

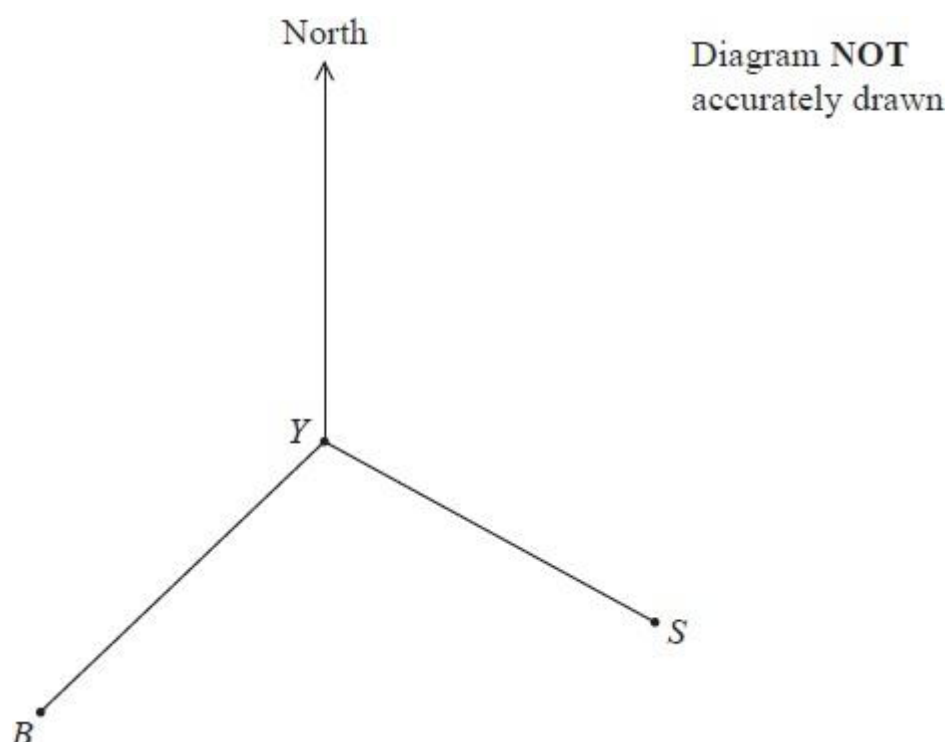


## Unit 2 Revision Sheet D Polygons Congruency Symmetry Bearings Constructions Higher

**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  $228^\circ$

- (a) Find the bearing of  $Y$  from  $B$ . (2)

The bearing of  $S$  from  $Y$  is  $118^\circ$

- (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  $043^\circ$

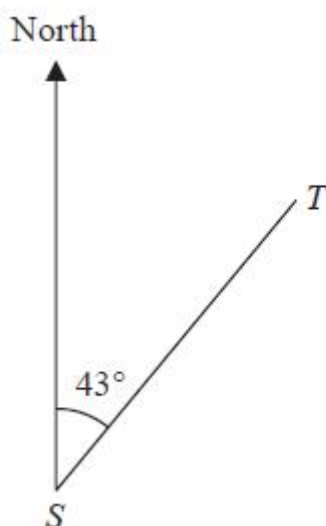


Diagram **NOT**  
accurately drawn

Work out the bearing of  $S$  from  $T$ .

(Total for question = 2 marks)

