4.10 Angles in Polygons: Test Pack

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A regular hexagon has all sides and angles equal. Write down the size of one interior angle of a regular hexagon.

(1)

2 A regular triangle is equilateral. A student says one exterior angle is 100 degrees. Explain why this statement is incorrect and give the correct exterior angle size.

(2)

3 The angles in a quadrilateral are in the ratio 3:4:5:6. Find the size, in degrees, of the largest angle.

(3)

4 A teacher draws a regular polygon on the board. The sum of its interior angles is 2340 degrees. How many sides does the polygon have?

(3)

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5 Stretch question. The interior angles of a convex polygon are in arithmetic progression. The smallest angle is 100 degrees and the largest is 170 degrees. There are 8 sides. Find the common difference of the progression and write down all eight interior angles.

(3)

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6 A regular octagon has 8 equal exterior angles. Work out the size of one exterior angle.

(2)

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7 Work out the size of one interior angle of a regular pentagon.

(3)

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8 Three angles of a quadrilateral are 71°, 118° and 42°. Work out the fourth angle.

(2)

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9 Work out the sum of the interior angles of a nonagon.

(2)

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10 Each exterior angle of a regular polygon is 15°. How many sides does the polygon have?

(2)

11 Each interior angle of a regular polygon is 120°. Work out the number of sides of the polygon.

(3)

12 6 of the interior angles of a heptagon are 158°, 102°, 128°, 145°, 121°, 122°. Is it possible for the last angle to be 144°? Give a reason.

(3)

13 The angles of a triangle are x°, x° and 2x°. Work out the value of x and the size of the largest angle.

(4)

14 A regular polygon has 20 sides. Calculate the size of one interior angle.

(2)

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15 The angles in a pentagon are in the ratio 4:5:6:7:8. Find the size, in degrees, of the largest angle.

(3)

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16 A regular polygon is joined to its centre to form isosceles triangles. Each triangle has a vertex angle of 18 degrees at the centre.

(a) Work out how many sides the polygon has. **(1)**

.....

(b) Each isosceles triangle has two equal base angles. Work out the size of one base angle. **(2)**

.....

(c) Hence state the size of one interior angle of the polygon. **(1)**

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17 Find the exterior angle of a regular nonagon (9 sides).

(1)

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18 Calculate the exterior angle of a regular dodecagon (12 sides).

(1)

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19 A regular polygon has each interior angle equal to 140 degrees. Find the number of sides of the polygon.

(2)

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Mark scheme · 4.10 Angles in Polygons: Test Pack

Question 1

120 degrees cao	B1

Answer: **120 degrees**

Question 2

explain that interior of equilateral is 60 so exterior = 180 - 60 = 120, not 100: identification of error using exterior = 180 - interior	M1
correct exterior angle is 120 degrees cao (award for clear correction)	A1

Answer: **Exterior angle = 120 degrees**

Question 3

let common multiplier = k, sum = (3+4+5+6)k = 18k and set = 360	M1
find k = 360/18 = 20	M1
largest angle = 6k = 120 degrees cao	A1

Answer: **120 degrees**

Question 4

use sum formula (n-2)*180 = 2340	M1
rearrange: n-2 = 2340/180 = 13	M1
n = 15 cao	A1

Answer: **15**

Question 5

recognise arithmetic progression with first a = 100, last a + 7d = 170 so 7d = 70	M1
compute d = 70/7 = 10 degrees	M1
angles: 100, 110, 120, 130, 140, 150, 160, 170 cao	A1

Answer: **common difference = 10 degrees; angles = 100, 110, 120, 130, 140, 150, 160, 170**

Question 6

360 ÷ 8	M1
45° cao	A1

Answer: **45°**

Question 7

360 ÷ 5 = 72 (exterior) or 540 ÷ 5	M1
180 - 72 or 540 ÷ 5	M1
108° cao	A1

Answer: **108°**

Question 8

360 - 71 - 118 - 42 or 360 - 231	M1
129° cao	A1

Answer: **129°**

Question 9

(9 - 2) x 180 or 7 triangles	M1
1260° cao	A1

Answer: **1260°**

Question 10

360 ÷ 15	M1
24 cao	A1

Answer: **24**

Question 11

exterior angle 180 - 120 = 60	M1
360 ÷ 60	M1
6 cao	A1

Answer: **6**

Question 12

(7 - 2) x 180 = 900	M1
900 - 776 = 124	M1
No, as the last angle must be 124°	B1

Answer: **No**

Question 13

4x = 180	M1
x = 45	A1
substitutes to find the largest angle	M1
90° cao	A1

Answer: **x = 45, largest angle 90°**

Question 14

find the sum of interior angles (20-2) x 180 = 3240	M1
162 cao	A1

Answer: **162 degrees**

Question 15

use the pentagon angle sum of 540 degrees	M1
divide 540 by the total number of parts, 4+5+6+7+8=30, to get 18 per part	M1
144 cao	A1

Answer: **144 degrees**

Question 16

(a) 20 cao	B1

(a) Answer: **20**

(b) 180 - 18 = 162, then divide by 2	M1
(b) 81 cao	A1

(b) Answer: **81 degrees**

(c) 162 cao	B1

(c) Answer: **162 degrees**

Question 17

40 cao	B1

Answer: **40 degrees**

Question 18

30 cao	B1

Answer: **30 degrees**

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Question 19

find exterior angle 180 - 140 = 40 **M1**

9 cao **A1**

Answer: **9**

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