1	$\frac{180-56}{2}$ or 62	M1	oe may be on diagram
	180 + their 62 or 360 – 56 – their 62	M1dep	oe eg 62 + 62 + 118
	242	A1	
	Additional Guidance		
	62 seen even if not subsequently used		M1
	Answer (0)62		M1M0A0
	56 only		M0
	242 seen but answer given as 62		M1M0A0
	242 seen but then further work eg 360 – 242 and answer 118		M1M0A0

Q	Answer	Mark	Comments
2(a)	$\frac{180-90}{2}$ or $\tan^{-1}\frac{6}{6}$ or 45	M1	oe may be seen on diagram eg $\sin^{-1}\left(\frac{6}{\sqrt{72}}\right)$
	315	A1	SC1 answer of 135 (bearing of C from A)
	Additional Guidance		
	$\tan\frac{6}{6}$ unless recovered		M0

2(b)	Correct explanation that the ship would be on land or 068° is the bearing of *D* from *E* or the bearing must be over 180° or the actual bearing is [246, 250]°	B1	eg that would take the ship over land 068° is from *E* 068° is the bearing from *E* to *D* the bearing is 248°
	Additional Guidance		
	Ignore irrelevant statements and compass points eg bearings go clockwise, bearings are measured from north, NE, south west		
	Do not accept incorrect statement or bearing alongside a correct statement		
	Bearings measured or stated outside of [246, 250]° range		B0
	Examples of statements		
	Must be over 180°		B1
	Should be reflex		B1
	This is going from *E*		B1
	Makes the ship go in the opposite direction		B1
	68° needs to be 248°		B1
	Should be 248°		B1
	Her bearing cannot be acute		B1
	Bearings cannot be acute		B0
	248° without a statement		B0
	Ship would not land at *E*		B0
	She needs to go south west		B0

Q	Answer	Mark	Comments
3(a)	$35^2 + 65^2 - 2 \times 35 \times 65 \times \cos 100$	M1	oe valid trigonometric method used must be correct
	$\sqrt{35^2 + 65^2 - 2 \times 35 \times 65 \times \cos 100}$ $= 78.9(\ldots)$ or $\sqrt{6240.(0992\ldots)} = 78.9(\ldots)$	A1	$CA = 78.99429858$
	Additional Guidance		
	Using sine rule with $CA = 79$ to obtain AB or BC		M0A0

Q	Answer	Mark	Comments
3(b)	**Alternative method 1 – sine rule to find *ACB***		
	$\frac{\sin ACB}{35} = \frac{\sin 100}{79}$	M1	oe 79 may be 78.9(…)
	$\sin ACB = 35 \times \frac{\sin 100}{79}$ or $\sin ACB = 35 \times 0.0124\ldots$ or $\sin ACB = 0.436\ldots$	M1dep	oe
	$ACB = [25.8, 26]$	A1	
	234.(…)	A1ft	ft 360 – 100 – their ACB with M2 scored
	Alternative method 2 – cosine rule to find *ACB*		
	$35^2 = 79^2 + 65^2 - 2 \times 79 \times 65 \times \cos ACB$	M1	oe 79 may be 78.9(…)
	$\cos ACB = \frac{79^2 + 65^2 - 35^2}{2 \times 79 \times 65}$ or $\cos ACB = \frac{9241}{10270}$ or $\cos ACB = 0.899\ldots$	M1dep	
	$ACB = [25.8, 26]$	A1	
	234.(…)	A1ft	ft 360 – 100 – their ACB with M2 scored

3(b) cont	**Alternative method 3 – sine rule to find *BAC***		
	$\frac{\sin BAC}{65} = \frac{\sin 100}{79}$	M1	oe 79 may be 78.9(…)
	$\sin BAC = 65 \times \frac{\sin 100}{79}$ or $\sin BAC = 65 \times 0.0124\ldots$ or $\sin BAC = 0.81(0\ldots)$	M1dep	oe
	$BAC = [54.1, 54.3]$	A1	
	234.(…)	A1ft	ft their $BAC + 180$ with M2 scored
	Alternative method 4 – cosine rule to find *BAC*		
	$65^2 = 79^2 + 35^2 - 2 \times 79 \times 35 \times \cos BAC$	M1	oe 79 may be 78.9(…)
	$\cos BAC = \frac{79^2 + 35^2 - 65^2}{2 \times 79 \times 35}$ or $\cos BAC = \frac{3241}{5530}$ or $\cos BAC = 0.586\ldots$	M1dep	
	$BAC = [54.1, 54.3]$	A1	
	234.(…)	A1ft	ft their $BAC + 180$ with M2 scored
	Additional Guidance		
	$CA = 79$ is given in part (a) or 78.9(…) can be used. There is no follow through from part (a).		
	Accept any notation for the angle eg $\sin x$ or $\sin C$ for angle ACB		
	Correct work for part (b) seen in part (a) may be awarded method marks in part (b)		

Q	Answer	Mark	Comment
4	247 – 170 or 77	M1	oe may be on diagram
	$23 \times 1\frac{1}{2}$ or 34.5	M1	oe eg 23 + 11.5 or $23 \times 90 \div 60$ or 23×1.5 may be on diagram
	(their 34.5)^2 + 60^2 – 2 × their 34.5 × 60 × cos (their 77) or [3858, 3859]	M1dep	oe dep on at least one M scored
	$\sqrt{\text{their [3858, 3859]}}$ or 62.1(…)	M1dep	oe eg $\sqrt{34.5^2 + 60^2 - 2 \times 34.5 \times 60 \times \cos 77}$ dep on 3rd M1
	No and 62.1(…)	A1	oe eg 62.1 and the ship is further away accept No and 62 with M4 scored
	Additional Guidance		
	Up to M2 may be awarded for correct work with no answer, or incorrect answer, even if this is seen amongst multiple attempts		
	2nd M1 Do not accept 23 × 1.30 unless recovered		