

Key

Tell whether each statement is true or false. If false, explain why.

1. The angle of elevation from your eye to the top of a tree increases as you walk toward the tree.

True

2. If you stand at street level, the angle of elevation to a building's tenth story window is greater than the angle of elevation to one of its ninth-story windows.

True

3. As you watch a plane fly above you, the angle of elevation to the plane gets closer to 0° as the plane approaches the point directly overhead.

False - closer to 90°

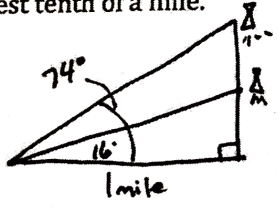
4. An angle of depression can never be more than 90°

True

Solve each. DRAW A PICTURE!

5. Gwen is observing the launch of a space shuttle from the command center. When she first sees the shuttle, the angle of elevation to it is 16° . Later, the angle of elevation is 74° . If the command center is 1 mile from the launch pad, how far did the shuttle travel while Gwen was watching? Round to the nearest tenth of a mile.

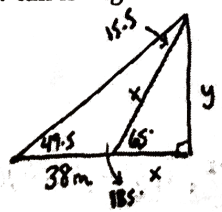
FR



$$\tan 16 = \frac{x}{1} \quad \tan 74 = \frac{y}{1}$$

$$y - x = 3.2 \text{ miles}$$

6. Garrett and Drew stand 38 m apart. From Garrett's position, the angle of elevation to the top of Big Ben is 65° . From Drew's position, the angle of elevation to the top of Big Ben is 49.5° . To the nearest meter, how tall is Big Ben?



* There are other methods.

$$\frac{\sin 49.5}{x} = \frac{\sin 15.5}{38}$$

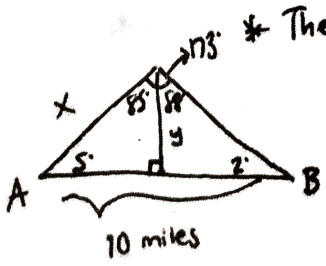
$$x = \frac{38 \sin 49.5}{\sin 15.5}$$

$$\sin 65 = \frac{y}{108} \quad \text{for } \sin 65 = y$$

$$38 \sin 49.5 = x \sin 15.5 \quad x = 108$$

98m

7. A skyscraper stands between two school buildings. The two schools are 10 miles apart. From school A, the angle of elevation to the top of the skyscraper is 5° . From school B, the angle of elevation is 2° . What is the height of the skyscraper to the nearest foot? 5280 feet in a mile



* There are other methods.

$$\frac{\sin 173}{10} = \frac{\sin 2}{x}$$

$$x \sin 173 = 10 \sin 2$$

$$x = \frac{10 \sin 2}{\sin 173}$$

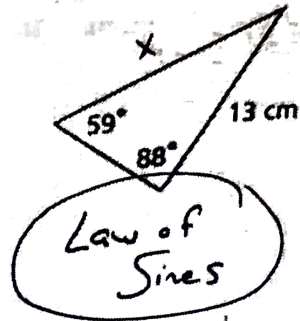
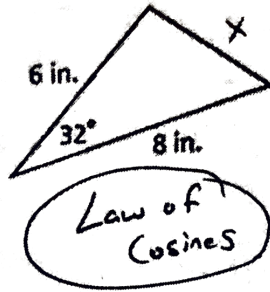
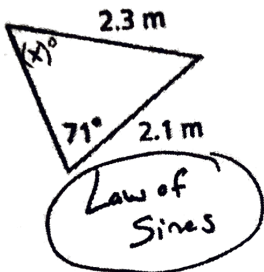
$$x \approx 2.86$$

$$\sin 5 = \frac{y}{2.86 \dots}$$

$$.249 \times 5280$$

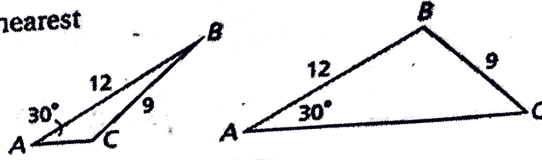
1318 ft

8. Identify whether you would use the Law of Sines or the Law of Cosines to find the value of x .



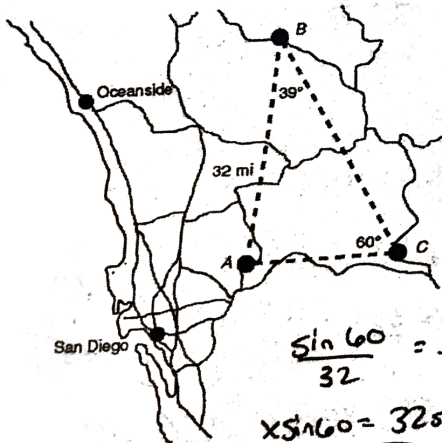
9. The *ambiguous case* of the Law of Sines occurs when you are given an acute angle measure and when the side opposite this angle is shorter than the other given side. In this case, there are two possible triangles.