**Q3.**

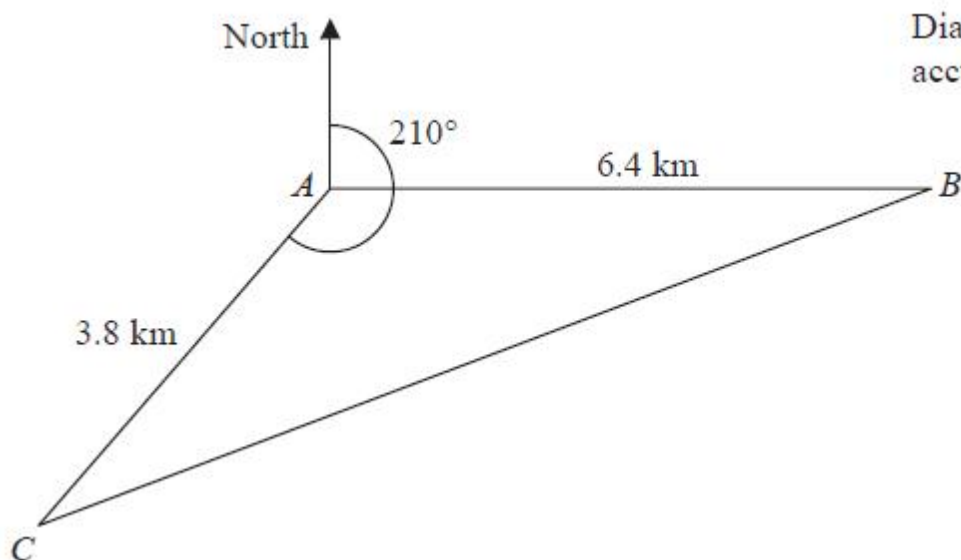


Diagram **NOT**  
accurately drawn

$A$ ,  $B$  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  $210^\circ$

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  $105^\circ$

The bearing of  $C$  from  $B$  is  $230^\circ$

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.

**(Total for question = 5 marks)**

**Q5.**

The bearing of Paris from London is  $149^\circ$

Work out the bearing of London from Paris.

**(Total for question = 2 marks)**



**Q6.**

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

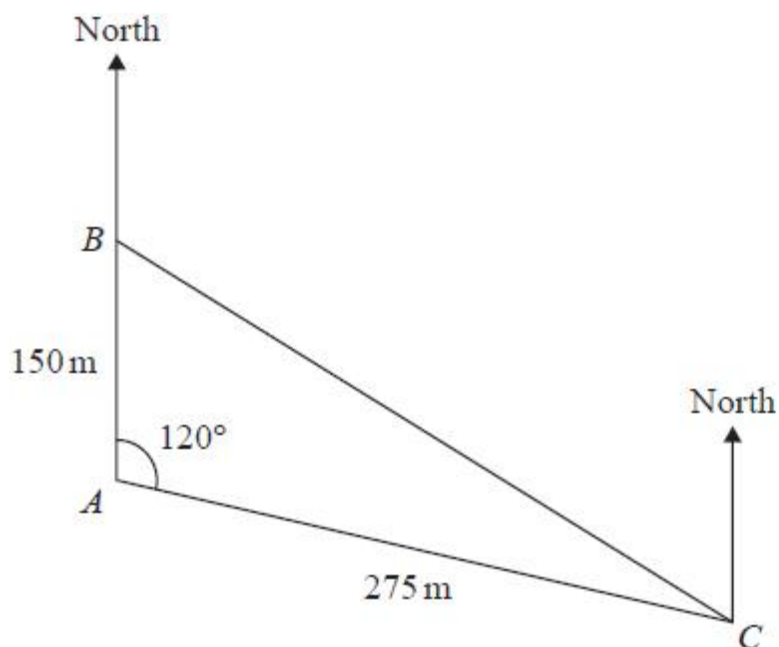


Diagram **NOT**  
accurately drawn

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

The bearing of ship  $C$  from ship  $A$  is  $120^\circ$

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

(Total for question = 5 marks)

