


# HW M207 Analytic Trigonometry - Answers -

1)  $\sin x = \frac{1}{2}$     $\cos x = \frac{\sqrt{3}}{2}$     $\csc x = \frac{1}{\sin x} = \boxed{2}$

2)  $\csc x = \frac{4\sqrt{3}}{3}$     $\cos x < 0$        $\sin x = \frac{1}{\csc x} = \frac{3}{4\sqrt{3}} = \frac{\sqrt{3}}{4}$

$\cos x = -\sqrt{1 - \sin^2 x} = -\sqrt{1 - \frac{3}{16}} = -\sqrt{\frac{16-3}{16}} = \boxed{-\frac{\sqrt{13}}{4}}$

3)  $\sin \theta \sec \theta = \sin \theta \cdot \frac{1}{\cos \theta} = \frac{\sin \theta}{\cos \theta} = \boxed{\tan \theta}$    (a)

4)  $\cos^2 \theta (\sec^2 \theta - 1) = \cos^2 \theta \left( \frac{1}{\cos^2 \theta} - 1 \right) = \frac{\cos^2 \theta}{\cos^2 \theta} - \cos^2 \theta$   
 $= 1 - \cos^2 \theta = \boxed{\sin^2 \theta}$

5)  $x = 6 \sin \theta$     $\sqrt{36 - x^2} = \sqrt{36 - 36 \sin^2 \theta} = \sqrt{36(1 - \sin^2 \theta)}$   
 $\theta: \begin{array}{c} \frac{\pi}{2} \\ \uparrow \\ \text{---} \leftarrow \cos \theta > 0 \\ \downarrow \\ -\frac{\pi}{2} \end{array}$     $= 6 \sqrt{\cos^2 \theta} = \boxed{6 \cos \theta}$

6)  $1 - \frac{\tan \theta \cdot \cos \theta}{\csc \theta} = 1 - \frac{\sin \theta}{\cos \theta} \cdot \cos \theta \cdot \sin \theta = 1 - \sin^2 \theta = \boxed{\cos^2 \theta}$  ✓

7) start from r.h.s:

$\sec^2 \theta + \tan \theta \sec \theta = \frac{1}{\cos^2 \theta} + \frac{\sin \theta}{\cos \theta} \cdot \frac{1}{\cos \theta} = \frac{1 + \sin \theta}{\cos^2 \theta}$

$= \frac{1 + \sin \theta}{1 - \sin^2 \theta} = \frac{(1 + \sin \theta)}{(1 + \sin \theta)(1 - \sin \theta)} = \boxed{\frac{1}{1 - \sin \theta}}$  ✓