

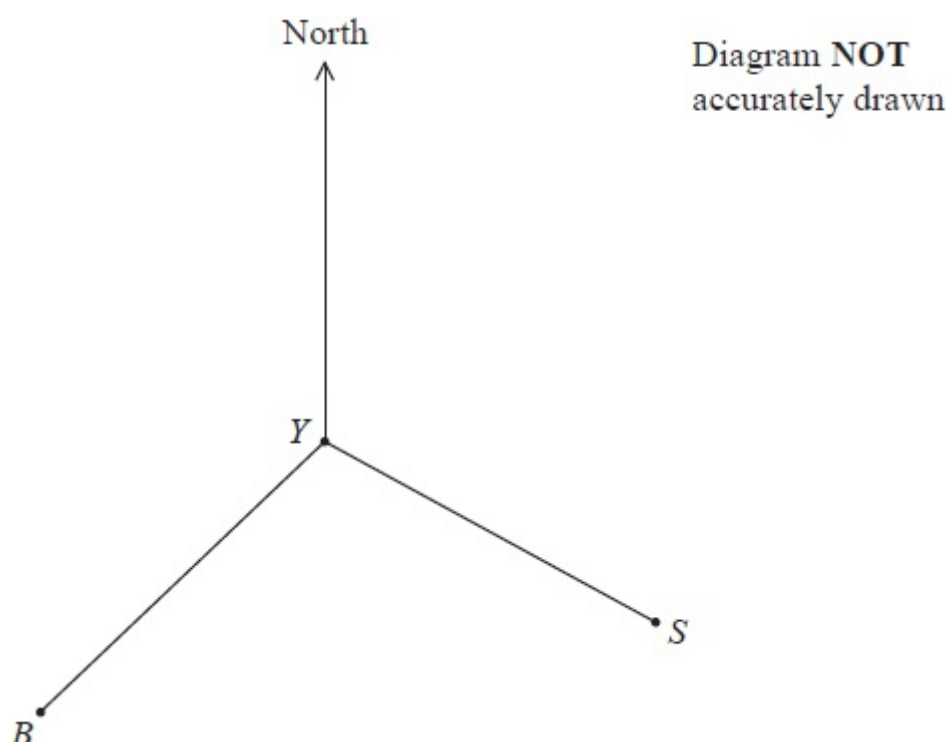


Unit 2 Revision Sheet D Polygons Congruency Symmetry Bearings Constructions Higher

Note: *Higher tier students must also revise using the foundation tier revision worksheets as this content can also be assessed on higher tier papers.*

Questions

Q1.



The diagram shows the positions of a yacht Y , a ship S and a beacon B .
The bearing of B from Y is 228°

(a) Find the bearing of Y from B .



The bearing of S from Y is 118°

(b) Find the size of the angle BYS .

.....[°]
(1)

(c) Given also that $BY = SY$, find the bearing of S from B .

.....[°]
(2)

(Total for question = 5 marks)

Q2.