**Q7.**

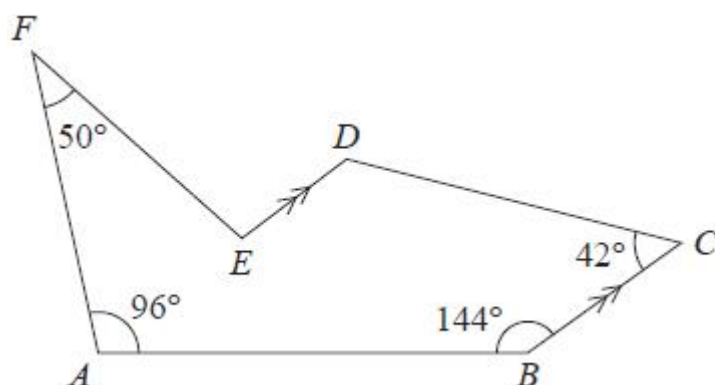


Diagram **NOT**  
accurately drawn

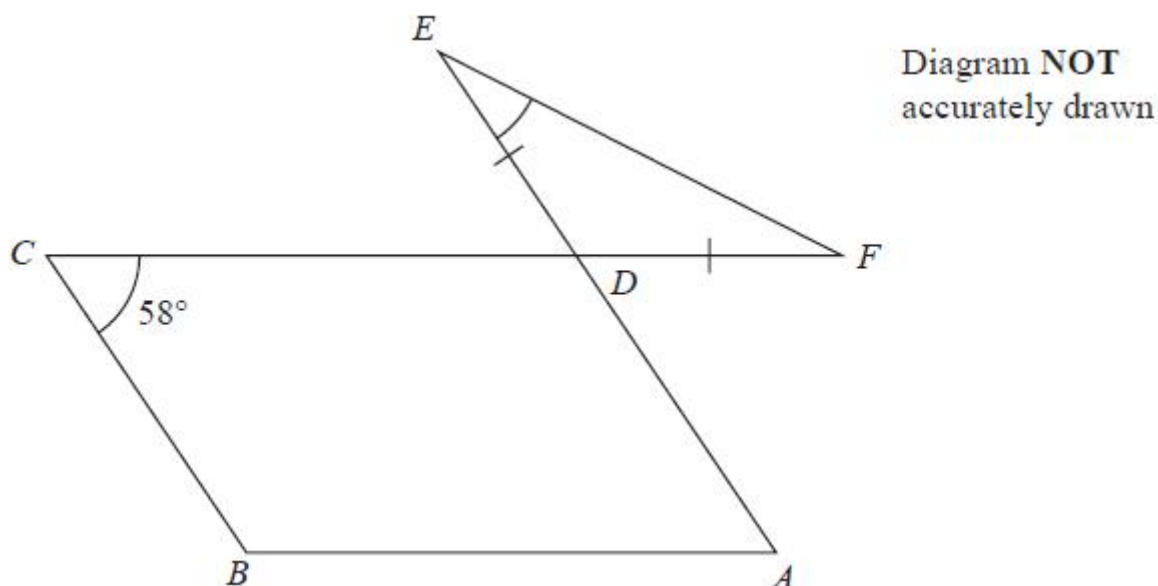
The diagram shows a hexagon  $ABCDEF$ .  
 $BC$  is parallel to  $ED$ .

Work out the size of the obtuse angle  $DEF$ .

(Total for question = 5 marks)



Q8.



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

$CDF$  and  $ADE$  are straight lines.

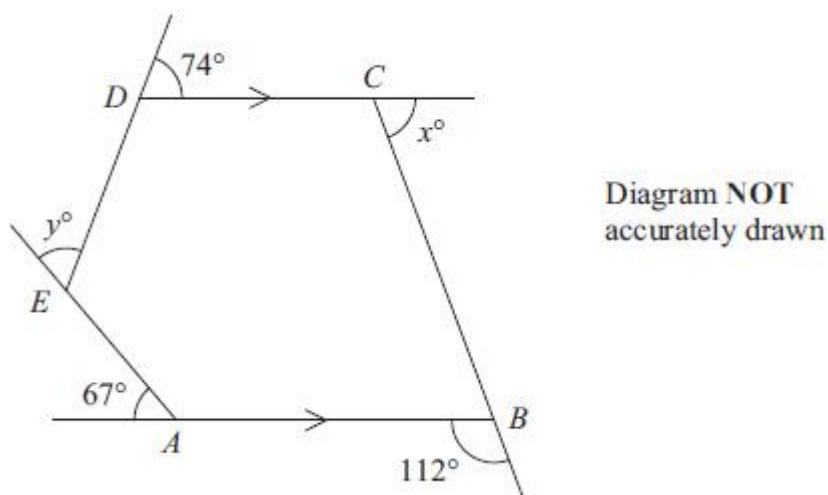
Angle  $BCD = 58^\circ$

Work out the size of angle  $DEF$ .

