

Geometric Reasoning 2

Questions

Q1.

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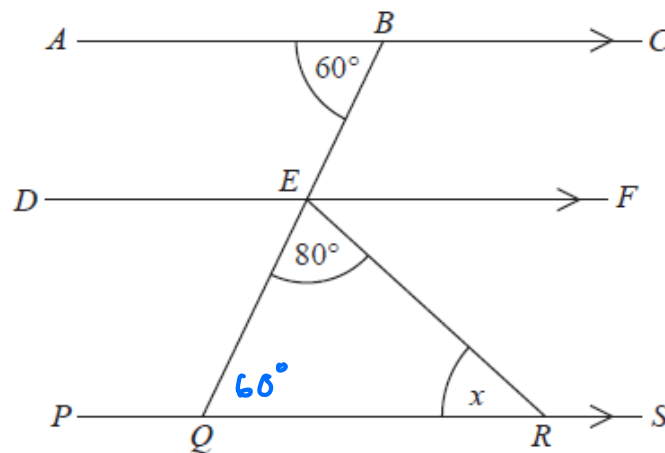


Diagram NOT
accurately drawn

$$\angle BQR = 60^\circ$$

(alternate \angle s)

$$x = 180 - 80 - 60$$

$$x = 40^\circ$$

(\angle sum of Δ)

ABC , DEF and $PQRS$ are parallel lines.
 BEQ is a straight line.

Angle $ABE = 60^\circ$
Angle $QER = 80^\circ$

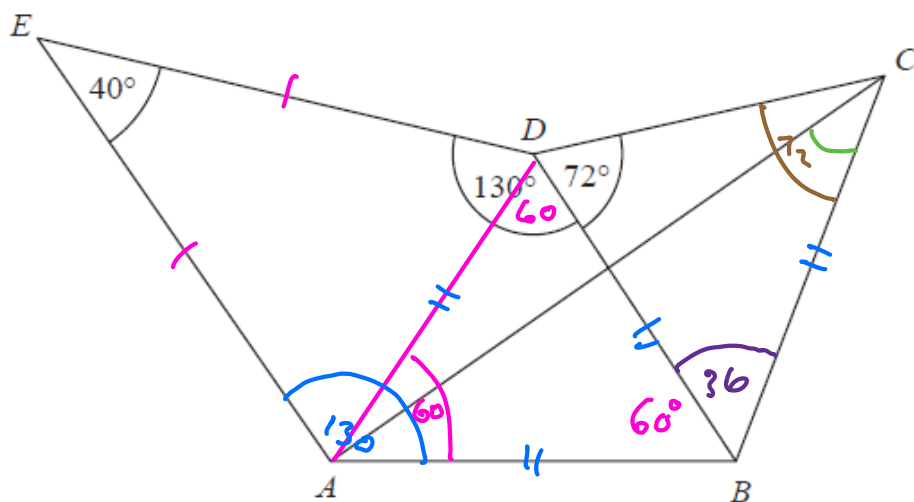
Work out the size of the angle marked x .
Give reasons for each stage of your working.

(Total for question = 4 marks)

Q2.

Here is a pentagon $ABCDE$.

Diagram NOT
accurately drawn



$AB = BC = BD$
 $ABDE$ is a kite.

Angle $AED = 40^\circ$
Angle $EDB = 130^\circ$
Angle $BDC = 72^\circ$

Work out the size of angle ACB .

$$\angle ACB = \frac{180 - 96}{2} = 42^\circ \quad (\text{base } \angle \text{ of isos } \triangle)$$

$$\angle BAE = 130^\circ$$

(opp \angle s of kite)

$$\angle ABD = 60^\circ$$

$$(360 - 130 - 130 - 40)$$

\angle sum of quadrilateral

$$\angle BAD = \angle DAB = \frac{180-60}{2} = 60^\circ$$

$\angle DCB = 72^\circ$
(base \angle of isos Δ)
 $\angle BDC = 36^\circ$ (\angle sum of Δ)

(Total for question = 3 marks)

Q3.

$ABCDEFGHI$ is a regular 9-sided polygon.