The diagram shows two points S and T .
The bearing of T from S is 043°

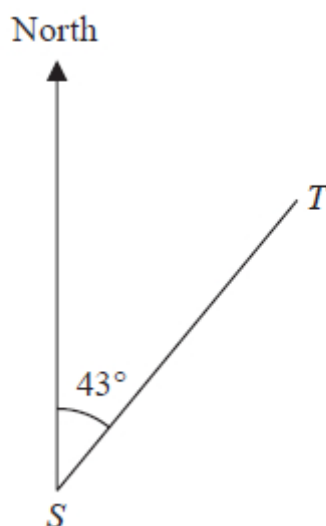


Diagram **NOT**
accurately drawn

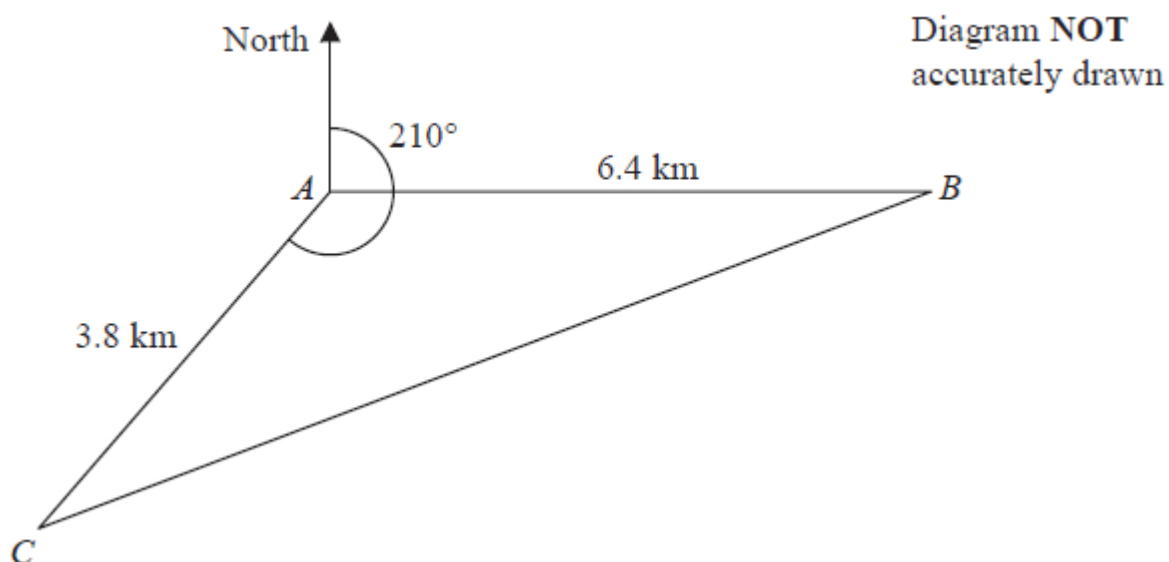


Work out the bearing of S from T .

.....°

(Total for question = 2 marks)

Q3.



A , B and C are 3 villages.
 B is 6.4 km due east of A .
 C is 3.8 km from A on a bearing of 210°

Calculate the bearing of B from C .
Give your answer correct to the nearest degree.
Show your working clearly.

.....°

(Total for question = 6 marks)



Q4.

A , B and C are three towns.

The bearing of B from A is 105°

The bearing of C from B is 230°

The distance of C from A is 180 km.

The distance of C from B is 95 km.

Calculate the distance of B from A .

Give your answer correct to 3 significant figures.

..... km

(Total for question = 5 marks)



Q5.

The bearing of Paris from London is 149°

Work out the bearing of London from Paris.

.....^o

(Total for question = 2 marks)

Q6.

The diagram shows the positions of three ships, *A*, *B* and *C*.

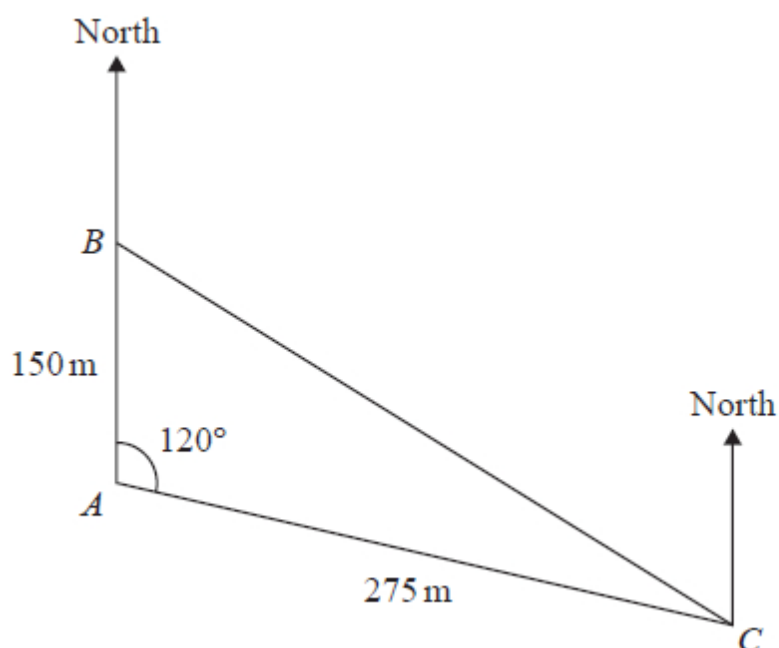


Diagram NOT
accurately drawn

Ship *B* is due north of ship *A*.



