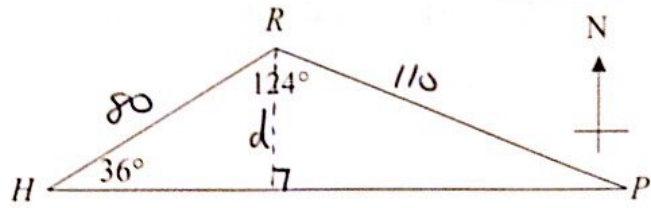


Question 8

Oct 15

(30 marks)

- (a) A port  $P$  is directly east of a port  $H$ . To sail from  $H$  to  $P$ , a ship first sails 80 km, in the direction shown in the diagram, to the point  $R$  before turning through an angle of  $124^\circ$  and sailing 110 km directly to  $P$ .



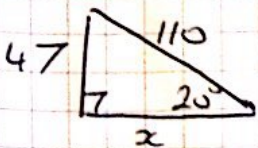
- (i) Find the distance from  $R$  to  $HP$ .

$$\sin 36^\circ = \frac{d}{80}$$

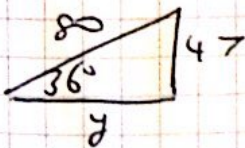
$$\therefore d = 80 \sin 36^\circ = \boxed{47 \text{ km}}$$

- (ii) Calculate  $|HP|$ .

$$\text{Angle at } P = 180^\circ - 124^\circ - 36^\circ = 20^\circ$$



$$\cos 20^\circ = \frac{x}{110} \Rightarrow x = 103.37 \text{ km}$$



$$\cos 36^\circ = \frac{y}{80} \Rightarrow y = 64.72 \text{ km}$$

$$\therefore |HP| = 103.37 + 64.72 = \boxed{168.09 \text{ km}}$$

or

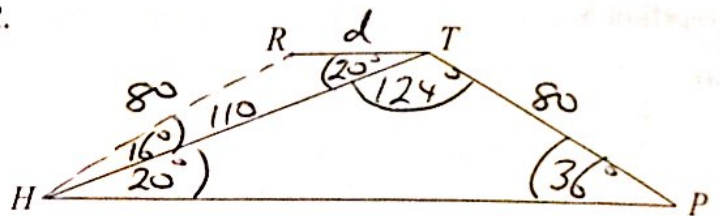
Use cos rule

$$|HP| = 168.35 \text{ km}$$

SEC Set C  
2013 P2

- (b) The point  $T$  is directly east of the point  $R$ .  
 $|HT| = 110$  km and  $|TP| = 80$  km.

Find  $|RT|$ .



~~Handwritten scribbles~~

$$\frac{d}{\sin 16^\circ} = \frac{80}{\sin 20^\circ}$$

$$d = 64.47 \text{ km}$$