

Geometric Reasoning 2

Questions

Q1.

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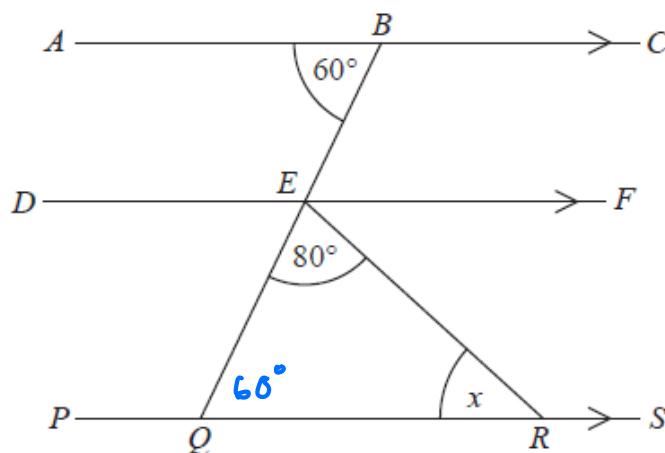


Diagram NOT
accurately drawn

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

(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 $QER = 80^\circ$

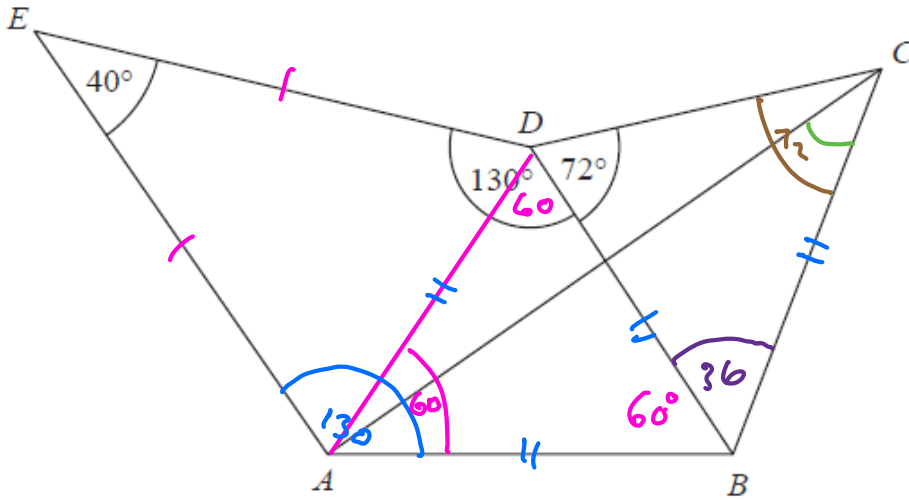
Work out the size of the angle marked x .
Give reasons for each stage of your working.

(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 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 \triangle)

$$\angle DBC = 36^\circ \quad (\angle \text{ sum of } \triangle)$$

(Total for question = 3 marks)

Q3.

$ABCDEFGHI$ is a regular 9-sided polygon.

Nonagon 9 sides

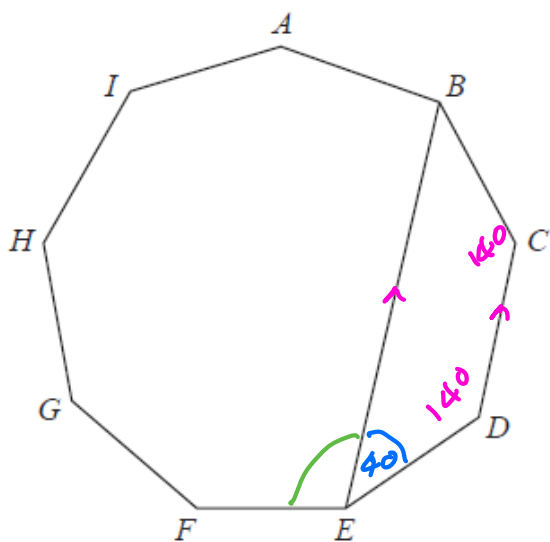


Diagram NOT accurately drawn

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

$\angle COE = 140^\circ$
 $\angle DEB = 40^\circ$ (allied \angle s)

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

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.