The bearing of ship *C* from ship *A* is 120°

Calculate the bearing of ship *C* from ship *B*.
Give your answer correct to the nearest degree.

.....^o

(Total for question = 5 marks)



Q7.

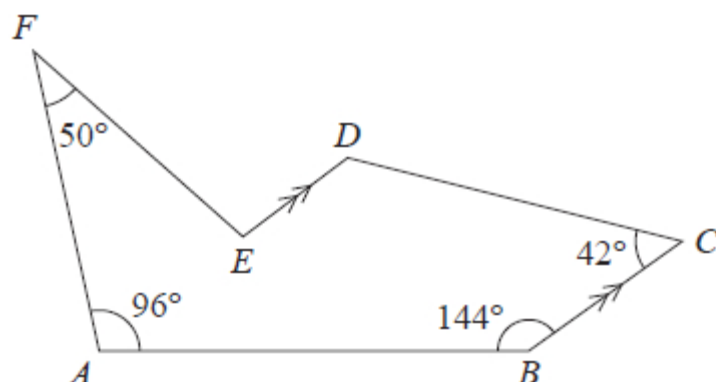


Diagram **NOT**
accurately drawn

The diagram shows a hexagon $ABCDEF$.
 BC is parallel to ED .

Work out the size of the obtuse angle DEF .

.....°

(Total for question = 5 marks)



Q8.

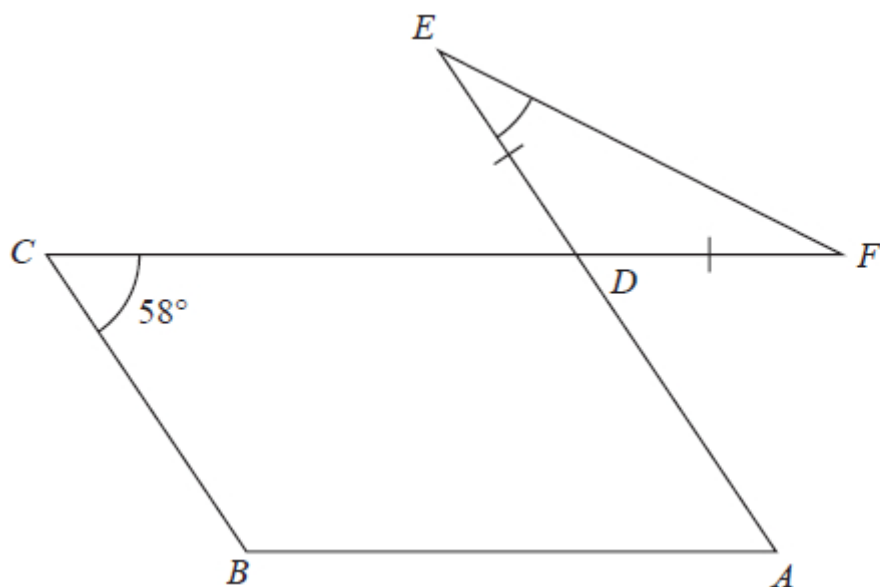


Diagram NOT
accurately drawn

The diagram shows a parallelogram $ABCD$ and an isosceles triangle DEF in which $DE = DF$

CDF and ADE are straight lines.

Angle $BCD = 58^\circ$

Work out the size of angle DEF .

Give a reason for each stage of your working.

.....°

(Total for question = 5 marks)



Q9.

