GCSE MATHEMATICS · HIGHER

Targeting Grade 9

Paper 10 · Mark scheme · Calculator · 40 marks

M method mark **P** process mark **A** accuracy mark (depends on the M or P marks before it)
B independent mark **C** communication mark **ft** follow through **oe** or equivalent

Q	Working	Answer	Mark	Notes
1(a)	Annual multiplier $= 1.015^{12}$ $= 1.1956\ldots$	 19.6	M1 M1 A1	
1(b)	$1.015^{46} = 1.98\ldots$, $1.015^{47} = 2.01\ldots$	 47	M1 A1	Trials either side of 2

Q	Working	Answer	Mark	Notes
2	Lower bound of area $= 49.5$ $\frac{1}{2}\pi r^2 = 49.5 \Rightarrow r = \sqrt{\frac{99}{\pi}} = 5.613\ldots$ Perimeter $= \pi r + 2r$	 28.86	B1 M1 M1 A1	 Arc + diameter

Q	Working	Answer	Mark	Notes
3(a)	Midpoints 5, 15, 25, 35: $\frac{40+15x+300+175}{25+x}=19$ $515+15x=475+19x$	 10	M1 M1 A1	
3(b)	$\frac{1}{2}\times 12+5=11$ out of 35	 $\frac{11}{35}$	M1 A1	ft their x

Q	Working	Answer	Mark	Notes
4	Radius of water surface $=15\times\frac{24}{36}=10$ cm Volume $=\frac{1}{3}\pi\times 10^2\times 24=800\pi$ $\frac{800\pi}{120}$	 20.9	P1 P1 P1 A1	Similar triangles

Q	Working	Answer	Mark	Notes
5	$\frac{1}{2}\times 10\times 10\times \sin A=40\Rightarrow$ $\sin A=0.8$ $A=53.13\ldots°$ or $A=126.86\ldots°$ $BC^2=$ $10^2+10^2-2\times 10\times 10\cos A$	 8.94 17.9	M1 M1 M1 A1 A1	 Both angles $\sqrt{80}$ $\sqrt{320}$

Q	Working	Answer	Mark	Notes
6(a)	Angle $LAB = 40°$, angle $ABL = 110°$ Angle $ALB = 30°$; $\frac{BL}{\sin 40°} = \frac{8}{\sin 30°}$	10.3	P1 P1 A1	 Sine rule 10.28...
6(b)	Shortest distance is perpendicular to the ship's path Angle between BL and the path east of B is $70°$ $10.28\ldots \times \sin 70°$	9.66	P1 P1 A1	

Q	Working	Answer	Mark	Notes
7	Angle $OAP = 90°$ (tangent and radius); angle $AOB = 360° - 90° - 90° - 50° = 130°$ $PA = \frac{6}{\tan 25°} = 12.86\ldots$ Area of kite $OAPB = 2 \times \frac{1}{2} \times 6 \times 12.86\ldots = 77.20\ldots$ Sector $= \frac{130}{360} \times \pi \times 6^2 = 40.84\ldots$	36.4	P1 P1 P1 P1 A1	

Q	Working	Answer	Mark	Notes
8	Let $AB = 2x$; then $BC = \sqrt{100 - x^2}$ (Pythagoras in triangle OBC)		P1	
	$2x\sqrt{100 - x^2} = 96$		P1	
	$4x^2(100 - x^2) = 9216 \Rightarrow$ $x^4 - 100x^2 + 2304 = 0$		P1	
	$(x^2 - 64)(x^2 - 36) = 0$		P1	
		16 cm by 6 cm	A1	
		12 cm by 8 cm	A1	
		Total	**40**	