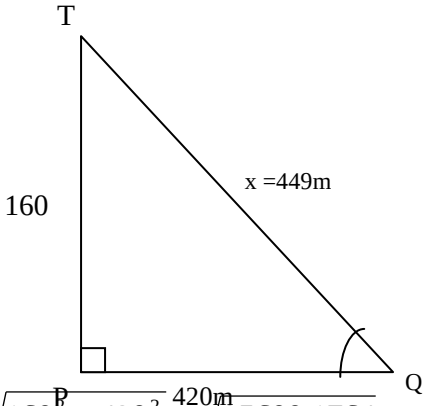
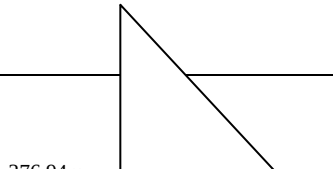
2. Angles and Plane figures

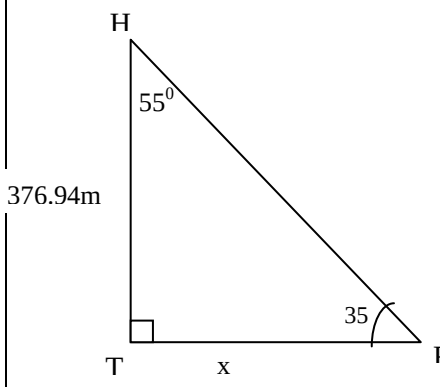
1	$2a+b=180$ $13a-b=360$ $15a=540$ $a=\frac{540}{15}=36$ $72+b=180$ $b=180-72-108^0$	M_1 M_1 M_1 A_1	✓formation of the equations ✓attempt to solve
2	$\angle XAD=30^0$ $180-(50+30)$ $=180-80=100^0$	B1 B1	
3	$\frac{h}{100}=\tan 67^0$ $h = 160 \times \tan 67^0$ $= 376.94m$  $x^2=\sqrt{160^2+420^2}=\sqrt{25600.1764}$ H $=449m$  	M_1 M_1 A_1 M_1	

$$\text{Tan } \theta = \frac{376.94m}{449m} = 0.8395$$

$$\vartheta = 40^0$$

M_1

A_1



$$x = \tan 55^0$$

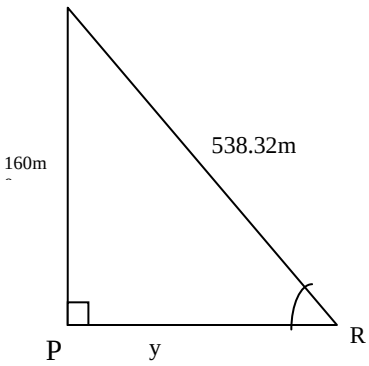
$$376.94$$

$$x = 376.94 \times \tan 55^0$$

$$= 538.32km$$

M_1

M_1



$$y^2 + 160^2 = 538.3^2$$

$$y^2 = \sqrt{538.32^2 - 160^2}$$

$$y = \sqrt{264{,}188.4224}$$

$$= 513.99m$$

$$\approx 514m$$

M_1

A_1

4.	$aA^2 = b^2 + c^2 - 2bc \cos A$ $4^2 = 3^2 + 6^2 - 2 \times 3 \times 6 \cos \theta$ $-29 = -36\cos \theta$ $\frac{-29}{-36} = \cos \theta$ $36.34^0 = \theta$	**M1** **M1** **A1**	Substitution Attempt to simplify
		03	

5.	$\frac{1}{3}\left(\frac{180(n-2)}{n}\right)=\frac{360}{n}$ $180n-360=1080$ $180n=1440$ $n=8$ The polygon is an octagon	M_1 M_1 $\underline{A_1}$ 3
6.	$y=180^0-130^0=50^0$ $x=180^0-(50^0+83^0)=47^0$ $z=180^0-47^0-133^0$	B1 B1 B1 3

9. Let the ex < be x^0
In < $8x^0$

$x + 8x = 180$…….. M1
$x = 20$

No of sides = $\frac{360}{20}$
= 18 sides

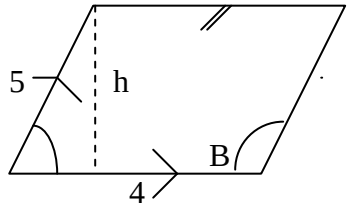
ALT
n = No. of sides
$\left(\frac{n-2}{n}\right)180 = 8\left(\frac{360}{n}\right)$ M1M1
n = 18 sides A1

M1

A1

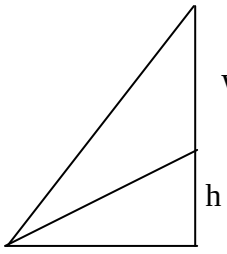
3

10.



Area = 5 x sin α = 12 M1
$\alpha = 36.87^0$ A1
$B = 143.13^0$ A1
3

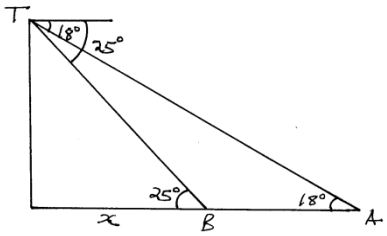
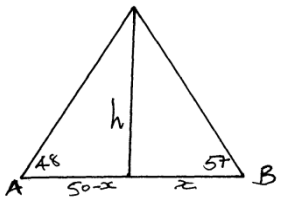
11. 5^0 27^0



Tan 27^0 = $\frac{h}{20}$ M1
h = 10.19m
Tan 32^0 = $^x/_{20}$ M1
x = 12.50m
Window height = 2.31m A1

3

12.	$\frac{360^0}{n} = 18^0$ $n = \frac{360^0}{} = 20$ sides	B1	

	18^0 Area = (½ x 16 x $^{16}/_2$ tan 81^0) x 20 = (8 x8 x 6.3138) x 20 = 8081.66cm^2	M1 A1	
		03	
13.	(a)  Sketch (b) i) $\frac{h}{x} = \tan 25^0 \Rightarrow h = x \tan 25$ $\frac{h}{x+70} = \tan 18^0 \Rightarrow h = \tan 18(x + 70)$ Equating the two equations x tan 25^0 = x tan 18^0 + 70 tan 18^0 x(tan 25 tan 18^0) = 70 tan 18^0 $x = \frac{70 \tan 18^0}{\tan 25^0 - \tan 18^0}$ $x = \frac{22.744 = 160.8}{0.1414}$ h = 160.8tan 25 = 75m (c) Distance of A to the front of post = x + 70 = 160.8 + 70 = 230.8m	B2 M1 M1 M1 M1 A1 B1 M1 A1	
		10	
14.	{2(8) - 2} x 90 14 x 90 1260^0	M1 A1 2	
15.	 	 M1 A1	

	$\tan 57^0 = {}^{h}\!/_{x} \Rightarrow h = x\tan 57^0$ $\tan 48^0 = {}^{h}\!/_{50-x}\, h = (50-x)\tan 48^0$ $x\tan 57^0 = (50-x)\tan 48$ $1.53986x = 55.53 - 1.1106x$ $x = 20.95$ $dis\tan ce = 50 - 20.95 = 29.045m\, or$ $20.95m$ $h = x\tan 57 = 20.95\tan 57$ $= 32.26m$	M1 A1	
		04	