



4.11F Angles in Polygons: Foundation Tier Practice

EDEXCEL Edexcel 1MA1 · Calculator allowed · about 50 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Work out the interior angle of a regular hexagon.

(Total for Question 1 is 1 mark)

- 2** Find the sum of the interior angles of a pentagon.

(Total for Question 2 is 2 marks)

- 3** A regular octagon has exterior angles all equal. Work out the size of one exterior angle.

(Total for Question 3 is 2 marks)

- 4** One interior angle of a regular polygon is 140 degrees. Work out the exterior angle and then find the number of sides of the polygon.

(a) Work out the size of the exterior angle. (1)

(b) Find the number of sides of the polygon. (1)

(Total for Question 4 is 2 marks)

- 5 A regular polygon has 12 sides. Work out an interior angle of this polygon.

(Total for Question 5 is 3 marks)

- 6 The angles in a quadrilateral ABCD are in the ratio 2:3:4:5. Work out the size of the largest angle. Give your answer to 1 decimal place.

(Total for Question 6 is 3 marks)

- 7 A regular polygon has interior angle 165 degrees. Find the number of sides of the polygon.

(Total for Question 7 is 4 marks)

8 In the regular polygon shown, each exterior angle is 30 degrees. Use this information to find:

a) the number of sides of the polygon,

b) the size of each interior angle.

(Work clearly and show your steps.)

(a) Find the number of sides. (2)

(b) Find the size of each interior angle. (3)

(Total for Question 8 is 5 marks)

9 The regular polygon below has n sides. The size of each interior angle is 156 degrees. Find n . Show your method clearly.

(a) Find the exterior angle. (2)

(b) Write an equation to find n using the exterior angle, then find n . (3)

(c) Find the interior angle you would get if the polygon had one fewer side. Show your calculation and give the size. (3)

(Total for Question 9 is 8 marks)

10 A classroom display shows three regular polygons side by side: a regular decagon (10 sides), a regular heptagon (7 sides) and a regular 18-sided polygon. Use the display to answer the parts below.

(a) Work out the interior angle of the regular decagon. (2)

(b) Work out the interior angle of the regular heptagon (7 sides). Give your answer to 1 decimal place. (3)

(c) The class teacher asks the students to find the difference between the interior angles of the 18-sided polygon and the heptagon. Find this difference and give the answer to 1 decimal place. (5)

(Total for Question 10 is 10 marks)

Mark scheme · 4.11F Angles in Polygons: Foundation Tier Practice

Question 1

- **B1** 120 degrees cao
- **Answer: 120 degrees**

Question 2

- **M1** use formula $(n - 2) \times 180$ with $n = 5$
- **A1** 540 degrees cao
- **Answer: 540 degrees**

Question 3

- **M1** recognise sum of exterior angles = 360 or use $360/8$
- **A1** 45 degrees cao
- **Answer: 45 degrees**

Question 4

- (a) **B1** 40 degrees cao
- (a) **Answer: 40 degrees**
- (b) **A1** 9 sides cao
- (b) **Answer: 9 sides**

Question 5

- **M1** use formula interior = $180 - 360/n$ or $(n-2) \times 180/n$ with $n = 12$
- **A1** 150 degrees cao
- **B1** final answer given clearly as 150 degrees
- **Answer: 150 degrees**

Question 6

- **M1** sum of angles in quadrilateral = 360, set up $2x+3x+4x+5x = 360$
- **M1** solve for x : $14x = 360$, so $x = 360/14 = 25.71...$ (awrt 25.7)
- **A1** 128.6 degrees awrt (1 dp); exact value $900/7$ degrees
- **Answer: 128.6 degrees (awrt to 1 dp)**

Question 7

- **M1** find exterior = $180 - 165 = 15$ degrees
- **M1** use $n = 360 / \text{exterior} = 360 / 15$
- **A1** 24 cao
- **B1** state answer as 24 sides
- **Answer: 24 sides**

Question 8

- (a) **M1** use $n = 360 / \text{exterior} = 360 / 30$
- (a) **A1** 12 cao
- (a) **Answer: 12 sides**
- (b) **M1** interior = $180 - \text{exterior} = 180 - 30$
- (b) **M1** compute interior = 150
- (b) **A1** 150 degrees cao
- (b) **Answer: 150 degrees**

Question 9

- (a) **M1** exterior = $180 - \text{interior}$
- (a) **A1** 24 degrees cao
- **(a) Answer: 24 degrees**
- (b) **M1** use $n = 360 / \text{exterior}$ or set up $360 = n \times \text{exterior}$
- (b) **M1** substitute exterior = 24 to form $360 = n \times 24$
- (b) **A1** 15 cao
- **(b) Answer: 15 sides**
- (c) **M1** find exterior for n-1: exterior = $360 / 14 = 25.714...$ or recognise change
- (c) **M1** compute interior = $180 - 360/14 = 180 - 25.714... = 154.2857...$
- (c) **A1** 154.2857 degrees awrt (154.29 degrees to 2 dp)
- **(c) Answer: Approximately 154.29 degrees (154.2857... degrees)**

Question 10

- (a) **M1** use interior = $180 - 360/n$ with $n = 10$ or $(n-2) \times 180/n$
- (a) **A1** 144 degrees cao
- **(a) Answer: 144 degrees**
- (b) **M1** use interior = $180 - 360/7$
- (b) **M1** compute $360/7 = 51.428571...$ and interior = $128.571428...$
- (b) **A1** 128.6 degrees awrt (1 dp)
- **(b) Answer: 128.6 degrees**
- (c) **M1** find interior of 18-sided polygon: interior = $180 - 360/18 = 180 - 20 = 160$
- (c) **M1** find interior of heptagon from part (b) 128.571428... (use ft)
- (c) **M1** compute difference $160 - 128.571428... = 31.428571...$
- (c) **M1** round to required 1 dp
- (c) **A1** 31.4 degrees awrt (1 dp)
- **(c) Answer: 31.4 degrees**