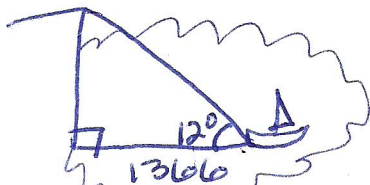


Solve. Draw a diagram and show all your work. Round all answers to the nearest tenth if necessary.

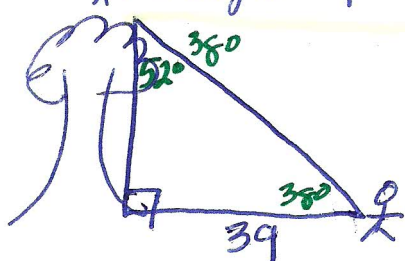
*1. From a boat on the lake, the angle of elevation to the top of a cliff is 12° . If the base of the cliff is 1,366 feet from the boat, how high is the cliff?

$x = \text{height of cliff}$



*2. When sitting atop a tree and looking down at his pal Joey, the angle of depression of Mack's line of sight is 38° . If Joey is known to be standing 39 feet from the base of the tree, how tall is the tree?

$x = \text{height of tree}$

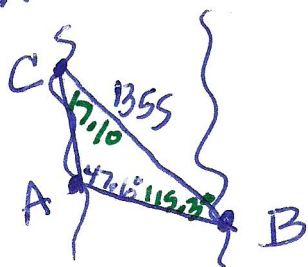


$90^\circ - 38^\circ = 52^\circ$

3. To find the distance AB across a river, a distance BC of 1355 meters is laid off on one side of the river. It is found that $\angle B = 115.3^\circ$ and $\angle C = 17.1^\circ$. Find AB.

ASA so use law of sines $x = \text{distance from A to B}$

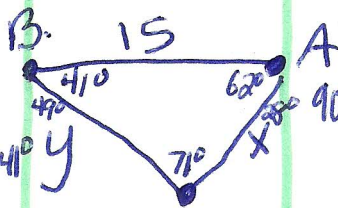
$180^\circ - 115.3^\circ - 17.1^\circ = 47.6^\circ = \angle A$



*4. Two, fire-lookout stations are 15 miles apart, with station B directly west of station A. Both stations spot a fire. The bearing of the fire from station A is $S28^\circ W$ and the bearing of the fire from station B is $S49^\circ E$. How far, to the nearest tenth of a mile, is the fire from each lookout station?

ASA so use law of sines

$x = \text{distance from A to fire}$
 $y = \text{distance from B to fire}$

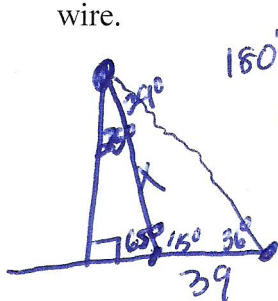


$90^\circ - 28^\circ = 62^\circ = \angle A$

$10^\circ - 49^\circ = 41^\circ = \angle B$

$180^\circ - 41^\circ - 62^\circ = \angle C = 77^\circ$

5. A wire to a tower makes a 65° angle with level ground. At a point 39 feet farther from the tower but on the same side as the base of the wire, the angle of elevation to the top of the tower is 36° . Find the length of the wire.



$$180^\circ - 65^\circ = 115^\circ$$

$$90^\circ - 65^\circ = 25^\circ$$

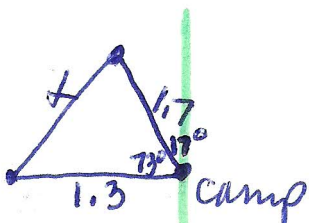
$x = \text{length of wire}$

$$180^\circ - 115^\circ - 36^\circ = 29^\circ$$

6. You and a friend hike 1.3 kilometers due west from a campsite. At the same time, two other friends hike 1.7 km at a heading of $N17^\circ W$ from the campsite. To the nearest tenth of a km, how far apart are the two groups?

