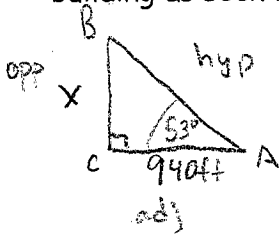


Right Triangle Trig Word Problems, Law of Sines and Law of Cosines Quiz Review

1) A boy visiting New York City views the Empire State building from a point on the ground, A, which is 940 feet from foot, C, of the building. The angle of elevation of the top, B, of the building as seen by the boy is 53 degrees. Find the height of the building to the *nearest foot*.

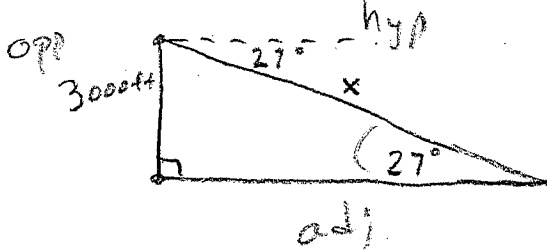


$$\tan 53^\circ = \frac{x}{940}$$

$$x = 1247 \text{ feet tall}$$

$$\frac{1.327}{1} = \frac{x}{940}$$

2) From an airplane which is flying at an altitude of 3000 feet, the angle of depression of an airport ground signal is 27 degrees. Find to the *nearest hundred feet* the distance between the airplane and the airport signal.



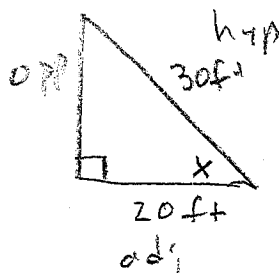
$$\frac{\sin 27^\circ}{1} = \frac{3000}{x}$$

$$\frac{0.454}{0.454} x = \frac{3000}{0.454}$$

$$x = 6607.93 \text{ ft}$$

$$0.454 = \frac{3000}{x}$$

3) A 30-foot steel beam is leaning against a wall. The foot of the beam is 20 feet from the wall. Find to the *nearest degree* the angle which the beam makes with the ground.

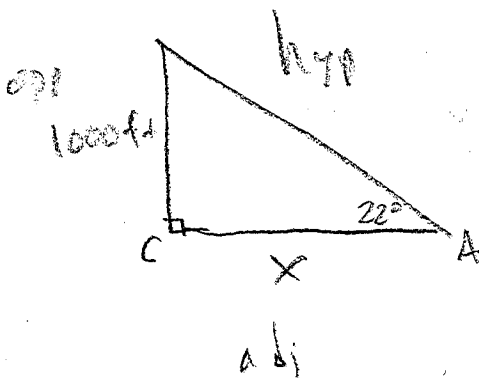


$$\cos x = \frac{20}{30}$$

$$\cos^{-1}(0.667) = 48.16$$

$$48^\circ$$

4) An airplane A is 1000 feet above the ground and directly over a church C. The angle of elevation of the plane as seen by a boy at a point A on the ground some distance from the church is 22 degrees. How far, to the *nearest foot*, is the boy is from the church?



$$\frac{\tan 22^\circ}{1} = \frac{1000}{x}$$

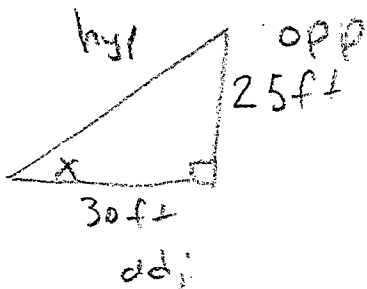
$$x = 2475.21$$

$$\frac{0.404}{1} = \frac{1000}{x}$$

$$2475 \text{ ft}$$

$$\frac{0.404x}{0.404} = \frac{1000}{0.404}$$

5) Find, to the nearest degree, the angle of elevation of the sun's rays when a flagpole 25 feet high casts a shadow 30 feet long.



$$\tan x = \frac{25}{30}$$

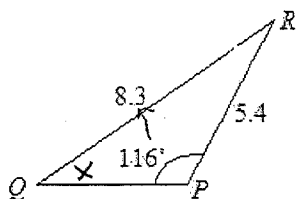
$$\tan^{-1}\left(\frac{25}{30}\right) =$$

$$\tan^{-1}(0.833) = 39.79$$

40°

Use the Law of Sines or the Law of Cosines to solve for each missing piece.

6) Angle Q = 36°



$$\frac{\sin 116}{8.3} = \frac{\sin x}{5.4}$$

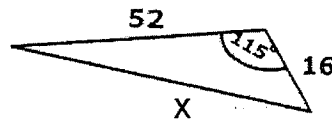
$$\frac{8.3 \sin x}{8.3} = \frac{5.4(0.899)}{8.3}$$

$$\sin x = \frac{4.855}{8.3}$$

$$\sin x = 0.585$$

$$\sin^{-1}(0.585) = 35.803$$

7) Find X = 58.76



$$x^2 = 52^2 + 16^2 - 2(52)(16)\cos 115$$

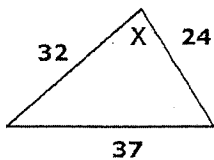
$$x^2 = 2704 + 256 - 1664(-0.423)$$

$$x^2 = 2960 + 492.372$$

$$\sqrt{x^2} = \sqrt{3452.372}$$

$$x = 58.76$$

8) Find x = 81°



$$37^2 = 32^2 + 24^2 - 2(32)(24)\cos x$$

$$1369 = 1024 + 576 - 1536\cos x$$

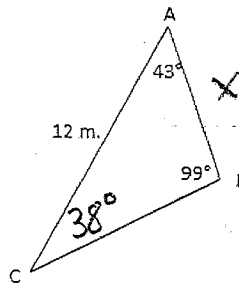
-1600      -1600

$$\frac{-231}{-1536} = \frac{-1536\cos x}{-1536}$$

$$0.150 = \cos x$$

$$\cos^{-1}(0.150) = 81.373$$

9) AB = 7.48



$$\frac{\sin 38}{x} = \frac{\sin 99}{12}$$

$$0.988x = 12(0.616)$$

$$\frac{0.988x}{0.988} = \frac{7.392}{0.988}$$

$$x = 7.482$$