Find two possible values for $m\angle C$ to the nearest degree. (Hint: The inverse sine function on your calculator gives you only acute angle measures. Consider this angle and its supplement.)



$$\frac{\sin 30}{9} = \frac{\sin C}{12} \quad \sin^{-1}\left(\frac{12 \sin 30}{9}\right) \quad \angle C \approx 42^\circ \text{ or } 138^\circ$$

10. The map shows three earthquake centers for one week in California. How far apart were the earthquake centers at points A and C? Round to the nearest tenth.



$$\frac{\sin 60}{32} = \frac{\sin 39}{x}$$

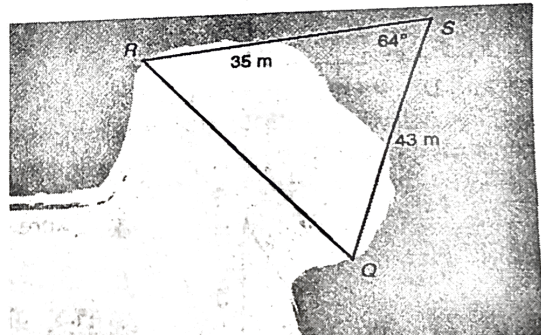
$$x \sin 60 = 32 \sin 39$$

$$x = 23.3$$

11. To find the distance across a bay, a surveyor locates points Q, R, and S as shown.

What is QR to the nearest tenth?

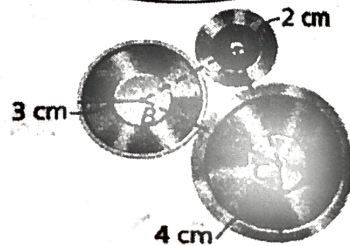
- A 8 m C 41.9 m
B 35.2 m D 55.4 m



$$x^2 = 35^2 + 43^2 - 2(35)(43)\cos 64$$

$$x = 41.9$$

12. **Multi-Step** Three circular disks are placed next to each other as shown. The disks have radii of 2 cm, 3 cm, and 4 cm. The centers of the disks form $\triangle ABC$. Find $m\angle ACB$ to the nearest degree.



$$5^2 = 6^2 + 7^2 - 2(6)(7)\cos \theta$$

$$25 = 36 + 49 - 84 \cos \theta$$

$$25 = 85 - 84 \cos \theta$$

$$-60 = -84 \cos \theta$$

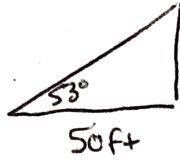
$$\frac{-60}{-84} = \cos \theta \rightarrow \cos^{-1}\left(\frac{60}{84}\right)$$

$$\theta = 44^\circ$$

Trig Quiz 2 Review

Use pictures! Round all values to the nearest tenth.

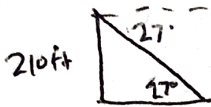
1. At a point on the ground 50 feet from the foot of a tree, the angle of elevation to the top of the tree is 53° . Find the height of the tree.



$$\tan 53 = \frac{x}{50}$$

$$\approx 66.4 \text{ ft}$$

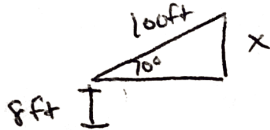
2. From the top of a lighthouse 210 feet high, the angle of depression to a boat is 27° . Find the distance from the boat to the foot of the lighthouse. The lighthouse was built at sea level.



$$\tan 27 = \frac{210}{x}$$

$$\approx 412.1 \text{ ft}$$

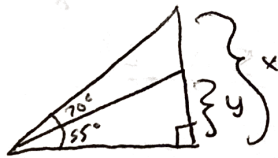
3. A ladder on a fire truck has its base 8 ft. above the ground. The maximum length of the ladder is 100 ft. If the ladder's greatest angle of elevation possible is 70° , what is the highest above the ground that it can reach?



$$\sin 70 = \frac{x}{100}$$

$$x + 8 \Rightarrow \approx 102 \text{ ft}$$

4. A rescue team 1000 ft. away from the base of a vertical cliff measures the angle of elevation to the top of the cliff to be 70° . A climber is stranded on a ledge. The angle of elevation from the rescue team to the ledge is 55° . How far is the stranded climber from the top of the cliff?