SAS so use law of cosines

$x = \text{distance between friends}$



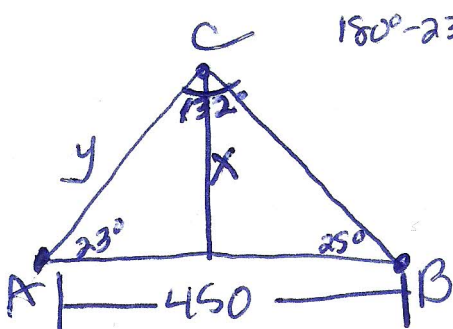
$$90^\circ - 17^\circ = 73^\circ$$

*7. Two observers are 450 feet apart on opposite sides of a flagpole. The angles of elevation from the observers to the top of the flagpole are 23° and 25° . Find the height of the flagpole to the nearest foot.

ASA so use law of sines

$x = \text{height of flagpole}$

$y = \text{distance from person A to top of flagpole}$

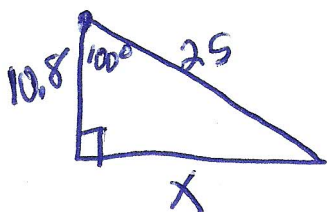


$$180^\circ - 23^\circ - 25^\circ = 132^\circ$$

8. A 25-ft water slide has a 10.8-ft ladder which meets the slide at a 100° angle. To the nearest tenth, what is the distance between the end of the slide and the bottom of the ladder?

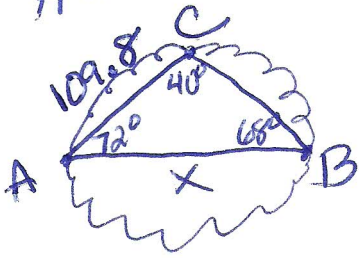
SAS so use law of cosines

$x = \text{distance from ladder \& slide}$



*9. Points A and B are on opposite sides of a lake. Point C is 109.8 meters from A. The measure of $\angle BAC = 72^\circ$ and the measure of $\angle ACB = 40^\circ$. Find the distance between points A and B.

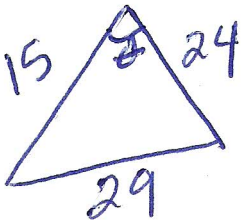
ASA so use law of sines $x = \text{distance from pt A to pt B}$



$$180^\circ - 72^\circ - 40^\circ = 68^\circ = \angle B$$

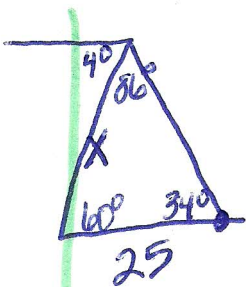
*10. The dimensions of a triangular flag are 15 inches by 24 inches by 29 inches. To the nearest tenth, what is the measure of the angle formed by the two shorter sides?

SSS so use law of cosines $\theta = \text{angle between 2 short sides}$



11. A leaning wall is inclined at 4° from vertical. At a distance of 25 feet from the wall, the angle of elevation to the top is 34° . Find the height of the wall to the nearest tenth of a foot.

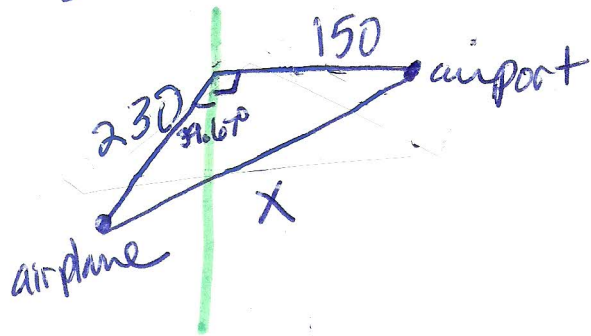
AAS so use law of sines $x = \text{height of wall}$



$$180^\circ - 86^\circ - 34^\circ = 60^\circ$$

12. An airplane leaves an airport and flies due west 150 miles and then 230 miles in the direction S 39.67° W. How far is the airport from the plane's final destination?

