

Sine & Cosine Rule Mark scheme		
1		[1] Identifying angles correctly
	$\frac{AE}{\sin(136)} = \frac{3}{\sin(13)}$	[1] Correct use of sine rule
	$AE = 9.2641 \dots$	[1] Finding length AE
	$\sin 31 = \frac{EC}{9.2641 \dots}$	[1] Correct use of sine rule
	$\therefore EC = 4.7714 \dots$ $EC = 5 \text{ cm}$	[1] Answer to nearest cm
2	$\cos(CDB) = \frac{6^2 + 5^2 - 7^2}{2(6)(5)}$	[1] Correct use of cosine rule
	$\cos(CDB) = 0.2$	[1] Calculation
	$CDB = 78.4630^\circ$ $\therefore ADB = 101.547 \dots$	[1] Simplifying and use of angles on a straight line add up to $180^\circ$
	$\frac{x}{\sin(101.547)} = \frac{5}{\sin(30)}$	[1] Correct use of sine rule
	$x = 9.8 \text{ cm (1 dp)}$	[1] Final answer
3		[1] Finding angle BAC = 140
	$\frac{120}{\sin(140)} \times \sin(18) = 57.6894 \dots \text{ m}$	[1] Correct use of sine rule to find length AB
	$h = 57.69 \times \sin(22) = 21.61 \text{ m}$	[1] Correct use of right angled triangle, either trig or sine rule.
	$h = 22 \text{ m}$	[1] Answer to the nearest meter

Turn over ►

<b>4</b>	$\frac{\sin ADB}{5.3} = \frac{\sin 70}{6.2}$ $ADB = 53.445\dots$	[1] Correct use of sine rule
	$\therefore \frac{DBA}{AD} = \frac{6.2}{\sin(56.555\dots)}$ $\therefore AD = 5.5053\dots$	[1] Apply sine rule twice for value of AD
	$\frac{\sin BDC}{6.4} = \frac{\sin 50}{6.2}$ $\therefore BDC = 52.256\dots$	[1] Similarly apply sine rule on second triangle
	$\frac{DBC}{DC} = \frac{6.2}{\sin(77.74382\dots)}$ $\therefore DC = 7.9190\dots$	[1] Finally apply a fourth time to get DC
	Hence perimeter is $5.3 + 6.4 + 5.5053\dots + 7.9190\dots$ $= 25\text{ m}$	[1] Correct value for perimeter
<b>6</b>	$\frac{BD}{\sin(47^\circ)} = \frac{7.9}{\sin(71^\circ)}$	[1] Use of sine rule to find length BD
	$BD = \frac{7.9}{\sin(71^\circ)} \times \sin(47^\circ) = 6.11 \text{ (2d.p.)}$	[1] Correct length BD
	$\cos(x^\circ) = \frac{5.1^2 - 6.2^2 - 6.1^2}{-2 \times 6.2 \times 6.1} = \frac{-49.64}{-75.64}$	[1] Use of cosine rule
	$\cos(x^\circ) = 0.656 \text{ (3d.p.)}$	[1] Simplifying
	$x = 48.98^\circ$	[1] Correct value of $x$ to 2 decimal places
<b>6(a)</b>	$182.3^2 = 180^2 + 170^2 - 2(180)(170) \cos EOD$	[1] Cosine rule
	$\cos EOD = \frac{180^2 + 170^2 - 182.3^2}{2(180)(170)}$ $\cos EOD = 0.4586\dots$ $\therefore EOD = 62.7023^\circ\dots$	[2] Correct angle
	$DE^2 = 370^2 + 480^2 - 2(370)(480) \cos(62.702\dots)$ $\therefore DE = 452\text{ m}$	[1] Apply cosine rule again
<b>6(b)</b>	$\frac{\sin ODE}{480} = \frac{\sin 62.7023^\circ}{452.11\dots}$	[1] Correct application of sine rule
	$\therefore ODE = 71^\circ\dots$	[2] Final answer

END