

# The Weekly Rigor

No. 249

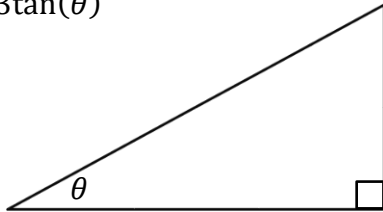
“A mathematician is a machine for turning coffee into theorems.”

March 30, 2019

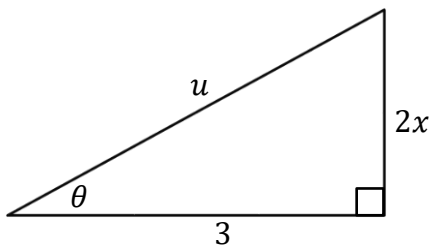
## 15 Problems in Solving Right Triangles (Part 3 of 4)

(Part 6)

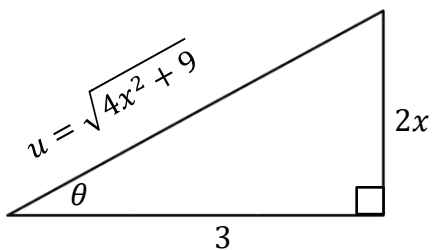
9.  $2x = 3\tan(\theta)$



$$2x = 3\tan(\theta) \Rightarrow \frac{2x}{3} = \tan(\theta)$$



$$(2x)^2 + 3^2 = u^2 \Rightarrow u = \sqrt{4x^2 + 9}$$

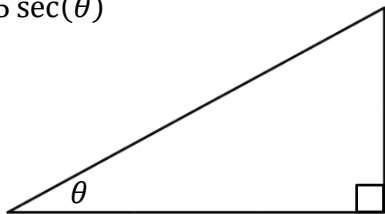


$$\sin(\theta) = \frac{2x}{\sqrt{4x^2+9}} \quad \csc(\theta) = \frac{\sqrt{4x^2+9}}{2x}$$

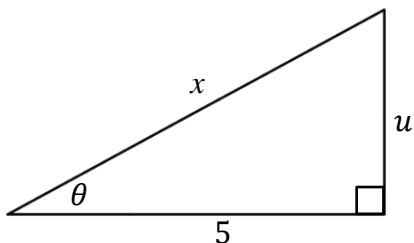
$$\cos(\theta) = \frac{3}{\sqrt{4x^2+9}} \quad \sec(\theta) = \frac{\sqrt{4x^2+9}}{3}$$

$$\tan(\theta) = \frac{2x}{3} \quad \cot(\theta) = \frac{3}{2x}$$

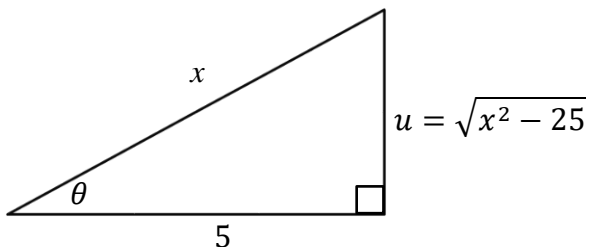
11.  $x = 5 \sec(\theta)$



$$x = 5 \sec(\theta) \Rightarrow \frac{x}{5} = \sec(\theta) \Rightarrow \frac{5}{x} = \cos(\theta)$$



$$u^2 + 5^2 = x^2 \Rightarrow u = \sqrt{x^2 - 25}$$



$$\sin(\theta) = \frac{\sqrt{x^2 - 25}}{x} \quad \csc(\theta) = \frac{x}{\sqrt{x^2 - 25}}$$

$$\cos(\theta) = \frac{5}{x} \quad \sec(\theta) = \frac{x}{5}$$

$$\tan(\theta) = \frac{\sqrt{x^2 - 25}}{5} \quad \cot(\theta) = \frac{5}{\sqrt{x^2 - 25}}$$

“Only he who never plays, never loses.”