Nonagon 9 sides

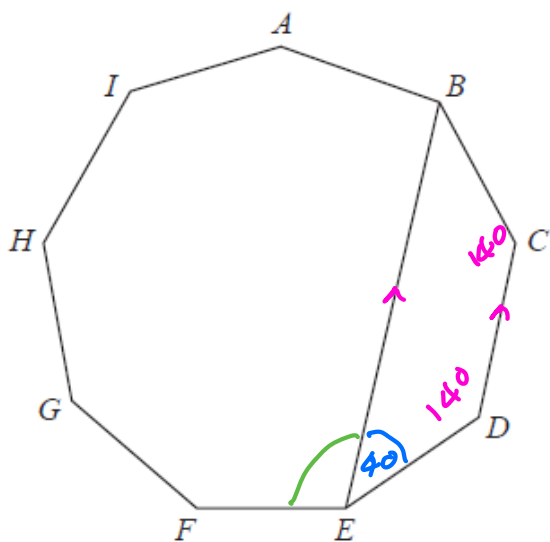


Diagram NOT accurately drawn

Interior angle

$$= 180 - \frac{360}{9} = 140^\circ$$

$$\angle CDE = 140^\circ$$

$$\angle DEB = 40^\circ \text{ (allied angles)}$$

$$\angle FEB = 140 - 40 = 100^\circ$$

The vertices B and E are joined with a straight line.

Work out the size of angle BEF .

You must show how you get your answer.

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(Total for question = 4 marks)

Q4.

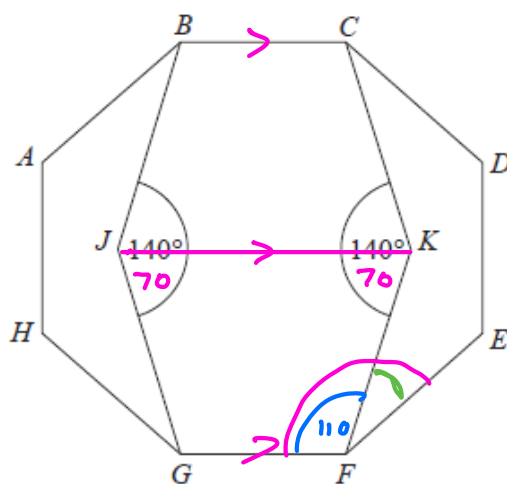


Diagram NOT accurately drawn

$$\angle JKF = 70^\circ$$

(symmetry)

$$\angle GFK = 110^\circ$$

(allied angles)

Interior angle of octagon

$$= 180 - \frac{360}{8}$$

$$= 135^\circ$$

$$\angle HFE = 135 - 110$$

$$= 25^\circ$$

$ABCDEFGH$ is a regular octagon.

$BCKFGJ$ is a hexagon.

JK is a line of symmetry of the hexagon.

Angle BJG = angle CKF = 140°

Work out the size of angle KFE .

You must show all your working.

(Total for Question is 4 marks)

Q5.

