

# The Weekly Rigor

No. 251

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

April 13, 2019

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

### PROBLEMS

1. State the Pythagorean Identity.
2.
  - (a) From the Pythagorean Identity, solve for  $\sin^2(\theta)$ .
  - (b) From the Pythagorean Identity, solve for  $\cos^2(\theta)$ .
3. State the Ratio Identity.
4. Draw and label the sides and angles of the two “reference triangles.”

## ANSWERS

1. The Pythagorean Identity:  $\sin^2(\theta) + \cos^2(\theta) = 1$

2. (a) From the Pythagorean Identity, solving for  $\sin^2(\theta)$ :

$$\sin^2(\theta) + \cos^2(\theta) = 1$$

$$\therefore \sin^2(\theta) = 1 - \cos^2(\theta)$$

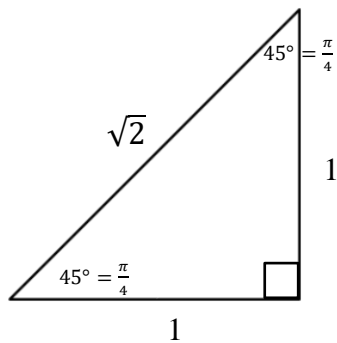
(b) From the Pythagorean Identity, solving for  $\cos^2(\theta)$ :

$$\sin^2(\theta) + \cos^2(\theta) = 1$$

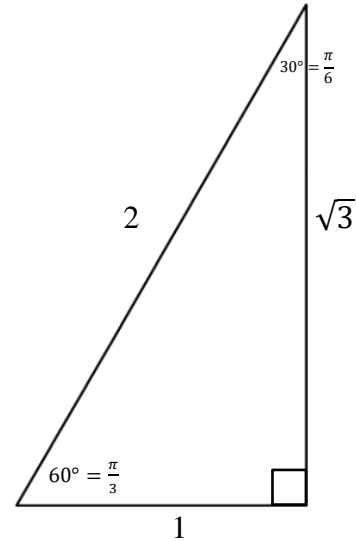
$$\therefore \cos^2(\theta) = 1 - \sin^2(\theta)$$

3. The Ratio Identity:  $\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$

4. The two “reference triangles”:



45-45-90



30-60-90

“Only he who never plays, never loses.”