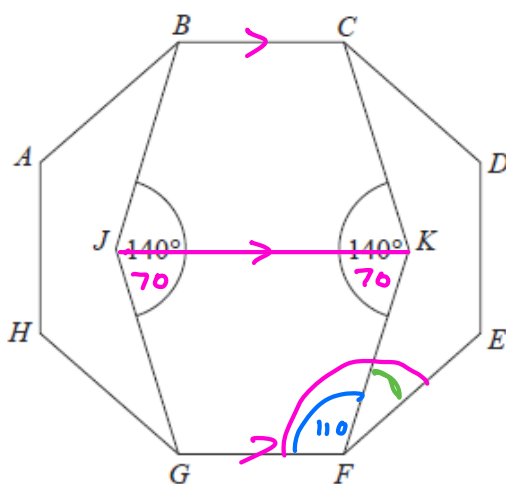


Diagram NOT accurately drawn

$\angle JFK = 70^\circ$
 (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.

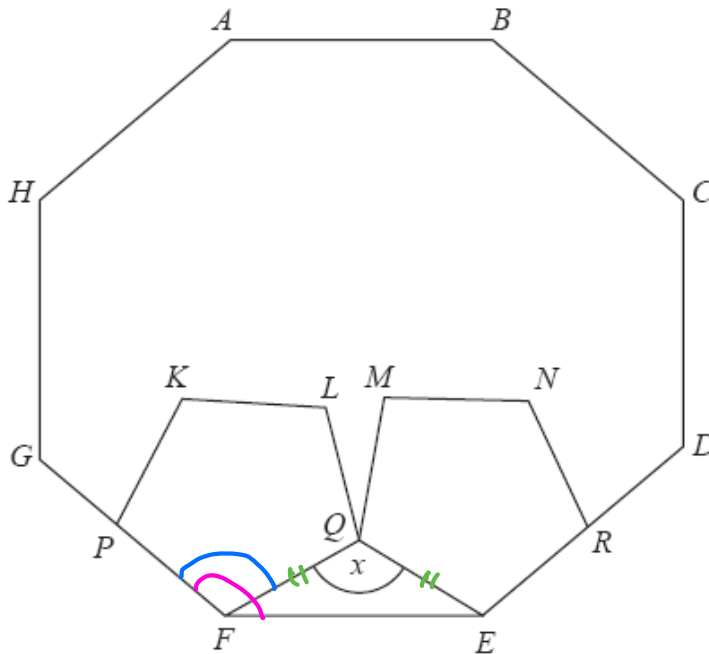


Diagram NOT accurately drawn

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

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

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

$$x = 180 - 27 - 27$$

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

ABCDEFGH is a regular octagon.
KLPQF 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.

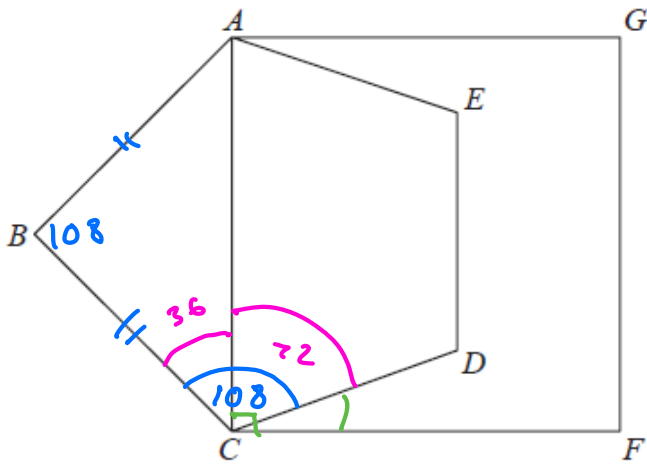


Diagram NOT accurately drawn

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

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

(base \angle of isos Δ)

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

$$\angle DCF = 90 - 72$$

$$\underline{\underline{\angle DCF = 18^\circ}}$$

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.

