

Edexcel GCSE

Mathematics (Linear) – 1MA0

ANGLES: POLYGONS

Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.
Tracing paper may be used.

Items included with question papers

Nil

SOLUTIONS



Instructions

Use black ink or ball-point pen.

Fill in the boxes at the top of this page with your name, centre number and candidate number.

Answer all questions.

Answer the questions in the spaces provided – there may be more space than you need.

Calculators may be used.

Information

The marks for each question are shown in brackets – use this as a guide as to how much time to spend on **each** question.

Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

Advice

Read each question carefully before you start to answer it.

Keep an eye on the time.

Try to answer every question.

Check your answers if you have time at the end.

1. Each exterior angle of a regular polygon is 30° .

Work out the number of sides of the polygon.

$$360 \div 30 = 12$$

.....
12

(2 marks)

2.

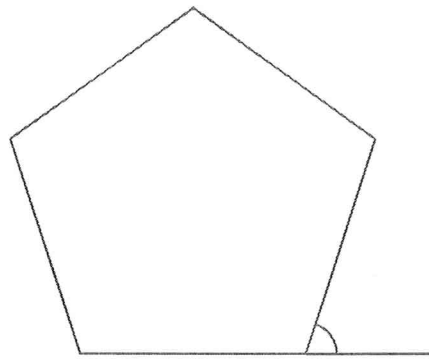


Diagram NOT
accurately drawn

Work out the size of an exterior angle of a regular pentagon.

$$360 \div 5 = 72$$

.....
72°

(2 marks)

3.

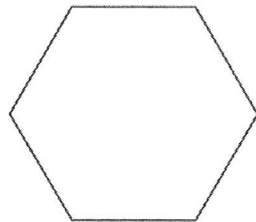


Diagram NOT
accurately drawn

Calculate the size of the exterior angle of a regular hexagon.

$$360 \div 6 = 60$$

.....
60°

(2 marks)

4. The size of each exterior angle of a regular polygon is 40° .

Work out the number of sides of the regular polygon.

$$360 \div 40 = 9$$

.....9.....

(2 marks)

5. The size of each interior angle of a regular polygon is 156° .
Work out the number of sides of the polygon.

$$180 - 156 = 24 \text{ (Exterior angle)}$$

$$360 \div 24 = 15$$

.....15.....

(3 marks)

6. Here is a regular polygon with 9 sides.

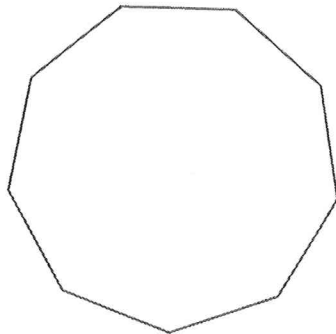


Diagram NOT accurately drawn

Work out the size of an exterior angle.

$$360 \div 9 = 40$$

.....40.....^o

(2 marks)

7.

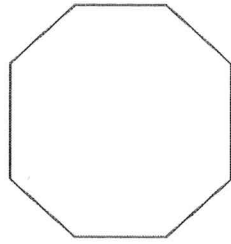


Diagram NOT accurately drawn

(a) Work out the size of each interior angle of a regular octagon.

$$\frac{180 \times (n-2)}{n} = \frac{180 \times 6}{8}$$
$$= \frac{1080}{8} = 135$$

..... 135

(3)

The size of each exterior angle of a regular polygon is 30°

(b) Work out the number of sides of the polygon.

$$360 \div 30 = 12$$

..... 12

(2)
(5 marks)

8.

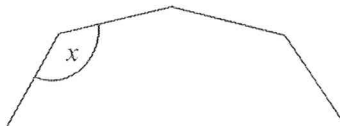


Diagram NOT accurately drawn

The diagram shows part of a **regular** 10-sided polygon.

Work out the size of the angle marked x .

$$\frac{180 \times (n-2)}{n} = \frac{180 \times 8}{10}$$
$$= \frac{1440}{10} = 144$$

..... 144°

(3 marks)

9.

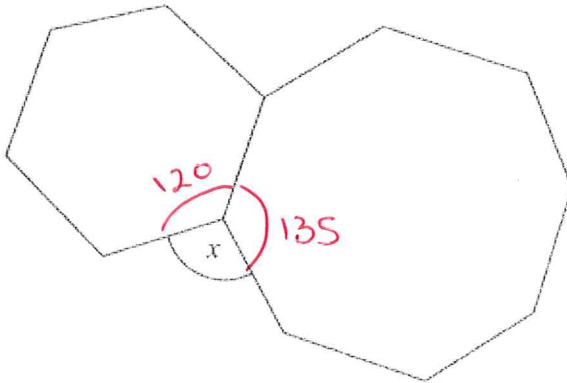


Diagram NOT
accurately drawn

The diagram shows a regular hexagon and a regular octagon.

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

$$\begin{aligned}\text{Hexagon} &= \frac{180 \times (n-2)}{n} \\ &= \frac{180 \times 4}{6} = \frac{720}{6} = 120\end{aligned}$$

$$\begin{aligned}\text{Octagon} &= \frac{180 \times (n-2)}{n} \\ &= \frac{180 \times 6}{8} = \frac{1080}{8} = 135\end{aligned}$$

$$360 - 120 - 135 = 105$$

.....
105°

(4 marks)

10.

