

$$\frac{\tan x + \tan y}{1 - \tan x \tan y} = \frac{\cot x + \cot y}{\cot x \cot y - 1}$$

$$\frac{\frac{\sin x}{\cos x} + \frac{\sin y}{\cos y}}{1 - \frac{\sin x \sin y}{\cos x \cos y}} = \frac{\frac{\sin x \cos y + \sin y \cos x}{\cos x \cos y}}{\frac{\cos x \cos y - \sin x \sin y}{\cos x \cos y}}$$

$$= \left( \frac{\sin x \cos y + \sin y \cos x}{\cancel{\cos x \cos y}} \right) \left( \frac{\cancel{\cos x \cos y}}{\cos x \cos y - \sin x \sin y} \right)$$

$$= \left( \frac{\sin x \cos y + \sin y \cos x}{\cos x \cos y - \sin x \sin y} \right) \left( \frac{\frac{1}{\sin y \sin x}}{\frac{1}{\sin y \sin x}} \right) =$$

$$= \frac{\frac{\cancel{\sin x} \cos y}{\sin y \cancel{\sin x}} + \frac{\cancel{\sin y} \cos x}{\cancel{\sin y} \sin x}}{\cot x \cot y - 1} = \frac{\cot y + \cot x}{\cot x \cot y - 1}$$

$$\begin{aligned} & (\cot^2 x + 1)(\cos^2 x) \\ &= (\csc^2 x)(\cos^2 x) \\ &= \left(\frac{1}{\sin^2 x}\right)(\cos^2 x) \\ &= \frac{\cos^2 x}{\sin^2 x} = \left(\frac{\cos x}{\sin x}\right)^2 = (\cot x)^2 = \cot^2 x \end{aligned}$$

$\cot^2 x + 1 = \csc^2 x$   
 $\tan^2 x + 1 = \sec^2 x$

Free graphing utility on-line

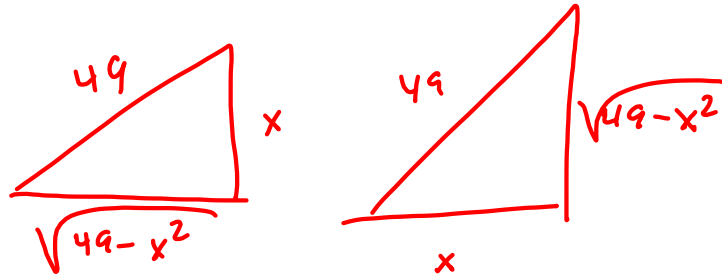
It sucks finding intercepts, intersections and max/min points. Don't know why.

But it draws the graphs well.

<http://dlippman.imathas.com/graphcalc/graphcalc.html>

$$\begin{aligned} \frac{-\sin x}{1 + \tan x} &= \frac{-\sin x}{\frac{\cos x - \sin x}{\cos x}} \\ &= \frac{-\sin x \cos x}{\cos x - \sin x} = \frac{\sin x \cos x}{\sin x - \cos x} \end{aligned}$$

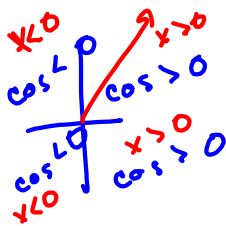
$$y = \sqrt{49 - x^2} \quad x = 7 \sin \theta$$



$$y = \sqrt{49 - x^2} = \sqrt{49 - (7 \sin \theta)^2}$$

$$= \sqrt{49 - 49 \sin^2 \theta}$$

$$\cos \theta = \frac{x}{h}$$



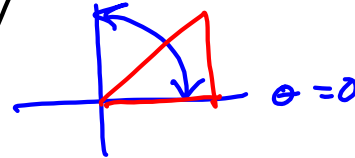
$$= \sqrt{49(1 - \sin^2 \theta)}$$

$$= \sqrt{49} \sqrt{1 - \sin^2 \theta}$$

$$= 7 \sqrt{\cos^2 \theta}$$

$$= 7 |\cos \theta|$$

$$0 < \theta < \frac{\pi}{2}$$



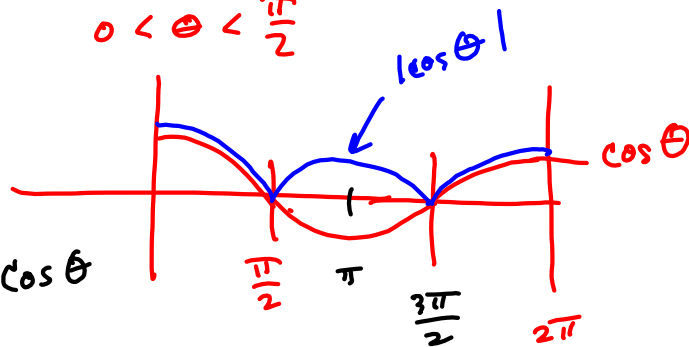
$$= 7 \cos \theta, \text{ b/c } \cos \theta > 0 \text{ when } 0 < \theta < \frac{\pi}{2}$$

If they said  $\frac{\pi}{2} < \theta < \pi$

$$|\cos \theta| = -\cos \theta$$

$$|3| = 3$$

$$|-3| = 3 = -(-3)$$



|                   |                   |
|-------------------|-------------------|
| $\sin \theta > 0$ | $\sin \theta > 0$ |
| $\sin \theta < 0$ | $\sin \theta < 0$ |