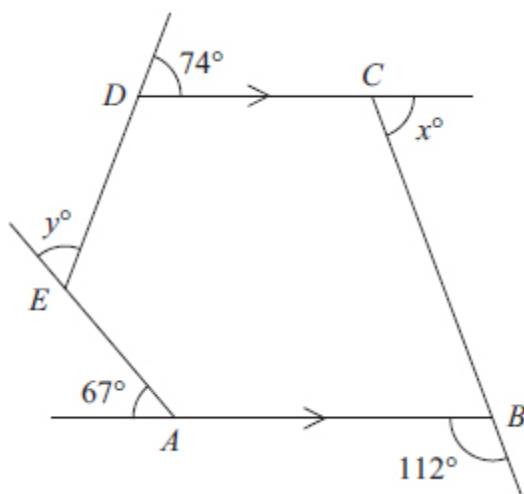


Diagram NOT
accurately drawn

The diagram shows a pentagon $ABCDE$.

DC is parallel to AB .

The size of an exterior angle at A is 67

The size of an exterior angle at B is 112

The size of an exterior angle at C is x

The size of an exterior angle at D is 74

The size of an exterior angle at E is y

(a) (i) Work out the value of x .

$x = \dots\dots\dots$

(ii) Work out the value of y .

$y = \dots\dots\dots$

(4)

(b) Work out the sum of the interior angles of the pentagon $ABCDE$.

$\dots\dots\dots^\circ$

(2)

(Total for question = 6 marks)



Q10.

Work out the size of each exterior angle of a regular polygon with 15 sides.

.....°

(Total for question = 2 marks)



Mark Scheme

Q1.

Question	Working	Answer	Mark	Notes
(a)	$228 - 180 (=48)$ or $360 - 228 (= 132)$ then $180 - 132$	048	2	M1 Can be marked on diagram. i.e Full method leading to correct answer. A1 Accept 48
(b)		110	1	B1
(c)	$228 - 118 (= 110)$ $(180 - "110") \div 2 (= 35)$ "48" + "35"	083	2	M1ft bearing from (a) + 35 A1 accept 83
Total 5 marks				

Q2.

The correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.

Question	Working	Answer	Mark	Notes
	$180 + 43$ or $360 - (180 - 43)$ or $360 - 137$	223	2	M1 For a complete method. A1
Total 2 marks				



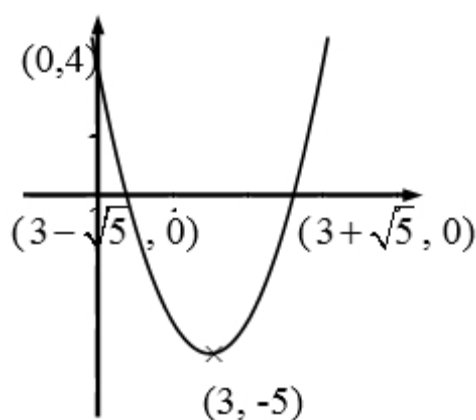
Q3.

Question	Working	Answer	Mark	Notes
	$(BC^2 =) 3.8^2 + 6.4^2 - 2 \times 3.8 \times 6.4 \cos 120^\circ$ $(= 79.72)$ $(BC^2 =) 14.44 + 40.96 + 24.32 (= 79.72)$			M1 correct use of Cosine rule to find BC Award M2 A1 for $BC = 8.9 - 8.93$ or $\sqrt{79.72}$ or $\sqrt{\frac{1993}{25}}$ oe
				M1 correct order of operations A1 for $BC = 8.9 - 8.93$ or $\sqrt{79.72}$ or $\sqrt{\frac{1993}{25}}$ oe
	$\frac{\sin C}{6.4} = \frac{\sin 120}{3.8}$ or $6.4^2 = 3.8^2 + 8.92^2 - 2 \times 3.8 \times 8.92 \times \cos C$ $\sin C = \frac{6.4 \times 0.866...}{8.92...} (= 0.62...)$ or $\cos C = \frac{3.8^2 + 8.92^2 - 6.4^2}{2 \times 3.8 \times 8.92} (= 0.78...)$ $C = 38 - 38.5$			M1 correct use of Sine rule or Cosine rule to find angle C Award M2 for $C = 38 - 38.5$ Award M2 for $B = 21.5 - 22$ and $C = 180 - 120 - B$
		068	6	A1 (0)68 – (0)68.4
	Alternative CD is the perpendicular from C to BA produced. $\angle CAD = 60^\circ$ or $\angle ACD = 30^\circ$ $AD = 3.8 \cos 60^\circ$ or $3.8 \sin 30^\circ (= 1.9)$ $BD = 6.4 + 1.9 (= 8.3)$			M1 uses triangle CAD and $\angle CAD = 60^\circ$ or $\angle ACD = 30^\circ$ CD may not be drawn in but can be implied
				M1 for correct method to find horizontal length
				A1 for $BD = 8.3$
	$CD = 3.8 \sin 60^\circ$ or $3.8 \cos 30^\circ (= 3.29)$ $\tan BCD = \frac{8.3}{3.8 \sin 60^\circ}$ oe			M1 M1
		068		A1 (0)68 – (0)68.4
Total 6 marks				