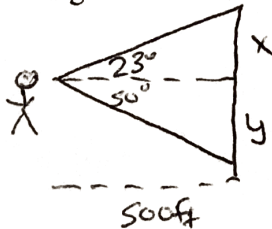


$$\tan 70 = \frac{x}{1000}$$

$$\tan 55 = \frac{y}{1000}$$

$$\approx 1319.3 \text{ ft}$$

5. A person in an apartment building sights the top and bottom of an office building 500 ft. away. The angle of elevation for the top of the office building is 23° and the angle of depression for the base of the building is 50° . How tall is the office building?

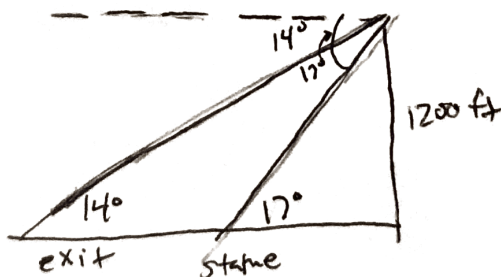


$$\tan 23 = \frac{x}{500}$$

$$\tan 50 = \frac{y}{500}$$

$$\approx 808.1 \text{ ft}$$

6. The pilot of a helicopter hovers at an altitude of 1200 feet over a park. The angle of depression to the base of a statue is 17° . The angle of depression to the nearest park exit, in line with the statue, is 14° . To the nearest foot, what is the distance from the statue to the exit?



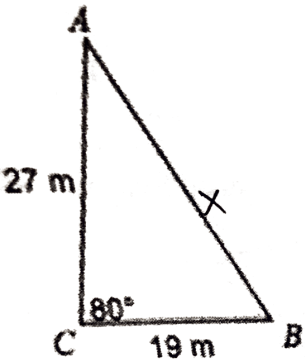
$$\tan 17 = \frac{1200}{x} \approx 3925.02 \text{ ft}$$

$$\tan 14 = \frac{1200}{y} \approx 4812.94$$

$$\approx 888 \text{ ft}$$

will be given law of cosines. You need to memorize Law of Sines.

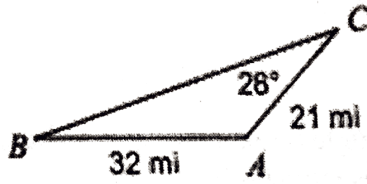
Find AB



$$X^2 = 19^2 + 27^2 - 2(27)(19)\cos 80$$

$$X \approx 30.2 \text{ m}$$

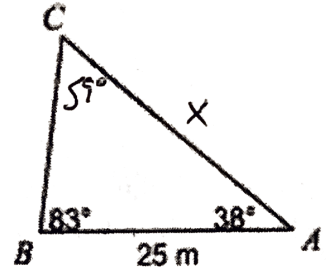
8. Find $m\angle B$ (round to the nearest degree)



$$\frac{\sin 28}{32} = \frac{\sin \theta}{21}$$

$$18^\circ$$

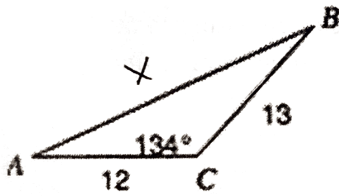
9. Find AC



$$\frac{\sin 83}{X} = \frac{\sin 57}{25}$$

$$X = 28.9 \text{ m}$$

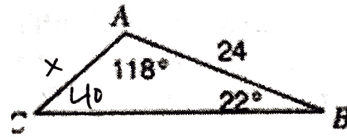
10. Find AB



$$(AB)^2 = 12^2 + 13^2 - 2(12)(13)\cos 134$$

$$\approx 23.0$$

11. Find AC

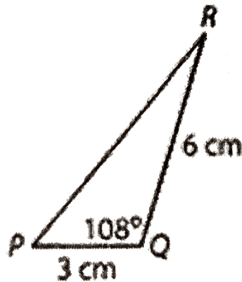


$$\frac{\sin 22}{X} = \frac{\sin 40}{24}$$

$$\approx 13.99$$

Find the area of each triangle.

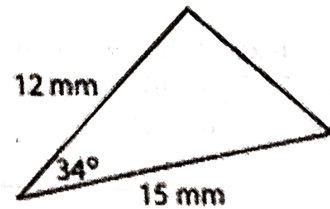
12.



$$\frac{1}{2}(3)(6)\sin 108$$

$$\approx 8.56 \text{ cm}^2$$

13.



$$\frac{1}{2}(12)(15)\sin 34$$

$$\approx 50.33 \text{ mm}^2$$