

# The Weekly Rigor

No. 248

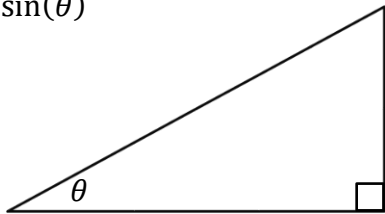
“A mathematician is a machine for turning coffee into theorems.”

March 23, 2019

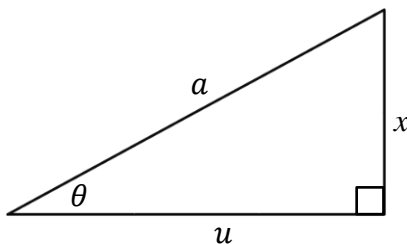
## 15 Problems in Solving Right Triangles (Part 3 of 4)

(Part 5)

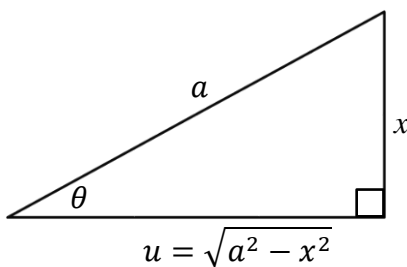
5.  $x = a \sin(\theta)$



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



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



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

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

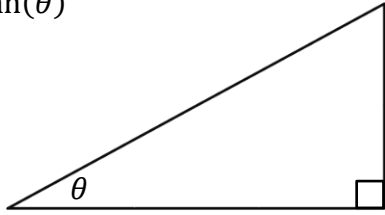
$$\cos(\theta) = \frac{\sqrt{a^2 - x^2}}{a}$$

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

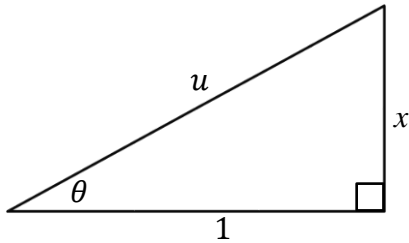
$$\tan(\theta) = \frac{x}{\sqrt{a^2 - x^2}}$$

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

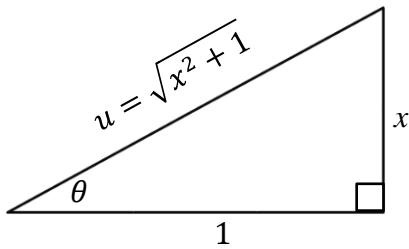
7.  $x = \tan(\theta)$



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



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



$$\sin(\theta) = \frac{x}{\sqrt{x^2+1}} \quad \csc(\theta) = \frac{\sqrt{x^2+1}}{x}$$

$$\cos(\theta) = \frac{1}{\sqrt{x^2+1}} \quad \sec(\theta) = \frac{\sqrt{x^2+1}}{1}$$

$$\tan(\theta) = \frac{x}{1} \quad \cot(\theta) = \frac{1}{x}$$

“Only he who never plays, never loses.”