Q4.

Q	Working	Answer	Mark	Notes	
	eg. diagram drawn showing relative positions of A , B and C can be implied by angle $ABC = 55^\circ$			M1	interprets information
	$\frac{\sin CAB}{95} = \frac{\sin 55}{180}$			M1	
	$CAB = \sin^{-1}\left(\frac{95 \sin 55}{180}\right)$ or $CAB = 25.6(1\dots)$			M1	dep
	$AB = \frac{180}{\sin 55} \times \sin(180 - 55 - "25.6")$			M1	dep or for $\sqrt{180^2 + 95^2 - 2 \times 180 \times 95 \times \cos(180 - 55 - "25.6")}$
		217	5	A1	
					Total 5 marks





Q5.

Q	Working	Answer	Mark	Notes
	180 + 149 or 360 – 31			M1
	<i>Working not required, so correct answer scores full marks</i>	329	2	A1
				Total 2 marks

Q6.

Q	Working	Answer	Mark	Notes
	$(BC^2 =) 150^2 + 275^2 - (2 \times 150 \times 275 \times \cos 120) (= 139\,375)$		5	M1 for correct substitution into the cosine rule
	$(BC =) \sqrt{150^2 + 275^2 + 41250}$ oe or $\sqrt{139375}$ or $25\sqrt{223}$ or 373....			M1 for correct order of operations and square root
	e.g. $\frac{\sin ABC}{275} = \frac{\sin 120}{"373..."}$ or $275^2 = 150^2 + "373..."^2 - (2 \times 150 \times "373..." \times \cos ABC)$ or $\cos ABC = \frac{150^2 + "373..."^2 - 275^2}{2 \times 150 \times "373..."}$ or $\frac{\sin ACB}{150} = \frac{\sin 120}{"373..."}$ or $150^2 = 275^2 + "373..."^2 - (2 \times 275 \times "373..." \times \cos ACB)$ or $\cos ACB = \frac{275^2 + "373..."^2 - 150^2}{2 \times 275 \times "373..."}$			M1 (dep on 1 st M1) ft 373... for a correct trig statement involving angle ABC or angle ACB
	$(ABC =) \sin^{-1} \left(\frac{\sin 120}{"373..." \times 275} \right) (= 39.6...)$ or $(ABC =) \cos^{-1} \left(\frac{150^2 + "373..."^2 - 275^2}{2 \times 150 \times "373..." \right) (= 39.6...)$ or $(ACB =) \sin^{-1} \left(\frac{\sin 120}{"373..." \times 150} \right) (= 20.3...)$ or $(ACB =) \cos^{-1} \left(\frac{275^2 + "373..."^2 - 150^2}{2 \times 275 \times "373..." \right) (= 20.3...)$			M1 for a complete method to find angle ABC or angle ACB
		140		A1 accept 140 – 140.4
				Total 5 marks



Q7.

