



1. If  $\sin \theta = \frac{1}{2}$ ,  $0 \leq \theta < \frac{\pi}{2}$ , then  $\cos \theta = \boxed{\frac{\sqrt{3}}{2}}$  ( $\theta = \frac{\pi}{6}$ )

2. If  $\sin \theta = \frac{3}{4}$ ,  $0 \leq \theta < \frac{\pi}{2}$ , then  $\cos \theta = \boxed{\frac{\sqrt{7}}{4}}$




3. If  $\sin \theta = \frac{3}{4}$ ,  $\frac{\pi}{2} \leq \theta < \frac{3\pi}{2}$ , then  $\cos \theta = \boxed{-\frac{\sqrt{7}}{4}}$

4. If  $\tan \theta = \frac{1}{2}$ ,  $0 \leq \theta < \frac{\pi}{2}$ , then  $\sec \theta = \boxed{\frac{\sqrt{5}}{2}}$



5. If  $\tan \theta = \frac{1}{2}$ ,  $\frac{\pi}{2} \leq \theta < \frac{3\pi}{2}$ , then  $\sin \theta = \boxed{-\frac{\sqrt{5}}{2}}$

6. If  $\sin \theta = \frac{1}{3}$ ,  $\frac{\pi}{2} \leq \theta < \pi$ , then  $\sin(2\theta) = \boxed{-\frac{4\sqrt{2}}{9}}$




$\sin 2\theta = 2 \sin \theta \cos \theta$   
 $= 2 \left( \frac{1}{3} \right) \left( -\frac{\sqrt{8}}{3} \right)$   
 $= -\frac{2\sqrt{8}}{9}$   
 $= -\frac{4\sqrt{2}}{9}$

7. If  $\cos 2\theta = \frac{1}{3}$ ,  $-\frac{\pi}{2} \leq \theta < \frac{\pi}{2}$ , then  $\cos \theta = \boxed{\frac{\sqrt{6}}{3}}$

$\cos^2 \theta = \frac{1 + \cos 2\theta}{2}$   
 $= \frac{1 + \frac{1}{3}}{2}$   
 $= \frac{\frac{4}{3}}{2}$   
 $= \frac{2}{3}$   
 $\cos \theta = \sqrt{\frac{2}{3}} = \frac{\sqrt{6}}{3}$

8. If  $\cos \theta = \frac{1}{3}$ ,  $0 \leq \theta < \frac{\pi}{2}$ , then  $\cos(2\theta) = \boxed{-\frac{7}{9}}$



$\cos 2\theta = \cos^2 \theta - \sin^2 \theta$   
 $= \frac{1}{9} - \frac{8}{9} = -\frac{7}{9}$

9. What are all the values of  $\theta$  for which  $\sin(2\theta) - \cos \theta = 0$  and  $0 \leq \theta < 2\pi$ ?

$\sin 2\theta = 2 \sin \theta \cos \theta$   
 $2 \sin \theta \cos \theta - \cos \theta = 0$   
 $\cos \theta (2 \sin \theta - 1) = 0$   
 $\cos \theta = 0$  or  $\sin \theta = \frac{1}{2} \rightarrow \boxed{\theta = 0, \frac{\pi}{6}, \frac{5\pi}{6}}$

10. What are all the values of  $\theta$  for which  $\cos(2\theta) + \sin \theta = 0$  and  $0 \leq \theta < 2\pi$ ?

$\cos 2\theta = 1 - 2 \sin^2 \theta$   
 $1 - 2 \sin^2 \theta + \sin \theta = 0$   
 $2 \sin^2 \theta - \sin \theta - 1 = 0$

$\sin \theta = \frac{1 \pm \sqrt{(-1)^2 - 4(2)(-1)}}{2(2)} = \frac{1 \pm 3}{4}$   
 $= 1$  or  $-\frac{1}{2}$

$\theta = \frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$

11. What are all the values of  $\theta$  for which  $4 \cos^2 \theta - 4 \sin \theta - 1 = 0$  and  $0 \leq \theta < 2\pi$ ?

$\cos^2 \theta = 1 - \sin^2 \theta$   
 $4(1 - \sin^2 \theta) - 4 \sin \theta - 1 = 0$   
 $4 - 4 \sin^2 \theta - 4 \sin \theta - 1 = 0$   
 $4 \sin^2 \theta + 4 \sin \theta - 3 = 0$

$\sin \theta = \frac{-4 \pm \sqrt{4^2 - 4(4)(-3)}}{2(4)}$   
 $= \frac{-4 \pm 8}{8} = \frac{1}{2}$  or  $-\frac{3}{2}$

*Not possible*

$\theta = \frac{\pi}{6}, \frac{5\pi}{6}$