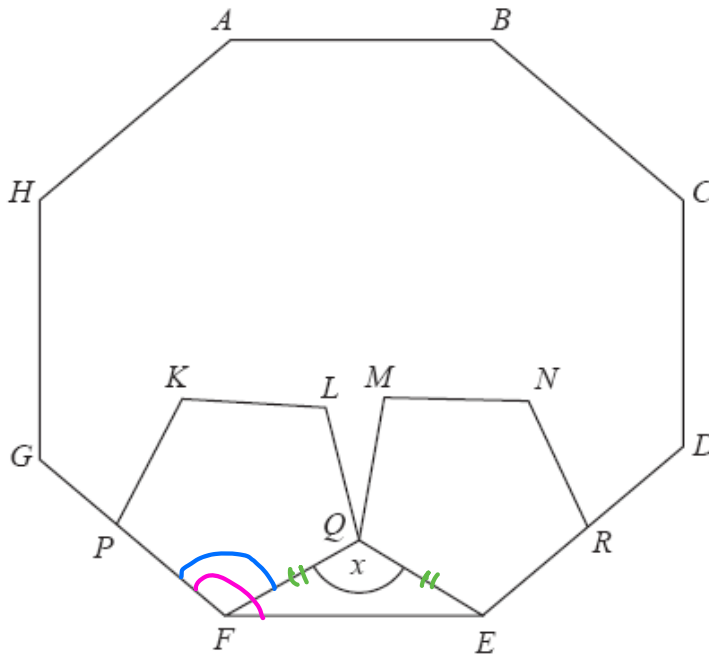


Diagram NOT
accurately drawn

$$\begin{aligned} \text{Int } \angle \text{ of pentagon} \\ &= 180 - \frac{360}{5} \\ &= 108^\circ \end{aligned}$$

$$\begin{aligned} \text{Int } \angle \text{ of octagon} \\ &= 180 - \frac{360}{8} \\ &= 135^\circ \end{aligned}$$

$$\angle QFE = 135 - 108 = 27^\circ$$

$$x = 180 - 27 - 27$$

$$\underline{x = 126^\circ} \quad (\text{isos } \triangle)$$

$ABCDEFGH$ is a regular octagon.
 $KLQFP$ and $MNREQ$ are two identical regular pentagons.

Work out the size of the angle marked x .
You must show all your working.

(Total for question = 4 marks)

Q6.

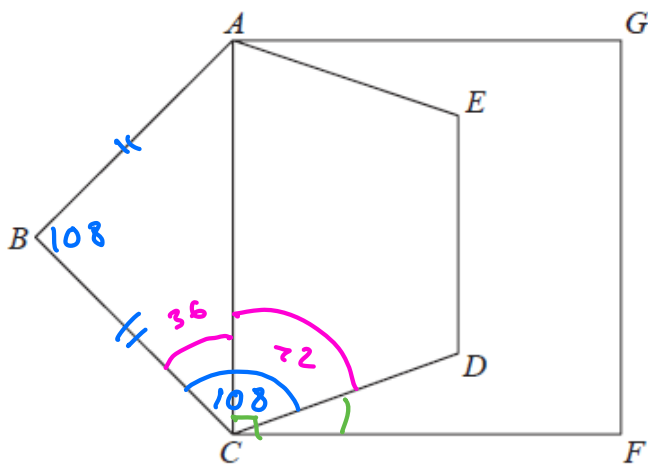


Diagram NOT
accurately drawn

$$\text{Int } \angle \text{ of pentagon} \\ = 180 - \frac{360}{5} = 108^\circ$$

$$\angle BCA = \frac{180 - 108}{2} = 36^\circ$$

(base \angle of isos Δ)

$$\angle ACD = 108 - 36 = 72^\circ$$

$$\angle DCF = 90 - 72$$

$$\angle DCF = 18^\circ$$

$ABCDE$ is a regular pentagon.
 $ACFG$ is a square.

Work out the size of angle DCF .
You must show all your working.

.....°

(Total for question = 4 marks)

Q7. The diagram shows a pattern using four identical rhombuses.

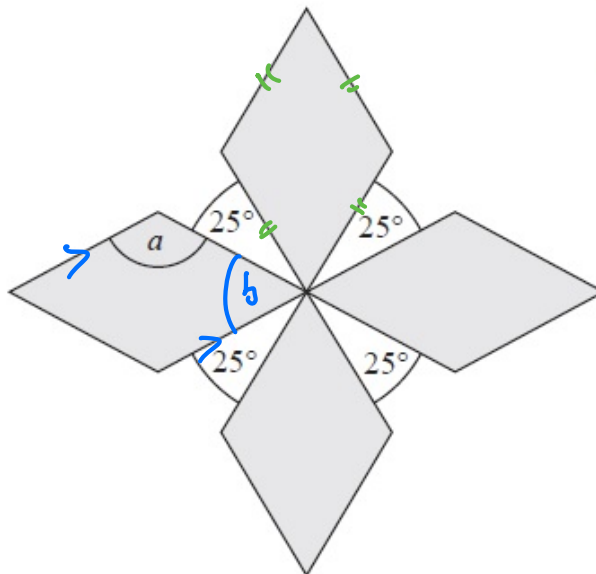


Diagram NOT
accurately drawn

$$b = \frac{360 - 100}{4}$$

$$b = 65^\circ$$

$$a = 180 - 65$$

$$a = 115^\circ$$

(allied angles)

