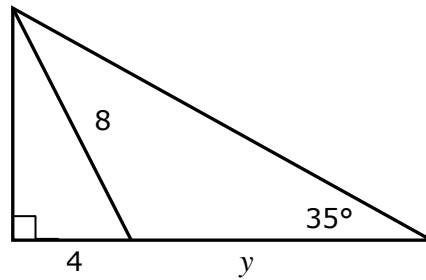


Merit+ Trigonometry Practice #2

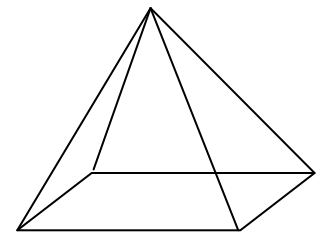
1. Find y



2. A boat heads North for 9km, then turns East for 8 km. It then starts to sink.
What bearing should a rescue vessel from the start point take to get directly to it?

3. A square based pyramid is made with eight pieces of wire, all 40 cm long.

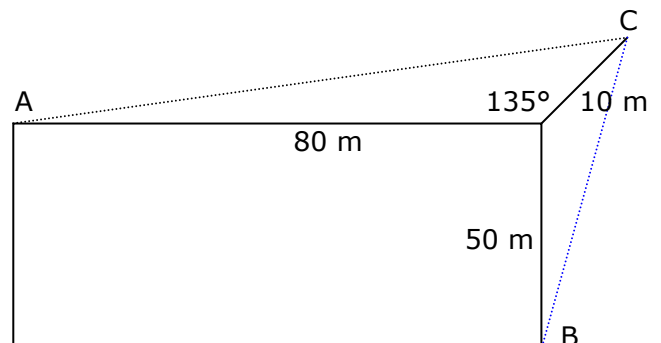
How high off the base is the apex (peak) of the pyramid?



4. The Police want a surveillance camera able to see everyone in an audience.

The audience area is a rectangle 50 metres by 80 metres, and the camera (at point C) is 10 metres back from one corner, at 135° from the sides.

What angle must the camera mount be able to move through to make sure every point is visible (i.e. what is $\angle ACB$) ?



Answers: Merit+ Trigonometry Practice #2

1. Find y

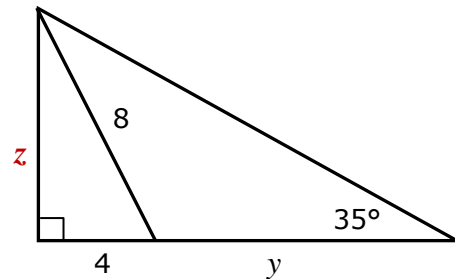
$$z^2 = 8^2 - 4^2 \quad \text{Pythagoras} \Rightarrow z = \sqrt{48}$$

$$\text{Outside triangle, } z = A, y + 4 = O$$

$$y + 4 = \sqrt{48} \div \tan 35^\circ = 9.8945$$

$$y = 9.8945 - 4$$

$$y = 5.89$$



2. A boat heads North for 9km, then turns East for 8 km. It then starts to sink.
What bearing should a rescue vessel from the start point take to get directly to it?

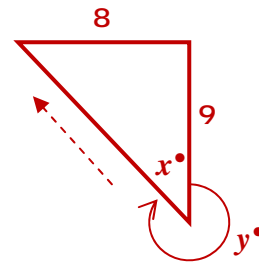
The rescue vessel should head in the dotted direction

$$x = \tan^{-1}(8/9) = 41.63^\circ$$

But a bearing is clockwise from North, so y

$$y = 360 - 41.63$$

$$\text{Bearing} = 318.37$$



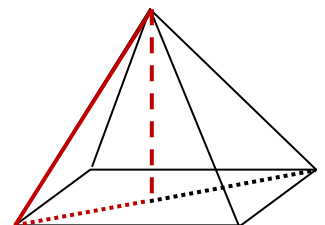
3. A square based pyramid is made with eight pieces of wire, all 40 cm long. How high off the base is the apex (peak) of the pyramid?

We want dashed line, height. It is at 90° to dotted diagonal

$$\text{Diagonal} = \sqrt{40^2 + 40^2} = 56.5685, \text{ and need half that} = 28.2843$$

Using the triangle marked in red, hypotenuse = 40 as full wire.

$$\text{Height} = \sqrt{40^2 - 28.2843^2} = 28.284$$



4. The audience area is a rectangle 50 metres by 80 metres, and the camera (at point C) is 10 metres back from one corner, at 135° from the sides. What is $\angle ACB$?

Need to break angle part into horizontal and vertical parts.

Triangle shown has angle of $135^\circ - 90^\circ = 45^\circ$

$$\Rightarrow x = \cos 45^\circ \times 10 = 7.071$$

$$\text{and } y = \sin 45^\circ \times 10 = 7.071$$

$$\angle DCB = \tan^{-1}\left(\frac{50 + 7.071}{7.071}\right) = 82.937^\circ$$

$$\angle ECB = \angle DCB - \angle DCE = 82.937^\circ - 45^\circ = 37.94^\circ$$

$\angle ACE$ is worked the same

$$\tan^{-1}\left(\frac{80 + 7.071}{7.071}\right) - 45^\circ = 40.36^\circ$$

$$\angle ACB = 37.94^\circ + 40.36^\circ = 78.3^\circ$$

