

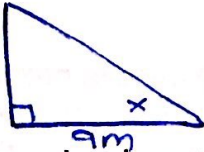
Name: _____

Triangle Applications of Trigonometry Review

Use: SOH-CAH-TOA, Law of Sines and Law of Cosines to solve each of the following. Round to the nearest tenth unless otherwise indicated.

- 1) A 12 meter flagpole casts a 9 meter shadow. Determine the angle of elevation of the sun.

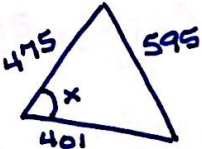
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$\tan x = \frac{12}{9}$
 $\angle x = \tan^{-1}(\frac{12}{9})$ $\angle x \approx 53.1^\circ$

- 2) A triangular playground has sides of length 475 feet, 595 feet and 401 feet. What is the measure of the largest angle between the sides?

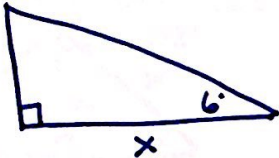
Law of Cosine



* Largest \angle opposite longest side
 $595^2 = 401^2 + 475^2 - 2(401)(475)\cos x$
 $\angle x = 85.1^\circ$

- 3) Max Power is walking to his office building which he knows is 150 feet high. The angle to the top of the building from his current location is 6° . How much further does he have to walk?

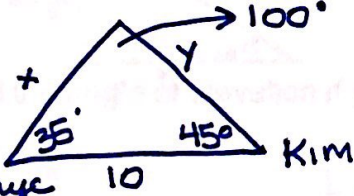
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$\tan 6 = \frac{150}{x}$
 $x = \frac{150}{\tan 6}$
 $x = 1427.2 \text{ ft}$

- 4) Kanye and Kim are standing at the seashore 10 miles apart. The coastline is a straight line between them. Both can see the same ship in the water. The angle between the coastline and the line between the ship and Kanye is 35° . The angle between the coastline and the line between the ship and Kim is 45° . How far are Kanye and Kim from the ship?

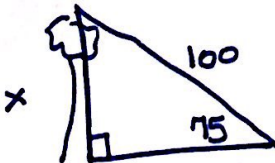
Law of Sine



$\frac{\sin 100}{10} = \frac{\sin 35}{y}$ $\frac{\sin 100}{10} = \frac{\sin 45}{x}$
 $y = 5.8 \text{ miles}$
 $x = 7.2 \text{ miles}$

- 5) Suppose you're flying a kite and it gets caught at the top of a tree. You've let out 100 feet of string for the kite and the angle the string makes with the ground is 75° . Due to your inquisitive nature, you wonder, "How tall is that tree?" Using your vast pre-calculus knowledge, determine the answer to your questions.

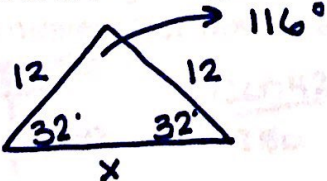
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$\sin 75 = \frac{x}{100}$
 $x = 96.6 \text{ ft}$

- 6) An isosceles triangle has legs of length 12 inches and base angles that measure 32° . Find the length of the missing side.

Law of Sine

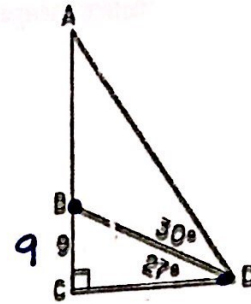


$\frac{\sin 32}{12} = \frac{\sin 116}{x}$
 $x = 20.4 \text{ in}$

- 7) Using the accompanying diagram, determine the length of BD.

$$\sin 27 = \frac{9}{x}$$

$$x = \underline{19.8}$$



- 8) A person at point A looks due east and sees a UFO with an angle of elevation of 40° . At the same instant, another person, 1 mile due west of point A, looks due east and sights the same UFO with an angle of elevation of 25° . Determine the distance between point A and the UFO. How far is the UFO above the ground?

1st $\frac{\sin 15}{1} = \frac{\sin 25}{u}$

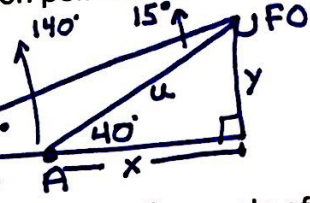
2nd $\sin 40 = \frac{y}{1.63}$

3rd $\cos 40 = \frac{x}{1.63}$

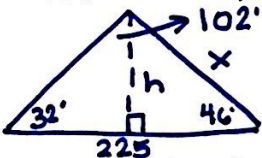
$x = 1.25 \text{ mi}$

$u \approx 1.63 \text{ mi}$

$y = 1.05 \text{ mi}$



- 9) An airplane flies directly overhead 2 people at the same time and they measure the angle of elevation. The airplane is between the two people. One angle is 32° and the other measure 46° . If the two people are 225 feet apart, how high is the plane?



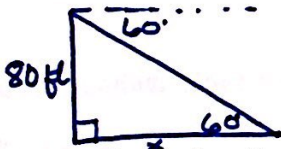
$$\frac{\sin 102}{225} = \frac{\sin 32}{x}$$

$$x = \underline{121.90 \text{ ft}}$$

$$\sin 46 = \frac{h}{121.90}$$

$$h = \underline{87.68 \text{ ft}}$$

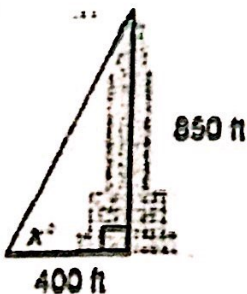
- 10) From the top of a tower, the angle of depression to a stake on the ground is 60° . The top of the tower is 80 feet above the ground. How far is the stake from the foot of the tower?



$$\tan 60 = \frac{80}{x}$$

$$x = \underline{46.19 \text{ ft}}$$

- 11) Find the angle of elevation if you are standing 400 feet away and the building is 850 feet tall?



$$\tan x = \frac{850}{400}$$

$$\angle x = \underline{64.8^\circ}$$

- 12) You are a block away from a skyscraper that is 750 feet tall. Your friend is between the skyscraper and yourself. The angle of elevation from your position to the top of the skyscraper is 42° . The angle of elevation from your friend's position to the top of the skyscraper is 71° . To the nearest foot, how far are you from your friend?

$$\frac{\sin 42}{750} = \frac{\sin 48}{a}$$

$$\tan 71 = \frac{750}{b}$$

$$a = \underline{832.96 \text{ ft}}$$

$$b = \underline{258.25 \text{ ft}}$$

$$x = a - b$$

$$\underline{575 \text{ ft}}$$

