

# The Weekly Rigor

No. 241

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

February 2, 2019

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## 10 Problems in Solving Right Triangles (Part 1 of 4)

### PROBLEMS

Solve the following right triangles. In each case  $C = 90^\circ$ .

1.  $a = 3.5, b = 2.6$

2.  $A = 26^\circ, b = 25$

3.  $B = 12.4^\circ, c = 72.4$

4.  $a = 57, c = 75$

5.  $A = 38^\circ, a = 19$

6.  $B = 48.4^\circ, a = 1.56$

7.  $b = 9.34, c = 12.6$

8.  $B = 42.63^\circ, b = 72.68$

9.  $A = 69.4^\circ, c = 258$

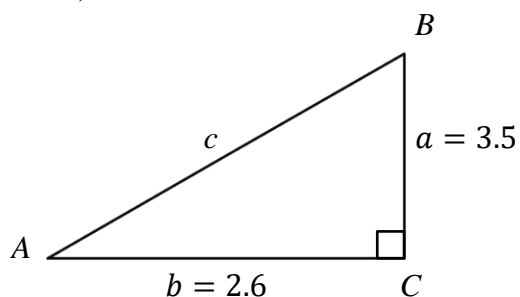
10.  $a = 4.05, b = 6.13$

## ANSWERS

1. $A = 53^\circ, B = 37^\circ, c = 4.4$	2. $B = 64^\circ, a = 12, c = 28$
3. $A = 77.6^\circ, a = 70.7, b = 15.5$	4. $A = 49^\circ, B = 41^\circ, b = 49$
5. $B = 52^\circ, b = 24, c = 31$	6. $A = 41.6^\circ, b = 1.76, c = 2.35$
7. $A = 42.2^\circ, B = 47.8^\circ, a = 8.46$	8. $A = 47.37^\circ, a = 78.96, c = 107.31$
9. $B = 20.6^\circ, a = 242, b = 90.8$	10. $A = 33^\circ, B = 57^\circ, c = 7.35$

### SELECTED SOLUTIONS

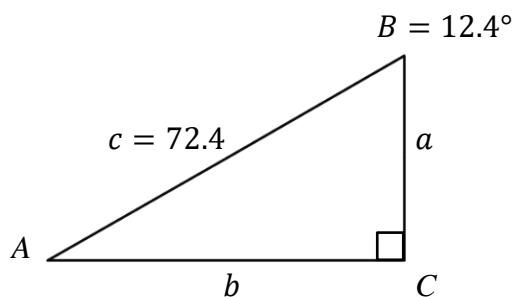
1.  $a = 3.5, b = 2.6$



$$\begin{aligned} a^2 + b^2 &= c^2 \\ 3.5^2 + 2.6^2 &= c^2 \\ 19.01 &= c^2 \\ 4.4 &= c \end{aligned}$$

$$\tan(A) = \frac{a}{b} = \frac{3.5}{2.6} \Rightarrow A = 53^\circ \Rightarrow B = 90^\circ - 53^\circ = 37^\circ.$$

3.  $B = 12.4^\circ, c = 72.4$



$$A = 90^\circ - 12.4^\circ = 77.6^\circ.$$

$$\sin(12.4^\circ) = \frac{b}{72.4} \Rightarrow b = 72.4 \sin(12.4^\circ) = 15.5.$$

$$\cos(12.4^\circ) = \frac{a}{72.4} \Rightarrow a = 72.4 \cos(12.4^\circ) = 70.7.$$

“Only he who never plays, never loses.”