Give a reason for each stage of your working.

(Total for question = 5 marks)

Q9.



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  $x$ .

(ii) Work out the value of  $y$ .

(4)

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

(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.

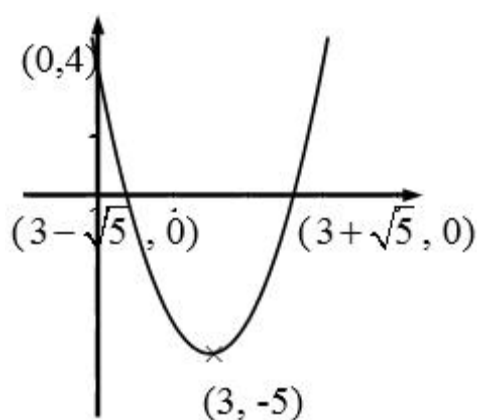
Question	Working	Answer	Mark	Notes
	$(BC^2 = ) 3.8^2 + 6.4^2 - 2 \times 3.8 \times 6.4 \cos 120^\circ$ $(= 79.72)$ $(BC^2 = ) 14.44 + 40.96 + 24.32 (= 79.72)$			M1 correct use of Cosine rule to find $BC$ Award M2 A1 for $BC = 8.9 - 8.93$ or $\sqrt{79.72}$ or $\sqrt{\frac{1993}{25}}$ oe
	$\frac{\sin C}{6.4}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





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	
					<b>Total 5 marks</b>





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
				<b>Total 2 marks</b>

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 <sup>st</sup> 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
				<b>Total 5 marks</b>



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 =  $720^\circ$  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 <b>or</b> the correct sums for the interior angles of shapes used (eg $540^\circ$ & $180^\circ$ if the line through FE to point on AB drawn or $720^\circ$ and $180^\circ$ if line drawn from E parallel to AB or $540^\circ$ & $180^\circ$ 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



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

Q8.

Q	Working	Answer	Mark	Notes
	$ADC = 180 - 58 (= 122)$ <b>or</b> $EDF = 122$ <b>or</b> $CDE = 58$ <b>or</b> $ADF = 58$			M1 may be seen marked on the diagram
	e.g. $DEF = 58 \div 2$ <b>or</b> $DEF = (180 - 122) \div 2$			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 on a straight line</u> add up to $180^\circ$ (or angles on a straight line add to $180^\circ$ ), Sum of <u>two angles</u> in a triangle are equal to <u>opposite exterior angle</u> , <u>Angles in a triangle</u> add up to $180^\circ$ (or Angles in a <u>triangle</u> add up to $180^\circ$ ), Base angles in an <u>isosceles triangle</u> <u>Angles in a quadrilateral</u> add up to 360. (accept "4-sided shape" or parallelogram) <u>Opposite angles of a parallelogram</u> are equal
				<b>Total 5 marks</b>





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 $3 \times 180$ <b>or</b> $(2 \times 5 - 4) \times 90$ or $6 \times 90$ <b>or</b> $360 + 180$ <b>or</b> $(180 - 67) + (180 - 112) +$ $(180 - "68") + (180 - 74) +$ $(180 - "39")$ <b>or</b> $113 + 68 + 112 + 106 + 141$		2	M1 Condone 1 incorrect interior angle
		540		A1 Cao <b>SC:</b> Award B1 for answer of 108
				<b>Total 6 marks</b>

Q10.

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