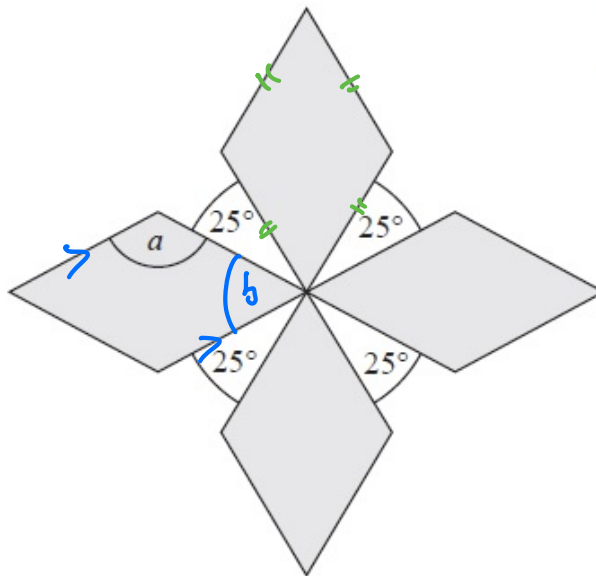


Diagram NOT accurately drawn

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

$$b = 65^\circ$$

$$a = 180 - 65$$

$$\underline{\underline{a = 115^\circ}}$$

(allied angles)

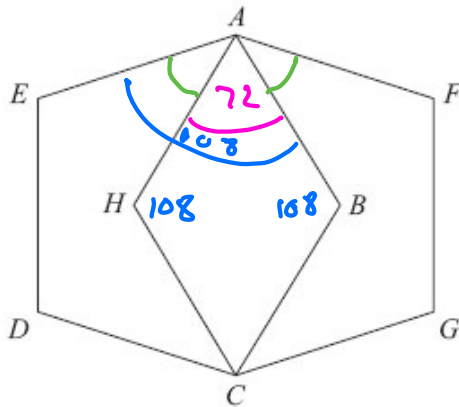
Work out the size of the angle marked a.

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

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

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

(angle sum of quad)

$$\angle HAS = 72$$

$$\angle EAH = 108 - 72$$

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

.....°

(Total for Question is 4 marks)

Q9.

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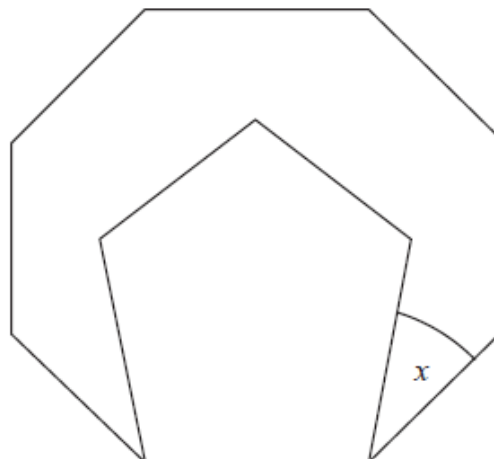


Diagram NOT accurately drawn

The diagram shows two regular polygons.

Find the size of the angle marked x .

Give reasons for your answer.

(Total for question = 4 marks)

Q10.