NB: splitting the shape incorrectly (FDC and DEA are not straight lines) gains no marks for angles calculated from false information. However angles calculated that follow the scheme, such as $\angle EDC = 138^\circ$ or interior angles of hexagon = 720° can be awarded. Other ways of correctly splitting the shape can be awarded full marks, eg FE to a point on AB or adding a parallel line eg from E parallel to AB

NB: some students show lots of lines but actually work with the angles correctly so please check carefully.

Question	Working	Answer	Mark	Notes
	$\angle EDC = 180 - 42$ (=138)		5	M1 May be marked on diagram.
	$(2 \times 6 - 4) \times 90 (=720)$			M1indep Method to find sum of interior angles of hexagon or the correct sums for the interior angles of shapes used (eg 540° & 180° if the line through FE to point on AB drawn or 720° and 180° if line drawn from E parallel to AB or 540° & 180° if line through FE extended and joined to line through CB extended) oe
	eg "138" + 42 + 50 + 96 + 144 + $E' = "720"$ or "138" + 42 + 50 + 96 + 144 + (360 - E) = "720" or 42 + 144 + "138" + (50 + 96) + $DEP = "540"$ (where P is on AB and FE extended) oe			M1 dep on previous M marks Equation for E or E' where E is the obtuse angle of the hexagon and E' is the interior (reflex) angle or for an answer of 250 from correct working



	$E' = "720" - "138" - 42 - 50 - 96 - 144$ $(= 720 - 470 = 250)$ and $E = 360 - "250"$ or $E = "138" + 42 + 50 + 96 + 144 + 360 - "720"$ $(= 830 - 720)$			M1	A completely correct calculation for the correct angle E
		110		A1	from no incorrect working
				Total 5 marks	

Q8.

Q	Working	Answer	Mark	Notes
	$ADC = 180 - 58 (= 122)$ or $EDF = 122$ or $CDE = 58$ or $ADF = 58$			M1 may be seen marked on the diagram
	e.g. $DEF = 58 \div 2$ or $DEF = (180 - 122) \div 2$			M1 complete method to find angle DEF
		29		A1
			5	B2 dep on M2 for fully correct reasons for their method (B1 dep on M1 for one correct reason stated and used) e.g. <u>Allied angles</u> , <u>co-interior angles</u> , <u>Alternate angles</u> , <u>Corresponding angles</u> , <u>Vertically opposite angles</u> are equal (or <u>Vertically opposite angles</u> are equal), <u>Angles</u> on a straight <u>line</u> add up to 180° (or angles on a straight <u>line</u> add to 180°), Sum of <u>two angles</u> in a triangle are equal to <u>opposite exterior angle</u> , <u>Angles</u> in a <u>triangle</u> add up to 180° (or Angles in a <u>triangle</u> add up to 180°), Base angles in an <u>isosceles triangle</u> <u>Angles</u> in a <u>quadrilateral</u> add up to 360. (accept "4-sided shape" or parallelogram) <u>Opposite angles</u> of a <u>parallelogram</u> are equal
				Total 5 marks



Q9.

Question Number	Working	Answer	Mark	Notes
(a)(i)	$\angle ABC = 68^\circ$ or $\angle BCD = 112^\circ$		4	M1 May be stated or marked on diagram
		68		A1 cao
(ii)	$360 - (67 + 112 + "68" + 74)$			M1
		39		A1 ft from their (a)(i) Award 2 marks if the answer to (ii) is 107 - answer to (i)
(b)	$(5 - 2) \times 180$ or 3×180 or $(2 \times 5 - 4) \times 90$ or 6×90 or $360 + 180$ or $(180 - 67) + (180 - 112) +$ $(180 - "68") + (180 - 74) +$ $(180 - "39")$ or $113 + 68 + 112 + 106 + 141$		2	M1 Condone 1 incorrect interior angle
		540		A1 Cao SC: Award B1 for answer of 108
				Total 6 marks

Q10.

Question	Working	Answer	Mark	Notes
	$360 \div 15 (=24)$ or $\frac{(15-2) \times 180}{15} (=156)$			M1
		24	2	A1
				Total 2 marks