac{11\pi}{6}$

B. Find all values of θ in terms of $(0 \leq \theta < 2\pi)$.

1) $\sin\theta = \frac{\sqrt{3}}{2}$

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

3) $\tan\theta = -1$

4) $2\cos^2\theta = \sqrt{3}\cos\theta$

5) $2\sin^2\theta + \sin\theta - 1 = 0$

C. Simplify the following expressions:

1) $\sin\theta + \cos\theta + \sin(-\theta) + \cos(-\theta)$

2) $\frac{\tan\theta}{\sin\theta\sec\theta}$

3) $\frac{\sin\theta}{1+\cos\theta} + \frac{\sin\theta}{1-\cos\theta}$

4) $\sin(\pi + x)$

5) $\cos^2(-\theta) - \sin\theta\sin(-\theta)$

6) $\csc^2\theta - \cos^2\theta\csc^2\theta$

7) $\frac{1+\sin\theta}{\cos\theta} + \frac{\cos\theta}{1+\sin\theta}$

8) $\cos(\frac{\pi}{2} + x)$

D. **Find all values of x in terms of π $(0 \leq x < 2\pi)$**

1) $\cos 2x + \sin x = 0$
2) $\sqrt{2}\sin x + \sin 2x = 0$
3) $\cos\frac{x}{2} = \frac{1}{2}$
4) $2\sin(3x) - \sqrt{3} = 0$
5) $3\tan^2 x = 1$
6) $4\cos^2 x - 1 = 0.$

E. Prove the following identities

1) $\frac{sin2x}{cos2x+1} = \tan x$

2) $\frac{1-cosx}{sinx} = \frac{sinx}{1+cosx}$

3) $csc^2x + sec^2x = csc^2x + sec^2x$

4) $\cot x - \csc x = \frac{\cos 2x - \cos x}{\sin 2x + \sin x}$

5) $2 \cos x \cos y = \cos (x + y) + \cos (x - y)$.

Answers:

A.

1.	0	2.	$\frac{1}{2}$	3.	$\frac{\sqrt{2}}{2}$	4.	$\frac{\sqrt{3}}{2}$
5.	1	6.	1	7.	$\frac{\sqrt{3}}{2}$	8.	$\frac{\sqrt{2}}{2}$
9.	$\frac{1}{2}$	10.	0	11.	0	12.	$\frac{\sqrt{3}}{3}$
13.	1	14.	$\sqrt{3}$	15.	Ø	16.	$\frac{2\sqrt{3}}{3}$
17.	$\frac{\sqrt{2}}{2}$	18.	0	19.	-2	20.	$-\frac{\sqrt{3}}{2}$
21.	$-\frac{1}{2}$	22.	$-\sqrt{2}$	23.	-1	24.	$-\frac{\sqrt{3}}{2}$
25.	2	26.	$-\frac{\sqrt{3}}{3}$	27.	-1	28.	Ø
29.	$\sqrt{3}$	30.	$-\frac{\sqrt{3}}{3}$				

B.

1. $\frac{\pi}{3}, \frac{2\pi}{3}$ 2. $\frac{4\pi}{3}, \frac{2\pi}{3}$ 3. $\frac{3\pi}{4}, \frac{7\pi}{4}$ 4. $\frac{\pi}{2}, \frac{3\pi}{2}, . \frac{\pi}{6}, . \frac{11\pi}{6}$

5. $\frac{3\pi}{2}, . \frac{\pi}{6}, . \frac{5\pi}{6}$

C.

1. $2\cos\theta$ 2. 1 3. 1 4. 1 5. $2\csc\theta$ 6. $2\sec\theta$

7. –sinx 8. –sinx

D.

1. $\frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$ 2. $0, \pi, \frac{3\pi}{4}, \frac{5\pi}{4}$ 3. $\frac{2\pi}{3}$

4. $\frac{\pi}{9}, \frac{2\pi}{9}, \frac{7\pi}{9}, \frac{8\pi}{9}, \frac{13\pi}{9}, \frac{14\pi}{9}$ 5. $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$ 6. $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$