311: 12-17 317: 3-7, 9, 10, 13, 87, 88

12. $\cot 420° = \cot 60° = \frac{\sqrt{3}}{3}$ (420 − 360)

13. $\cos \frac{7\pi}{4} = \frac{\sqrt{2}}{2}$

14. $\sec \frac{10\pi}{3} - \frac{6\pi}{3} = \frac{4\pi}{3}$ $\cos \frac{4\pi}{3} = -\frac{1}{2}$ $\sec\theta = -2$

15. $\tan 480° \quad -360$ $\tan 120° = -\sqrt{3}$

16. $\csc \frac{2\pi}{3}$ $\sin \frac{2\pi}{3}$ $\frac{\sqrt{3}}{2}$ $\csc \frac{2\pi}{3} = \frac{2\sqrt{3}}{3}$

17. $\sin 510° \quad -360°$ $= \sin 150° = \frac{1}{2}$

317:

3. $\tan\alpha = \frac{1}{5}$ find $\cot\alpha$

$\cot\alpha = \frac{1}{\tan} = \frac{1}{(\frac{1}{5})} = 5$

4. $\sin\beta = -\frac{5}{6}$ find $\csc\beta$

$\csc\beta = \frac{1}{\sin\beta} = \frac{1}{(-\frac{5}{6})} = -\frac{6}{5}$

5. $\cos x = \frac{1}{6}$, $\sin x = \frac{\sqrt{35}}{6}$

find $\cot x$

$\cot = \frac{\cos x}{\sin x} = \frac{(\frac{1}{6})}{\frac{\sqrt{35}}{6}}$

$\frac{1}{6} \cdot \frac{6}{\sqrt{35}} = \frac{1}{\sqrt{35}} \cdot \frac{\sqrt{35}}{35}$

6. $\sec\varphi = 2$ $\tan\varphi = \sqrt{3}$

find $\sin\varphi$

$\sec\theta = \frac{1}{\cos\varphi}$ $\tan = \frac{\sin\varphi}{\cos\varphi}$

$2 = \frac{1}{\cos\varphi}$ $\frac{1}{2} \cdot \sqrt{3} = \frac{\sin\varphi}{(\frac{1}{2})} \cdot (\frac{1}{2})$

$\cos\varphi = \frac{1}{2}$ $\sin\varphi = \frac{\sqrt{3}}{2}$

7. $\sec\theta = 8$, $\tan\theta = 3\sqrt{7}$ $\csc\theta$

$\frac{1}{\cos\theta} = 8$ $\cos\theta = \frac{1}{8}$

$3\sqrt{7} = \frac{\sin\theta}{(\frac{1}{8})}$ $\sin\theta = \frac{3\sqrt{7}}{8}$

$\csc\theta = \frac{8\sqrt{7}}{21}$

9. $\sec\theta, \cos\theta$ gvn $\tan\theta = -5$, $\cos\theta > 0$

$\tan^2\theta + 1 = \sec^2\theta$

$(-5)^2 + 1 = \sec^2\theta$

$26 = \sec^2\theta$

$\pm\sqrt{26} = \sec\theta$

$\cos\theta = \pm\frac{\sqrt{26}}{26}$ ← positive

$\boxed{\sec = \sqrt{26} \qquad \cos = \frac{\sqrt{26}}{26}}$

10. $\cot\theta, \sec\theta$; gvn: $\sin\theta = \frac{1}{3}$, $\tan\theta < 0$

$\frac{\cos\theta}{\sin\theta}$ $\frac{1}{\cos\theta}$ $\frac{\sin\theta}{\cos\theta}$ ← know ← need

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

$\left(\frac{1}{3}\right)^2 + \cos^2\theta = 1$

$\cos^2\theta = \frac{8}{9}$

$\cos\theta = \pm\sqrt{\frac{8}{9}} = \pm\frac{\sqrt{8}}{3} = \pm\frac{2\sqrt{2}}{3}$

sin +
tan −
cos − ✓

$\cos\theta = -\frac{2\sqrt{2}}{3}$ $\boxed{\sec = -\frac{3\sqrt{2}}{4}}$

$\cot = \frac{\left(-\frac{2\sqrt{2}}{3}\right)}{\left(\frac{1}{3}\right)} \cdot \frac{3}{1}$ $\boxed{\cot\theta = -2\sqrt{2}}$

13. $\cos\theta, \tan\theta$ gvn: $\csc\theta = \frac{8}{3}$ $\tan\theta > 0$ $\frac{+}{I}$ $\frac{-}{-}$

$\csc\theta = \frac{1}{\sin\theta}$ $\sin\theta = \frac{3}{8}$

$\cot^2\theta + 1 = \csc^2\theta$

$\cot^2\theta + 1 = \left(\frac{8}{3}\right)^2$

$\cot^2\theta = \frac{64}{9} - \frac{9}{9} = \frac{55}{9}$

$\cot\theta = \frac{\pm\sqrt{55}}{3}$ $\boxed{\tan\theta = \pm\frac{3\sqrt{55}}{55}}$

$\tan\theta = \frac{\sin\theta}{\cos\theta}$ $\frac{3\sqrt{55}}{55} = \frac{\left(\frac{3}{8}\right)}{\cos\theta}$

$\cos\theta = \frac{\left(\frac{3}{8}\right)}{\frac{3\sqrt{55}}{55}} \cdot \frac{55}{3\sqrt{55}} = \frac{55\sqrt{55}}{8 \cdot 55} = \boxed{\frac{\sqrt{55}}{8}}$

87 $\frac{x^2-1}{x+1} + \frac{(x+1)^2-1}{x+2} + \frac{(x+2)^2-1}{x+3} = \frac{}{(x+1)(x+2)(x+3)}$

$\frac{x^2-1}{x+1} + \frac{x^2+2x+1-1}{x+2} + \frac{x^2+4x+4-1}{x+3}$ $(x+3)(x+1)$

$= \frac{(x+1)(x-1)}{x+1} + \frac{x(x+2)}{x+2} + \frac{x^2+4x+3}{x+3}$

$x - 1 + x + x + 1 = 3x$ D

88. $\sin x = m$, $0 < x < 90$, $\tan x =$

$\tan x = \frac{\sin x}{\cos x}$ ← $\cos^2 x = 1 - \sin^2 x$ *

$\cos x = \sqrt{1 - \sin^2 x}$

$= \frac{m}{\sqrt{1 - m^2}}$ ←

$= \frac{m\sqrt{1 - m^2}}{1 - m^2}$

+1