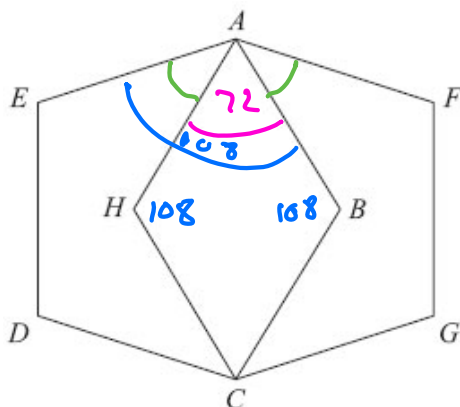
Work out the size of the angle marked a .

You must show your working.

.....°

(Total for Question is 4 marks)

Q8.



$ABCDE$ and $AFGCH$ are regular pentagons.
The two pentagons are the same size.

Work out the size of angle EAH .
You must show how you got your answer.

Diagram **NOT**
accurately drawn

$$\text{Int } \angle \text{ of pentagon} = 180 - \frac{360}{5} = 108^\circ$$

$$\angle HAB = \frac{360 - 108 - 108}{2}$$

(angle sum at quad)

$$\angle HAB = 72$$

$$\angle EAH = 108 - 72$$

$$\angle EAH = 36^\circ$$

.....°

(Total for Question is 4 marks)

Q9.

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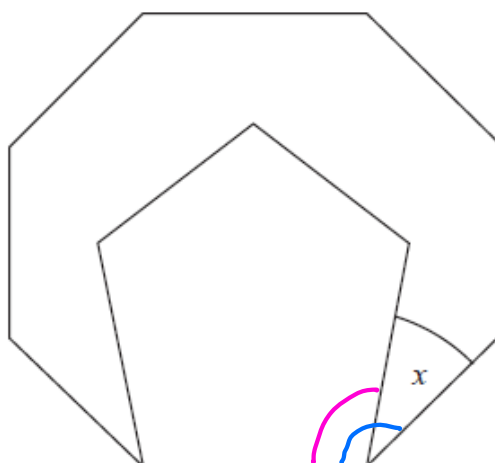


Diagram **NOT**
accurately drawn

$$\text{Interior angle of regular octagon} = 180 - \frac{360}{8} = 135^\circ$$

$$\text{Interior angle of regular pentagon} = 180 - \frac{360}{5} = 108$$

The diagram shows two regular polygons.

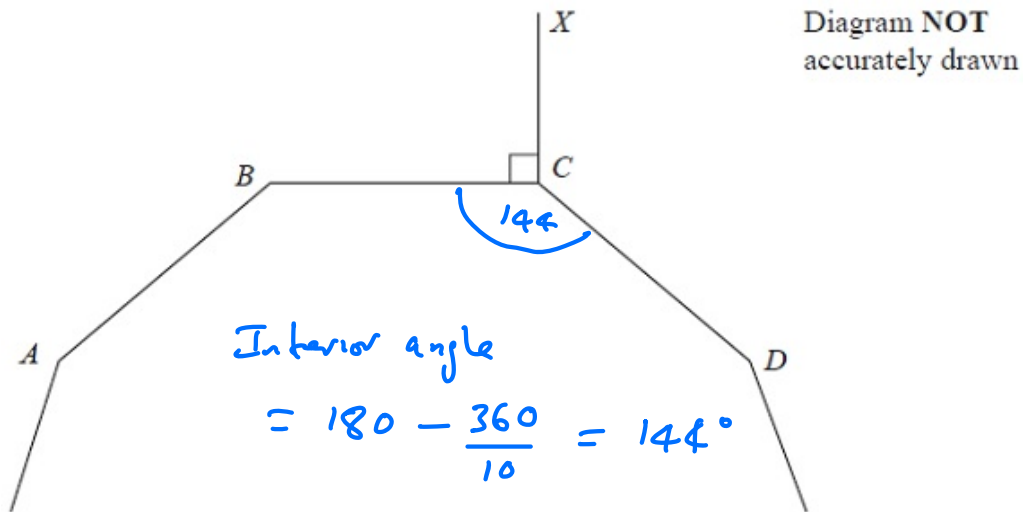
Find the size of the angle marked x .
Give reasons for your answer.

$$x = 135 - 108$$

$$x = 27^\circ$$

(Total for question = 4 marks)

Q10.