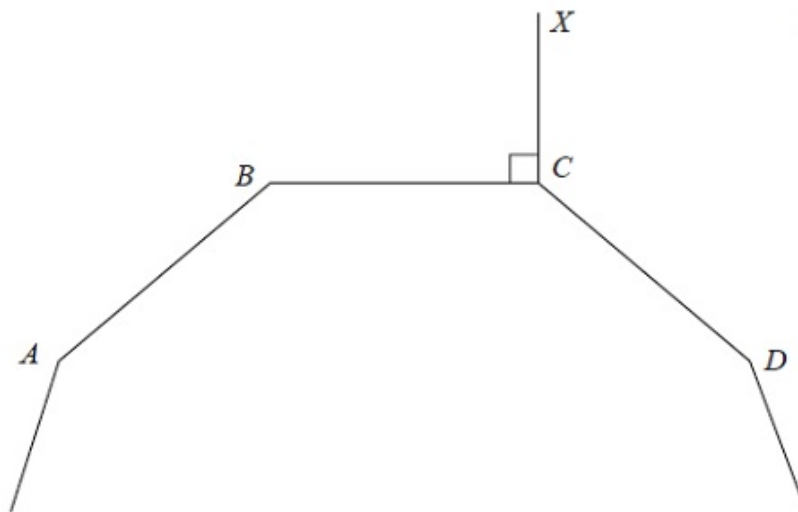


Diagram NOT accurately drawn

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

Angle $BCX = 90^\circ$.

Work out the size of angle DCX .

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(Total for Question is 3 marks)

Q11.

$ABCDE$ and $PQRST$ are regular pentagons.

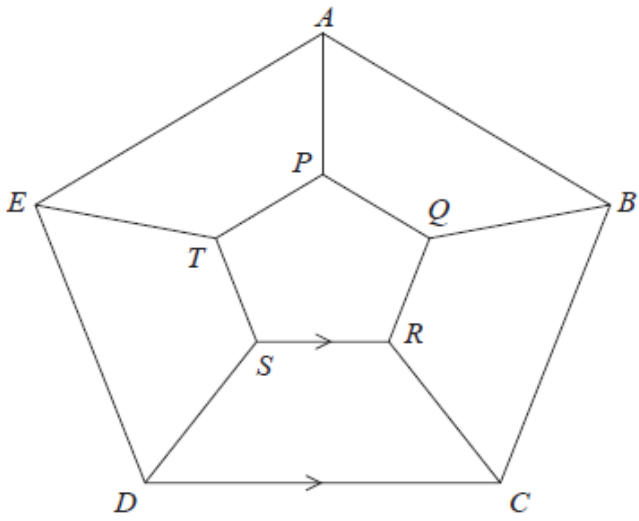


Diagram NOT accurately drawn

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

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

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(Total for question = 3 marks)

Q12.

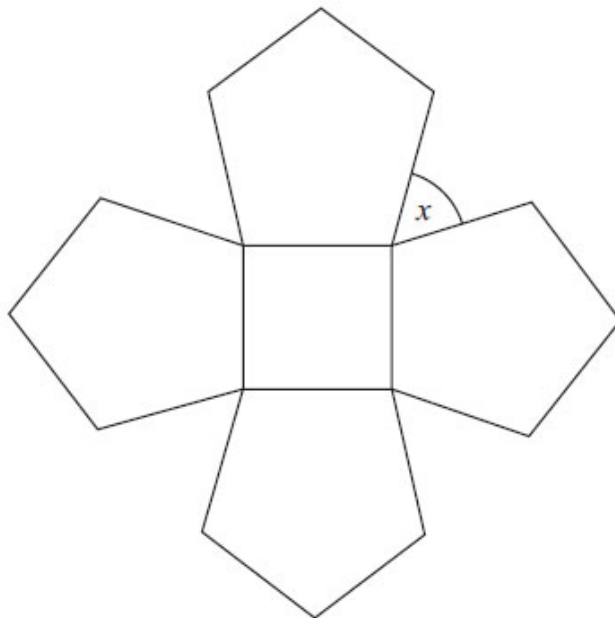


Diagram NOT accurately drawn

The diagram shows a square and 4 regular pentagons.

Work out the size of the angle marked x .

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(Total for Question is 3 marks)