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

$y = \sin\theta$

$x = \cos\theta$

✓ $\cos^2\theta + \sin^2\theta = 1$

$- \sin^2\theta \quad - \sin^2\theta$

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

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

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

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

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

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

$$\boxed{1 + \cot^2\theta = \csc^2\theta}$$

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

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

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

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

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

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

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

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ex 2 a.

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

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

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

$\sin\theta$ $\cot\theta$

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

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

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

-1

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

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

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

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

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