SAS so use law of cosines $x = \text{distance from airport to airplane}$

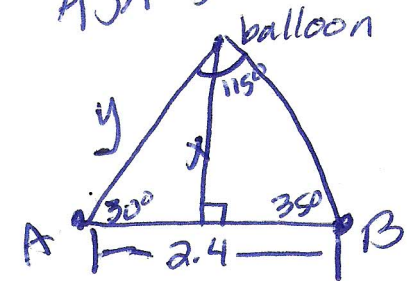


$$39.67^\circ + 90^\circ = 129.67^\circ$$

13. Two observers are 2.4 miles apart on opposite sides of a hot-air balloon. The angle of elevation from observer A is 30° and the angle of elevation from observer B is 35° . Find the altitude (height) of the balloon to the nearest tenth of a mile.

ASA so use law of sines

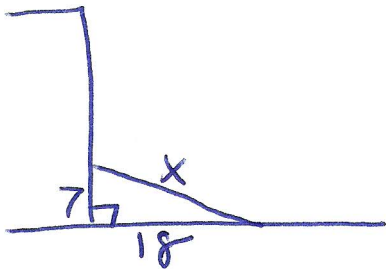
$x = \text{distance balloon is from ground}$
 $y = \text{distance from person A to balloon}$



$$180^\circ - 30^\circ - 35^\circ = 115^\circ = \angle C$$

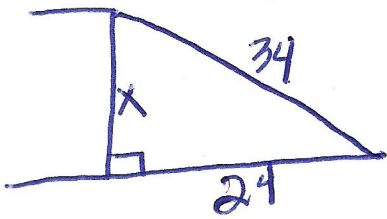
- *14. A building has a ramp to its front door to accommodate persons with disabilities. If the distance from the building to the end of the ramp is 18 feet and the height of the ramp from the ground to the front doors is 7 feet, how long is the ramp?

$x = \text{length of ramp}$ since 90° use Pythag Thm



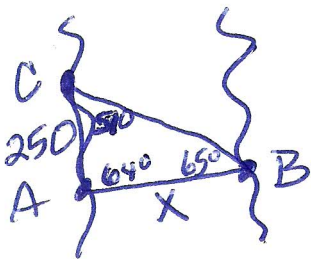
*15. On a sunny day, a building and its shadow for the sides of a right triangle. If the hypotenuse is 34 m long and the shadow is 24 m, how tall is the building?

$x =$ height of building since 90° use Pythag Thm



*16. A surveyor needs to determine the distance between two points that lie on opposite banks of a river. Two points, A and C, along one bank are 250 yards apart. The point B is on the opposite bank. Angle A is 64° and angle C is 51° . Find the distance between A and B to the nearest tenth of a yard.

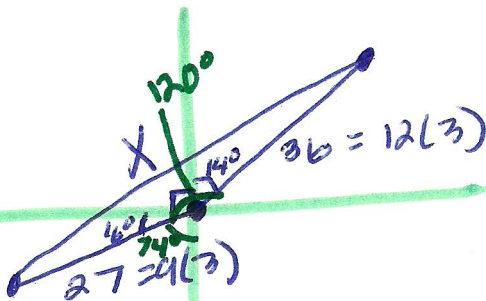
ASA so use law of sines $x =$ distance between A & B



$$180^\circ - 64^\circ - 51^\circ = 65^\circ = \angle B$$

*17. Two ships leave a harbor at the same time. One ship travels on a bearing of $N14^\circ E$ at 12 mph. The other ship travels on a bearing of $S74^\circ W$ at 9 mph. To the nearest tenth of a mile, how far apart will the ships be after three hours?

SAS so use law of cosines $x =$ distance between ships



$$90^\circ + 16^\circ + 14^\circ = 120^\circ$$

$$90^\circ - 74^\circ = 16^\circ$$