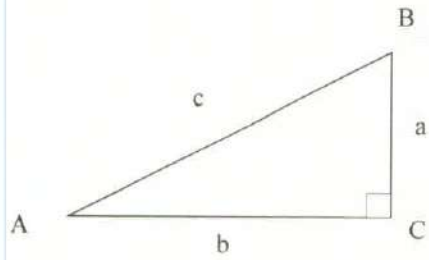
Right Triangle Trigonometry Name Key

For triangle *ABC*, below, express the given trigonometric function in terms of a, b, and *c*.

1. $\sin B = \frac{b}{c}$
2. $\sin A = \frac{a}{c}$
3. $\cos B = \frac{a}{c}$
4. $\cos A = \frac{b}{c}$
5. $\tan B = \frac{b}{a}$
6. $\tan A = \frac{a}{b}$



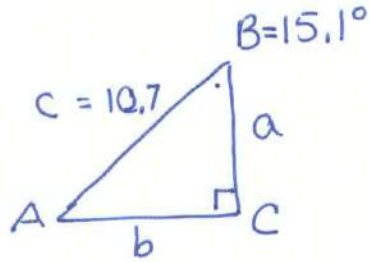
Solve each right triangle *ABC* $\angle C = 90°$ given the measures.

7. $\angle B = 15.1°$; $c = 10.7$

$\angle A = 74.9°$
$a \approx 10.33$
$b \approx 2.79$

$\sin 74.9° = \frac{a}{10.7}$

$\sin 15.1 = \frac{b}{10.7}$

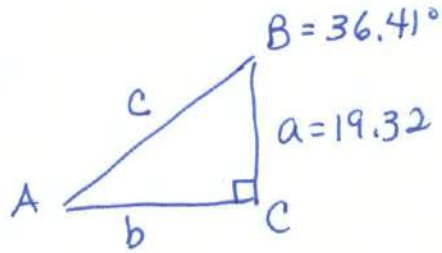


8. $\angle B = 36.41°$; $a = 19.32$

$\angle A = 53.59°$
$b \approx 14.25$
$c \approx 24.01$

$\sin 36.41 = \frac{14.25}{c}$

$\tan 36.41 = \frac{b}{19.32}$

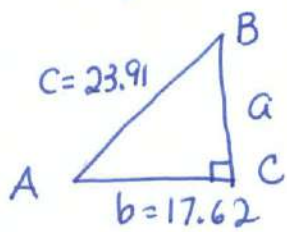


9. $b = 17.62$; $c = 23.91$

$a \approx 16.16$
$\angle B \approx 47.5°$
$\angle A \approx 42.5°$

$a = \sqrt{23.91^2 - 17.62^2}$

$\sin B = \frac{17.62}{23.91}$



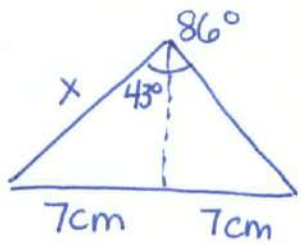
Each of the following problems must have a drawing and should be solved in a plain manner such that it will be obvious to the untrained eye how you got your answer.

10. ***Geometry.*** The base of an isosceles triangle is 14 cm in length and the angle opposite the base measures 86°. Find the length of each of the congruent sides.

$\sin 43° = \frac{7}{x}$

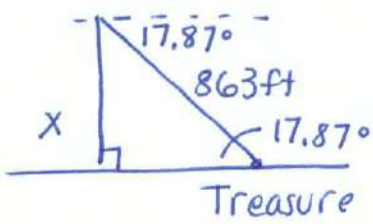
$x = \frac{7}{\sin 43°}$

$x \approx 10.26$ cm



Jean Adams

11. ***Treasures.*** Suppose that you are on a salvage ship in the Gulf of Mexico. Your sonar system has located a sunken Spanish galleon at a slant distance of 863 ft. from your ship, with an angle of depression of 17° 52′. How deep is the water at the location of the galleon?



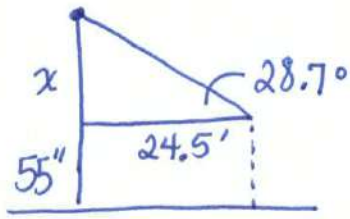
$17° 52' = 17.87°$

$\sin 17.87° = \frac{x}{863}$

$x = 863 \sin(17.87°)$

$x \approx 265$ ft

12. ***Science Project.*** Rachel needs to find the height of the flagpole for her science experiment. She has measured her eye height level to be 55 inches above the ground. She is standing 24′6″ from the flagpole. At this distance, the angle of elevation to the top of the pole is 28.7°. Calculate the height of the flagpole to the nearest foot.



$55'' = 4.583$ ft

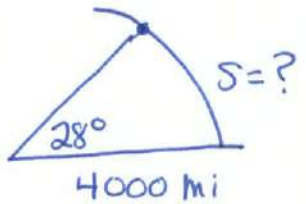
$\tan 28.7 = \frac{x}{24.5'}$

$x \approx 13.41$

$13.41 + 4.583 = 17.993'$

$x \approx 18$ ft

13. ***Surf's Up.*** Assuming Earth to be a sphere of radius 4000 miles, how many miles north of the Equator is Cocoa Beach, Florida, if it is *28°*north from the Equator? Round your answer to the nearest mile.



$28° = \frac{7\pi}{45}$

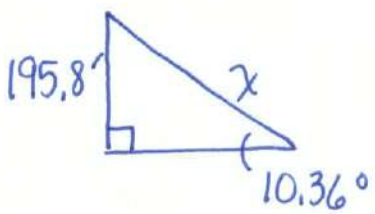
$S = r\theta$

$S = 4000\left(\frac{7\pi}{45}\right)$

$S \approx 1954.77$ miles

1955 miles

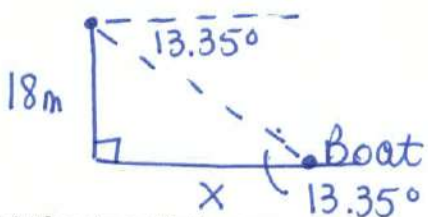
14. **Going Up.** The world's longest escalator is at the Leningrad Underground in Lenin Square. The escalator has an angle of elevation of 10.36° and a vertical rise of 195.8 ft. Find the length of the escalator.



$\sin 10.36° = \frac{195.8}{x}$

$x \approx 1089$ ft

15. ***Lost at Sea.*** From a lighthouse 18 m above sea level, the angle of depression to a small boat is 13° 21′. How far from the foot of the lighthouse is the boat? Give your answer to the nearest meter.



$\tan 13.35° = \frac{18}{x}$

$x \approx 75.85$m

76 m