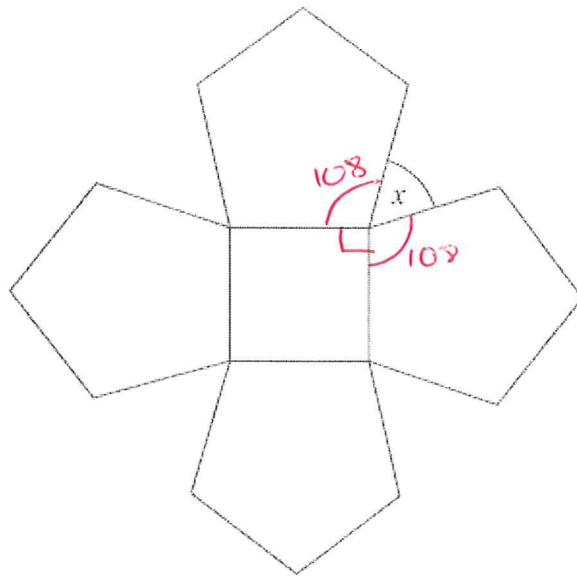


Diagram NOT
accurately drawn

The diagram shows a square and 4 regular pentagons.

Work out the size of the angle marked x .

$$\begin{aligned} \text{Pentagon} &= \frac{180 \times (n-2)}{n} \\ &= \frac{180 \times 3}{5} = \frac{540}{5} = 108 \end{aligned}$$

$$360 - 108 - 108 - 90 = 54$$

54

.....°
(4 marks)

11.

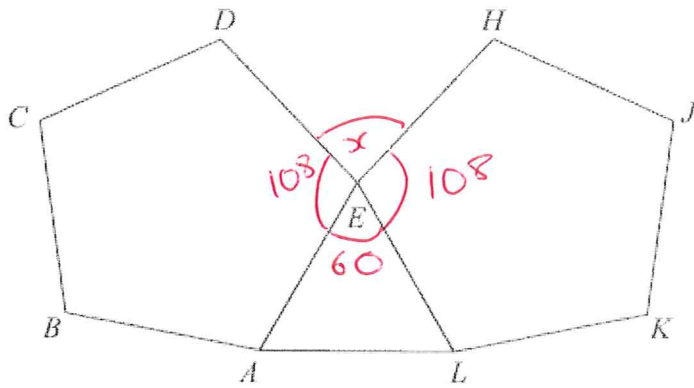


Diagram NOT accurately drawn

ABCDE and *EHJKL* are regular pentagons.
AEL is an equilateral triangle.

Work out the size of angle *DEH*.

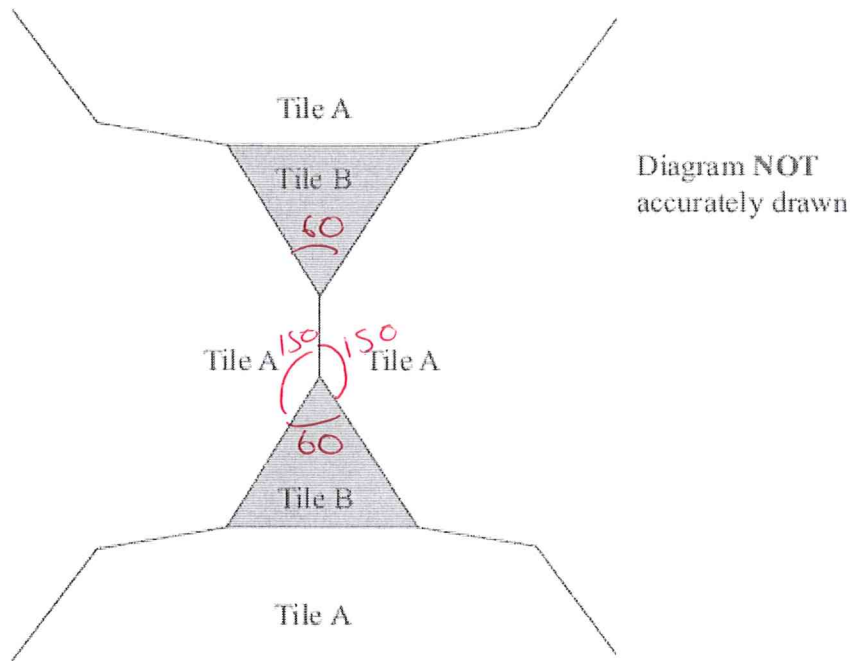
$$\begin{aligned} \text{Pentagon} &= \frac{180 \times (n-2)}{n} \\ &= \frac{180 \times 3}{5} = \frac{540}{5} = 108 \end{aligned}$$

$$360 - 108 - 108 - 60 = 84$$

84

.....°
(4 marks)

12. The diagram shows part of a pattern made from tiles.



The pattern is made from two types of tiles, tile A and tile B.

Both tile A and tile B are regular polygons.

Work out the number of sides tile A has.

Tile B = equilateral triangle (60°)

$$360 - 60 = 300$$

$$300 \div 2 = 150$$

$$180 - 150 = 30^\circ \text{ (exterior angle)}$$

$$360 \div 30 = 12$$

12

.....
(4 marks)