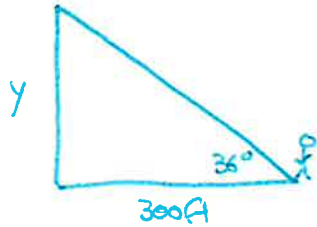


Section 6.1d – Practice Problems

PROFICIENT LEVEL QUESTIONS

1. Standing 300ft from the base of a water tower, there is a 36° angle from your feet to the top of the water tower. How high is the water tower?

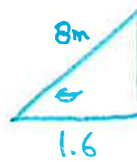


$$\tan 36 = \frac{y}{300}$$

$$300 \cdot \tan 36 = y$$

$$y = 217.96 \rightarrow \boxed{218 \text{ ft}}$$

2. An 8 meter ladder leans against a house so that the bottom end is 1.6m from the house. What angle does the ladder make with the ground?

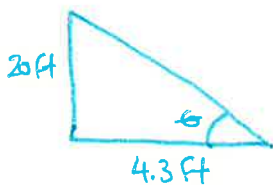


$$\cos \theta = \frac{1.6}{8}$$

$$\theta = \cos^{-1}\left(\frac{1.6}{8}\right)$$

$$\boxed{\theta = 78.5^\circ}$$

3. A flagpole 20ft high casts a shadow of 4.3ft. What is the angle of elevation of the sun?

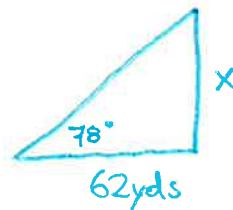


$$\tan \theta = \frac{20}{4.3}$$

$$\theta = \tan^{-1}\left(\frac{20}{4.3}\right)$$

$$\boxed{\theta = 77.9^\circ}$$

4. The angle of elevation of the top of a high-rise building is 78° for a person standing 62yds away from the base of the building. How high is the building?

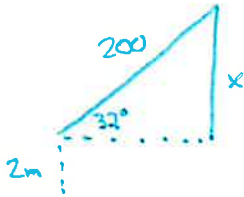


$$\tan 78 = \frac{x}{62}$$

$$62 \cdot \tan 78 = x$$

$$\boxed{x = 291.7 \text{ yds}}$$

5. If 200 meters of string is used to fly a kite, an angle of 37° is formed with the person flying the kite. If the person is two meters tall, and the string has no slack, how high in the air is the kite?

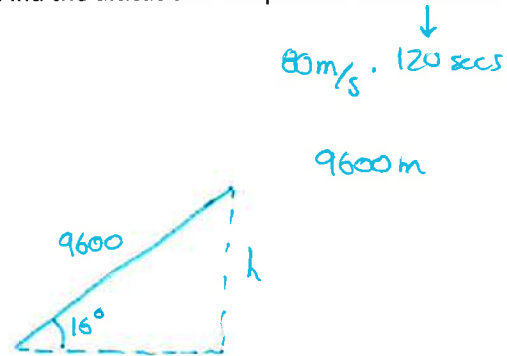


$$\sin 37^\circ = \frac{x}{200}$$

$$200 \cdot \sin 37 = x$$

$$x = 120.4 + 2m = \boxed{122.4m}$$

6. When an airplane leaves the runway, its angle of ascent is 16° , with a speed of 80 metres/second. Find the altitude of the plane after two minutes.

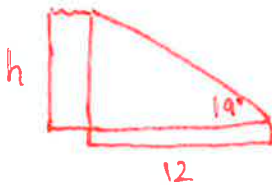


$$\sin 16 = \frac{h}{9600}$$

$$9600 \cdot \sin 16 = h$$

$$h = \boxed{2846.1 \text{ m}}$$

7. The top of a cedar tree broken by the wind hits the ground 12yds from the base of the tree. If the top of the tree makes an angle of 19° with the ground, what was the original height of the tree?



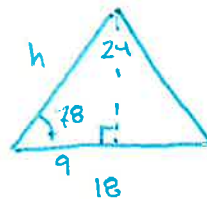
$$\tan 19 = \frac{h}{12}$$

$$12 \cdot \tan 19 = h$$

$$h = 4.13 \text{ m}$$

$$4.13 + 12 = 16.1 \text{ yds}$$

8. An isosceles triangle has a base of 18in. If the legs of the isosceles triangle meet at an angle of 24° , how long are the legs?



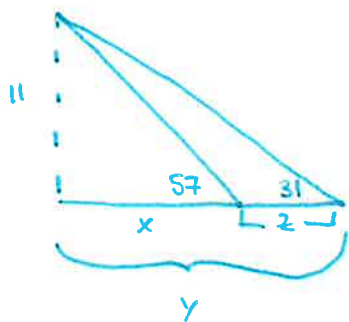
$$\cos 78 = \frac{9}{h}$$

$$h = \frac{9}{\cos 78}$$

$$h = \boxed{43.3 \text{ in}}$$

EXTENDING LEVEL QUESTIONS

9. A passenger in an airplane flying at an altitude of 11km spots two cities directly to the right. The angle of depression to the towns are 31° and 57° . How far is it between the two cities?



$$\tan 57 = \frac{11}{x} \quad \tan 31 = \frac{11}{y}$$

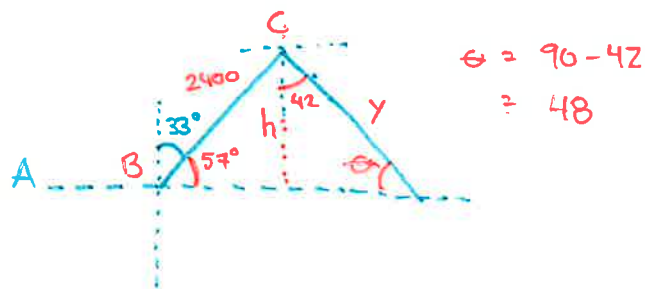
$$x = \frac{11}{\tan 57} \quad y = \frac{11}{\tan 31}$$

$$x = 7.1 \quad y = 18.3$$

$$z = 18.3 - 7.1$$

$$= \boxed{11.2 \text{ km}}$$

10. A surveyor laying a road due east from A encounters a small lake at B. She changes her direction to $N 33^\circ E$ for 2400m to C, then she turns $S 42^\circ E$. How far must she continue in this direction to reach point D on the east – west line through A?



$$\sin 57 = \frac{h}{2400}$$

$$h = 2400 \cdot \sin 57$$

$$h = 2012.8$$

$$\sin 48 = \frac{h}{y}$$

$$y = \frac{h}{\sin 48} = \frac{2012.8}{\sin 48}$$

$$\boxed{y = 2708.5 \text{ m}}$$