$$x^2 + y^2 = 1^2$$

$$\cos\theta = x$$

$$\sin\theta = y$$

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

$$-\sin^2\theta \qquad -\sin^2\theta$$

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

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

$$-1 \qquad -1$$

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

$$17\sin^2\theta - 17 = -17\cos^2\theta$$

$$\cos^2\theta = (\cos\theta)^2$$

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

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

$$(\cot\theta)^2 = \left(\frac{\cos\theta}{\sin\theta}\right)^2$$

$$\cot^2\theta = \frac{\cos^2\theta}{\sin^2\theta}$$

$$\left(\frac{1}{\sin\theta}\right)^2 = (\csc\theta)^2$$

$$\frac{1}{\sin^2\theta} = \csc^2\theta$$

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

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

$$\frac{\sin\theta}{\cos\theta} = \tan\theta$$

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

ex. 2

a. If $\sec\theta = \frac{3}{2}$, find $\cos\theta$. $= \frac{2}{3}$

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

$= \frac{1}{3/2} = 1 \cdot \frac{2}{3}$

$\cos\theta = \frac{2}{3}$

b. If $\csc\theta = \frac{4}{3}$, find $\tan\theta$.

$\sin\theta = \frac{3}{4}$

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

$\frac{\sin\theta}{\cos\theta} = \tan\theta$

$\cot\theta$

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

$1 + \cot^2\theta = \left(\frac{4}{3}\right)^2$

$1 + \cot^2\theta = \frac{16}{9} - \frac{9}{9}$

$\sqrt{\cot^2\theta} = \pm\sqrt{\frac{7}{9}}$

$\cot\theta = \pm\frac{\sqrt{7}}{3}$

$\tan\theta = \pm\frac{3}{\sqrt{7}}$

$\tan\theta = \pm\frac{3\sqrt{7}}{7}$

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