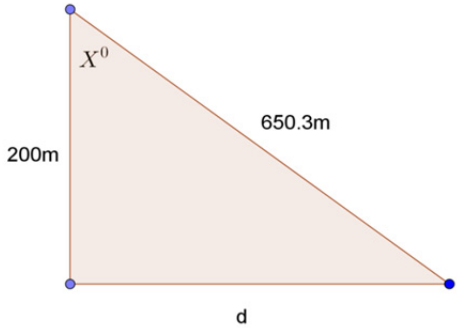
Runaway Plane Solution

Question 1

From the worksheet and tutorial example we know that the distance between the track and the prop plane is 200 m, and the distance between the track and the end of the runway is 650.3 m. The vertices of the track, the plane and the end of the runway form sides of a right-angled triangle (one side is 200 m long, the other is 650.3 m)



We have to find out the angle **X** between these two paths/lengths

Students should write:

$$\cos X = \frac{adjacent}{hypotenuse}$$

$$\cos X = \frac{200}{650.3}$$ (2 marks)

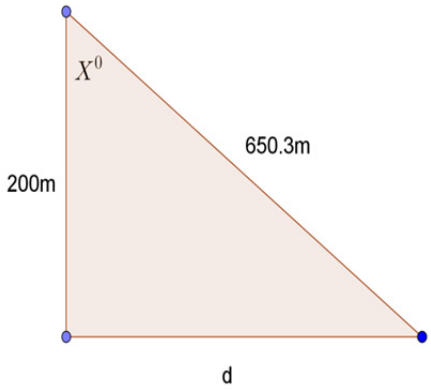
$$\cos X = 0.3075503614$$

$$X = \text{acos } 0.3$$

$X \approx$72.1 degrees (2 marks)

Question 2

Now we have to find the length of the runway.



For this we use Pythagoras' theorem:

$$650.3^2 = 200^2 + d^2$$ (1 mark)

$422890.09=40000+d^2$

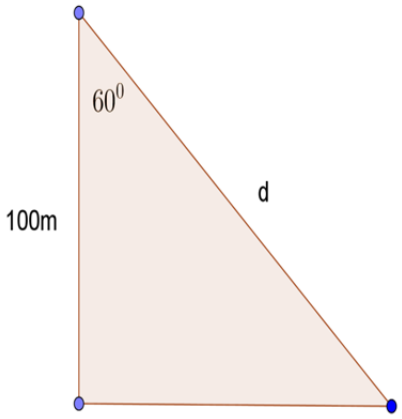
$$d^2 = 422890.09 - 40000$$

$$d^2 = 382890.09$$

d=618. 8 m (1 mark)

Question 3

In this task we should also form right-angled triangle (see picture).



Students should write:

$$\cos 60 = \frac{adjacent}{hypotenuse}$$

$$\cos 60 = \frac{100}{d}$$ (2 marks)

$$0.5 = \frac{100}{d}$$

$$d = \frac{100}{0.5}$$

$$d = 200m$$ (2 marks)