

Answer key

Math 36

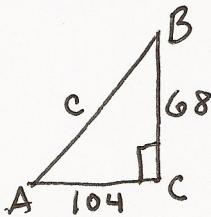
Test 4 Pretest, Chapters 2 & 7

Round each part (length or angle measure) in an answer to the nearest tenth, unless otherwise indicated.

1. The following refer to triangle ABC with $C = 90^\circ$. In each case, find all of the missing parts.

a) $a = 68$ and $b = 104$.

$$\begin{aligned} \text{Side } c: c^2 &= 68^2 + 104^2 \\ c^2 &= 15,440 \\ c &= 124.3 \end{aligned}$$



$$\text{Angle } A: \tan A = \frac{68}{104}$$

$$A = \tan^{-1}(68 \div 104)$$

$$A = 33.2^\circ, B = 56.8^\circ$$

c) $b = 305$ and $B = 24.9^\circ$.

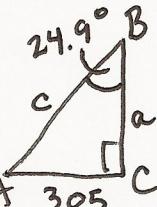
$$\text{Angle } A: A = 65.1^\circ$$

$$\text{Side } c: \cos 65.1^\circ = \frac{305}{c}$$

$$c = \frac{305}{\cos 65.1^\circ} \Rightarrow c = 724.4$$

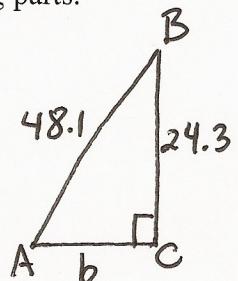
$$\text{Side } a: \tan 65.1^\circ = \frac{a}{305}$$

$$a = 305 \cdot \tan 65.1^\circ \Rightarrow a = 657.1$$



b) $a = 24.3$ and $c = 48.1$.

$$\begin{aligned} \text{Side } b: b^2 &= 48.1^2 - 24.3^2 \\ b^2 &= 1,723.12 \\ b &= 41.5 \end{aligned}$$



$$\text{Angle } A: \sin A = \frac{24.3}{48.1}$$

$$A = \sin^{-1}(24.3 \div 48.1)$$

$$A = 30.3^\circ, B = 59.7^\circ$$

d) $c = 8.1$ and $A = 35.5^\circ$.

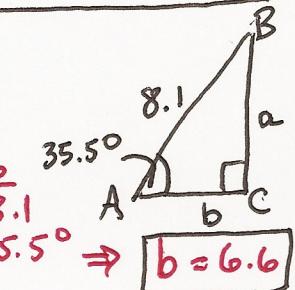
$$\text{Angle } B: B = 54.5^\circ$$

$$\text{Side } b: \cos 35.5^\circ = \frac{b}{8.1}$$

$$b = 8.1 \cdot \cos 35.5^\circ \Rightarrow b = 6.6$$

$$\text{Side } a: \sin 35.5^\circ = \frac{a}{8.1}$$

$$a = 8.1 \cdot \sin 35.5^\circ \Rightarrow a = 4.7$$



2. The altitude of an isosceles triangle is 25 cm and each base angle measures 17° .

- a) How long is each of the two congruent sides of the triangle?

Call these sides x :

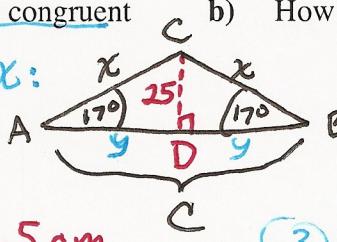
$$(2) \quad \sin 17^\circ = \frac{25}{x}$$

$$x = \frac{25}{\sin 17^\circ} \Rightarrow x = 85.5 \text{ cm}$$

write a sentence:

Each congruent side is 85.5 cm.

- b) How long is the base of the triangle?



(1) We'll use this triangle to answer the questions.

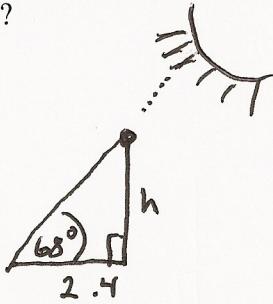
- (3) Find y and double it to find the length b .

$$\tan 17^\circ = \frac{25}{y}$$

$$y = \frac{25}{\tan 17^\circ} = 81.77$$

$$b = 2(81.77) = 163.5$$

3. If the angle of elevation of the sun is 68° , how tall is a fence post that casts a shadow that is 2.4 feet long?



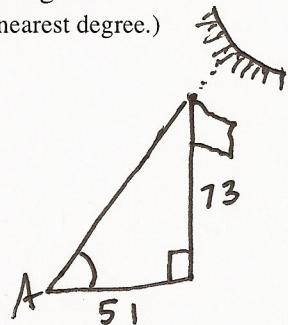
$$\tan 68^\circ = \frac{h}{2.4}$$

$$h = 2.4 \cdot \tan 68^\circ$$

$$h = 5.9$$

the fence post is 5.9 feet tall.

4. If a 73-foot tall flagpole casts a 51-foot long shadow, what is the angle of elevation of the sun? (Round to the nearest degree.)



$$\tan A = \frac{73}{51}$$

$$A = \tan^{-1}(73 \div 51)$$

$$A = 55.1^\circ$$

The angle of elevation of the sun is 55.1° .

5. Jerrod is paddling a kayak on a lake. He pauses 100 meters from the nearest point on a shore and points the kayak toward a dock that is 240 meters down the straight shoreline.

Label the diagram (I've chosen angles K, D, and S). Let $x = KD$

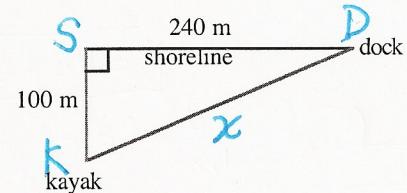
- a) At this moment, how far is the kayak from the dock? (Round to the nearest meter.)

$$x^2 = 100^2 + 240^2$$

$$x^2 = 67,600$$

$$x = 260$$

The Kayak is 260 meters from the dock.



- b) What angle with the shoreline is the kayak making as he paddles toward the dock? (Round to the nearest degree.)

$$\tan D = \frac{100}{240}$$

$$D = \tan^{-1}(100 \div 240)$$

$$D = 22.6 \approx 23^\circ$$

The angle toward the shoreline is 23° .