

The Weekly Rigor

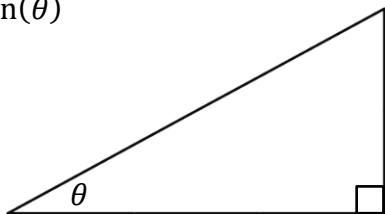
No. 247

“A mathematician is a machine for turning coffee into theorems.”

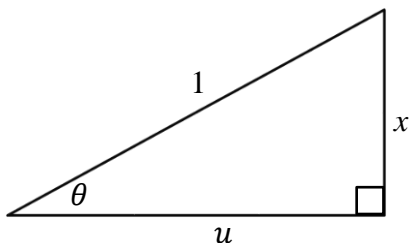
March 16, 2019

15 Problems in Solving Right Triangles (Part 3 of 4) (Part 4)

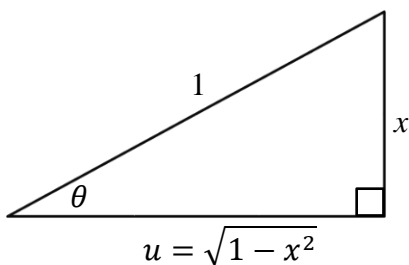
2. $x = \sin(\theta)$



$$x = \sin(\theta) = 1 \sin(\theta) \quad \Rightarrow \quad \frac{x}{1} = \sin(\theta)$$



$$x^2 + u^2 = 1^2 \quad \Rightarrow \quad u = \sqrt{1 - x^2}$$



$$\sin(\theta) = \frac{x}{1}$$

$$\csc(\theta) = \frac{1}{x}$$

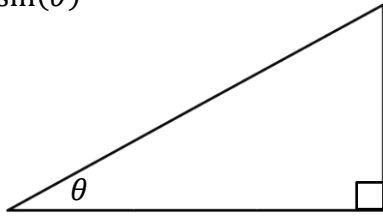
$$\cos(\theta) = \frac{\sqrt{1-x^2}}{1}$$

$$\sec(\theta) = \frac{1}{\sqrt{1-x^2}}$$

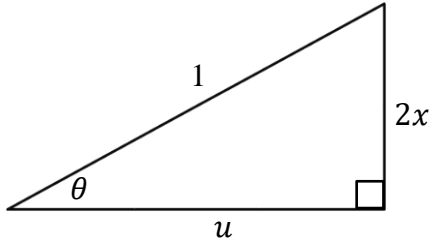
$$\tan(\theta) = \frac{x}{\sqrt{1-x^2}}$$

$$\cot(\theta) = \frac{\sqrt{1-x^2}}{x}$$

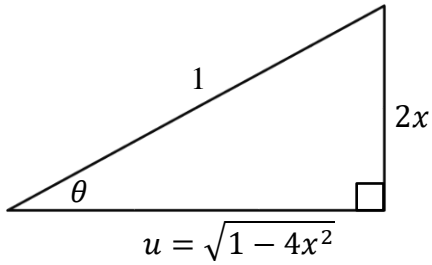
$$3. x = \frac{1}{2} \sin(\theta)$$



$$x = \frac{1}{2} \sin(\theta) \Rightarrow 2x = \frac{2x}{1} = \sin(\theta)$$



$$(2x)^2 + u^2 = 1^2 \Rightarrow u = \sqrt{1 - 4x^2}$$



$$\sin(\theta) = \frac{2x}{1}$$

$$\csc(\theta) = \frac{1}{2x}$$

$$\cos(\theta) = \frac{\sqrt{1-4x^2}}{1}$$

$$\sec(\theta) = \frac{1}{\sqrt{1-4x^2}}$$

$$\tan(\theta) = \frac{2x}{\sqrt{1-4x^2}}$$

$$\cot(\theta) = \frac{\sqrt{1-4x^2}}{2x}$$

“Only he who never plays, never loses.”