4.11 Angles in Polygons: 1-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

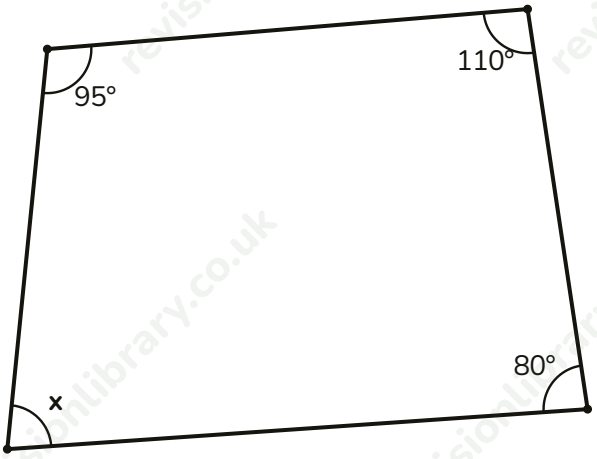
Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 The diagram shows a quadrilateral with angles 95 degrees, 110 degrees, 80 degrees and x. Work out the size of angle x.

Diagram NOT accurately drawn



(Total for Question 1 is 2 marks)

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

(Total for Question 2 is 2 marks)

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3 A regular polygon has 5 sides. Work out the size of one interior angle.

(Total for Question 3 is 3 marks)

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4 Work out the sum of the interior angles of a hexagon (6 sides).

(Total for Question 4 is 2 marks)

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5 The interior angles of a pentagon are, in degrees, (x + 17), (2x + 29), (3x - 13), (3x + 13), (2x - 45).
Work out the value of x.

(Total for Question 5 is 3 marks)

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6 One interior angle of a regular polygon is 135 degrees.
Work out the number of sides of the polygon.

(Total for Question 6 is 3 marks)

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7 The interior angles of a pentagon are, in degrees, (2x - 2), (x + 13), (2x + 20), (2x + 13), (3x + 36).
Work out the value of x.

(Total for Question 7 is 3 marks)

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8 The exterior angle of a regular polygon is 15 degrees.
Work out the number of sides of the polygon.

(Total for Question 8 is 2 marks)

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9 A regular polygon has each interior angle equal to 162 degrees.

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

.....

(b) Hence work out the number of sides of the polygon. **(2)**

.....

(Total for Question 9 is 3 marks)

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10 In a quadrilateral, three of the angles measure 97 degrees, 112 degrees and 94 degrees.
Work out the size of the fourth angle.

(Total for Question 10 is 2 marks)

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11 A polygon has 13 sides.
Calculate the sum of its interior angles.

(Total for Question 11 is 2 marks)

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12 A polygon has 11 sides.
Calculate the sum of its interior angles.

(Total for Question 12 is 2 marks)

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13 A polygon has 14 sides.
Calculate the sum of its interior angles.

(Total for Question 13 is 2 marks)

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14 One interior angle of a regular polygon is 140 degrees.

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

.....

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

.....

(Total for Question 14 is 2 marks)

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

(Total for Question 15 is 4 marks)

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16 Polygon A is a regular polygon with n sides. Polygon B is a regular polygon with (n + 3) sides.
The exterior angle of polygon A is twice the exterior angle of polygon B.
Work out the value of n.

(Total for Question 16 is 5 marks)

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17 Nadia says: 'A regular polygon can have an interior angle of exactly 173 degrees.'
Show, using calculations, that Nadia is wrong.

(Total for Question 17 is 3 marks)

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Mark scheme · 4.11 Angles in Polygons: 1-hour Pack

Question 1

360 - 95 - 110 - 80 oe	**M1**
x = 75 cao	**A1**

Answer: x = 75 degrees

Question 2

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

Answer: 45 degrees

Question 3

exterior angle 360 / 5 = 72	**M1**
180 - 72	**M1**
108 degrees	**A1**

Answer: 108 degrees

Question 4

(6 - 2) x 180	**M1**
720 degrees	**A1**

Answer: 720 degrees

Question 5

sum of angles = 540	**M1**
11x + 1 = 540	**M1**
x = 49	**A1**

Answer: x = 49

Question 6

exterior angle = 180 - 135 = 45	**M1**
360 / 45	**M1**
8	**A1**

Answer: 8

Question 7

sum of angles = 540	**M1**
10x + 80 = 540	**M1**
x = 46	**A1**

Answer: x = 46

Question 8

360 / 15	**M1**
24 cao	**A1**

Answer: 24 sides

Question 9

(a) 18 (degrees) cao	**B1**

(a) Answer: 18 degrees

(b) 360 / their 18	**M1**
(b) 20 cao	**A1**

(b) Answer: 20 sides

Question 10

97 + 112 + 94 (= 303) soi	**M1**
57 (degrees) cao	**A1**

Answer: 57 degrees

Question 11

(13 - 2) * 180 oe	**M1**
1980 (degrees) cao	**A1**

Answer: 1980 degrees

Question 12

(11 - 2) * 180 oe	**M1**
1620 (degrees) cao	**A1**

Answer: 1620 degrees

Question 13

(14 - 2) * 180 oe	**M1**
2160 (degrees) cao	**A1**

Answer: 2160 degrees

Question 14

(a) 40 degrees cao	**B1**

(a) Answer: 40 degrees

(b) 9 sides cao	**A1**

(b) Answer: 9 sides

Question 15

find exterior = 180 - 165 = 15 degrees	**M1**
use n = 360 / exterior = 360 / 15	**M1**
24 cao	**A1**
state answer as 24 sides	**B1**

Answer: 24 sides

Question 16

exterior angle of A = 360/n and exterior angle of B = 360/(n + 3)	**M1**
360/n = 2 x 360/(n + 3) oe	**M1**
360(n + 3) = 720n oe leading to 360n + 1080 = 720n	**M1**
1080 = 360n	**M1**
n = 3 cao	**A1**

Answer: n = 3

Question 17

180 - 173 (= 7) to find the exterior angle oe	**M1**
360 / their 7 (dependent on the previous method mark)	**M1**
awrt 51.4, which is not a whole number, with a conclusion that a regular polygon cannot have an interior angle of exactly 173 degrees	**A1**

Answer: 360 / 7 = awrt 51.4, which is not a whole number, so Nadia is wrong.

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