

# PC 12 LG 10 Worksheet (Sum & Diff/Double Angle)

Write as a single trigonometric function.

1.  $\sin 20^\circ \cos 50^\circ + \cos 20^\circ \sin 50^\circ$

2.  $\cos \frac{\pi}{3} \cos \frac{\pi}{4} - \sin \frac{\pi}{3} \sin \frac{\pi}{4}$

3.  $\frac{\tan 20^\circ + \tan 50^\circ}{1 - \tan 20^\circ \tan 50^\circ}$

4.  $\cos 35^\circ \cos 20^\circ + \sin 35^\circ \sin 20^\circ$

5.  $\frac{\tan \frac{\pi}{6} - \tan \frac{\pi}{4}}{1 + \tan \frac{\pi}{6} \tan \frac{\pi}{4}}$

6.  $\sin 70^\circ \cos 100^\circ - \cos 70^\circ \sin 100^\circ$

7.  $\sin^2 \theta + \cos^2 \theta$

8.  $\cos^2 \theta - \sin^2 \theta$

9.  $\cos^2 \theta + \sin^2 \theta$

10.  $\sin^2 \theta - \cos^2 \theta$

11.  $2 \sin \theta \cos \theta$

12.  $\sin \theta \cos \theta$

13.  $10 \sin \theta \cos \theta$

14.  $8 \sin \theta \cos \theta$

15.  $2 \sin 3\theta \cos 3\theta$

16.  $10 \sin 5\theta \cos 5\theta$

17.  $\cos^2 6\theta - \sin^2 6\theta$

18.  $1 - 2 \sin^2 \theta$

19.  $\sin^2 3\theta + \cos^2 3\theta$

20.  $2 - 4 \sin^2 5\theta$

21.  $\frac{2 \tan 20^\circ}{1 - \tan^2 20^\circ}$

22.  $\frac{2 \tan \frac{\pi}{6}}{1 - \tan^2 \frac{\pi}{6}}$

23.  $\frac{8 \tan 5\theta}{1 - \tan^2 5\theta}$

24.  $\frac{4 \tan 3\theta}{1 - \tan^2 3\theta}$

Prove the following identities:

25. 
$$\frac{\cos 2\theta + 1}{\sin 2\theta} = \frac{\cos \theta}{\sin \theta}$$

26. 
$$2(1 - \sin^2 \theta) = \cos 2\theta + 1$$

27. 
$$\tan \theta + \cot \theta = 2 \csc 2\theta$$

# PC 12 LG 10 Worksheet (Sum & Diff/Double Angle)

Prove the following identities:

28 
$$\frac{\sin 2\theta}{1 - \cos 2\theta} = 2 \csc 2\theta - \tan \theta$$

29 
$$\tan 2\theta = \frac{2 \sin \theta \cos \theta}{1 - 2 \sin^2 \theta}$$

30 
$$\frac{2 \cos^2 \theta - 1}{\sin 2\theta} = \frac{1 - \frac{\sin^2 \theta}{\cos^2 \theta}}{2 \tan \theta}$$

1.  $\sin 70^\circ$                       13.  $5 \sin 2\theta$

2.  $\cos \frac{7\pi}{12}$                       14.  $4 \sin 2\theta$

3.  $\tan 70^\circ$                       15.  $\sin 6\theta$

4.  $\cos 15^\circ$                       16.  $5 \sin 10\theta$

5.  $\tan \frac{-\pi}{12}$                       17.  $\cos 12\theta$

6.  $\sin -30^\circ$                       18.  $\cos 2\theta$

7. 1                                      19. 1

8.  $\cos 2\theta$                       20.  $2 \cos 10\theta$

9. 1                                      21.  $\tan 4\theta$

10.  $-\cos 2\theta$                       22.  $\tan \frac{\pi}{3}$

11.  $\sin 2\theta$                       23.  $4 \tan 10\theta$

12.  $\frac{1}{2} \sin 2\theta$                       24.  $2 \tan 6\theta$

*Note: To prove identities 25 - 30, you must make the LHS equal to the RHS*

Answer Key