A , B , C and D are four vertices of a regular 10-sided polygon.

Angle $BCX = 90^\circ$.

$$\angle DCX = 360 - 144 - 90$$

Work out the size of angle DCX .

$$= 126^\circ$$

(Total for Question is 3 marks)

Q11.

$ABCDE$ and $PQRST$ are regular pentagons.

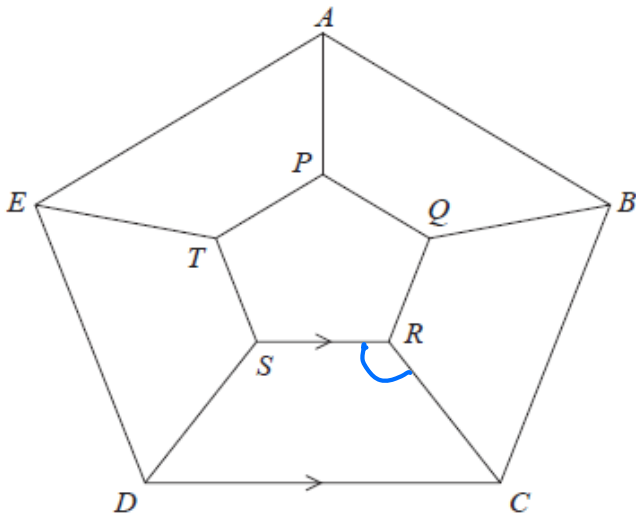


Diagram NOT
accurately drawn

$$\begin{aligned}\angle DCB &= \text{interior angle} \\ &= 180 - \frac{360}{5} = 108^\circ\end{aligned}$$

$$\angle DCR = \frac{108}{2} = 54^\circ$$

SR is parallel to DC
 $AP = BQ = CR = DS = ET$

Work out the size of angle SRC.
You must show all your working.

$$\begin{aligned}\angle SRC &= 180 - 54 = 126^\circ \\ &\text{(allied angles)}\end{aligned}$$

(Total for question = 3 marks)

Q12.

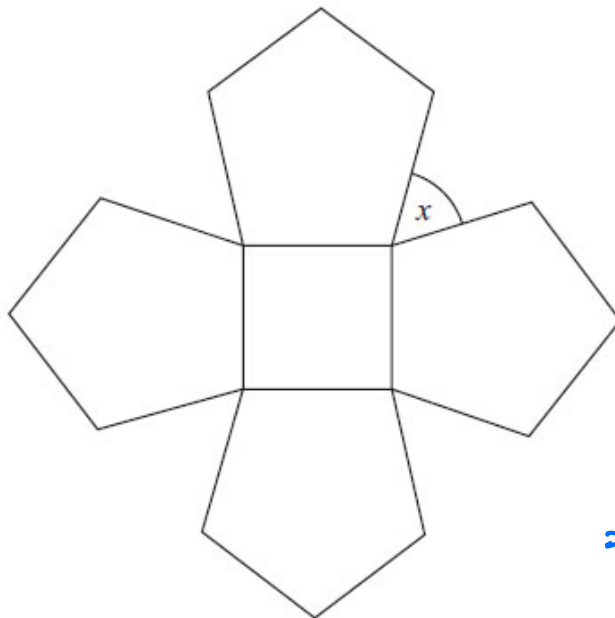


Diagram NOT
accurately drawn

$$\begin{aligned}\text{Interior angle} \\ \text{of pentagon} \\ &= 180 - \frac{360}{5} = 108^\circ\end{aligned}$$

$$x = 360 - 108 - 90 - 108$$

$$x = 54^\circ$$

The diagram shows a square and 4 regular pentagons.

Work out the size of the angle marked x.

.....°

(Total for Question is 3 marks)