4.10 Angles in Polygons: 1-hour Pack

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Stretch question. A regular polygon is joined to its centre to form isosceles triangles. If each triangle has a vertex angle of 20 degrees at the centre, how many sides does the polygon have and what is each base angle of the isosceles triangle?

(3)

2 Each exterior angle of a regular polygon is 60°. How many sides does the polygon have?

(2)

3 Three angles of a quadrilateral are 111°, 99° and 82°. Work out the fourth angle.

(2)

4 4 of the interior angles of a pentagon are 141°, 106°, 90°, 111°. Is it possible for the last angle to be 112°? Give a reason.

(3)

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5 Work out the size of one interior angle of a regular hexagon.

(3)

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6 Three angles of a quadrilateral are 101°, 98° and 56°. Work out the fourth angle.

(2)

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

(2)

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8 Work out the sum of the interior angles for each polygon.

(a) Triangle **(1)**

.....

(b) Quadrilateral **(1)**

.....

(c) Heptagon **(1)**

.....

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9 Three angles of a quadrilateral are 67°, 97° and 89°. Work out the fourth angle.

(2)

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10 Three angles of a quadrilateral are 119°, 97° and 66°. Work out the fourth angle and say whether the quadrilateral could be a parallelogram.

(3)

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11 The angles of a quadrilateral are x°, (x + 20)°, 2x° and (2x + 10)°. Work out the value of x.

(3)

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12 Three angles of a quadrilateral are 116°, 82° and 55°. Work out the fourth angle.

(2)

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13 Two angles on a straight line are (3x + 10)° and (2x - 20)°. Work out the value of x.

(3)

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14 Each interior angle of a regular polygon is 165°. Work out the number of sides of the polygon.

(3)

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15 Three angles of a quadrilateral are 58°, 86° and 87°. Work out the fourth angle.

(2)

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16 Work out the size of one interior angle of a regular heptagon.

(3)

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17 Calculate the exterior angle of a regular decagon.

(2)

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18 The interior angles of a quadrilateral add to 360 degrees. Two of the angles are equal and the other two are 95 degrees and 85 degrees. Find the size of each of the equal angles.

(2)

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19 Write down the sum of the interior angles of a triangle.

(1)

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Mark scheme · 4.10 Angles in Polygons: 1-hour Pack

Question 1

use central angle = 360/n so n = 360/20	M1
compute n = 18	M1
base angles = (180 - 20)/2 = 80 degrees each cao	A1

Answer: **18; 80 degrees**

Question 2

360 ÷ 60	M1
6 cao	A1

Answer: **6**

Question 3

360 - 111 - 99 - 82 or 360 - 292	M1
68° cao	A1

Answer: **68°**

Question 4

(5 - 2) x 180 = 540	M1
540 - 448 = 92	M1
No, as the last angle must be 92°	B1

Answer: **No**

Question 5

360 ÷ 6 = 60 (exterior) or 720 ÷ 6	M1
180 - 60 or 720 ÷ 6	M1
120° cao	A1

Answer: **120°**

Question 6

360 - 101 - 98 - 56 or 360 - 255	M1
105° cao	A1

Answer: **105°**

Question 7

360 ÷ 10	M1
36 cao	A1

Answer: **36**

Question 8

(a) 180 degrees cao	B1

(a) Answer: **180 degrees**

(b) 360 degrees cao	B1

(b) Answer: **360 degrees**

(c) 900 degrees cao	B1

(c) Answer: **900 degrees**

Question 9

360 - 67 - 97 - 89 or 360 - 253	M1
107° cao	A1

Answer: **107°**

Question 10

360 - 282	M1
78°	A1
parallelogram needs opposite angles equal; check pairs	B1

Answer: **78°; it cannot be a parallelogram**

Question 11

x + x + 20 + 2x + 2x + 10 = 360	M1
6x + 30 = 360 or equivalent	M1
x = 55 cao	A1

Answer: **x = 55**

Question 12

360 - 116 - 82 - 55 or 360 - 253	M1
107° cao	A1

Answer: **107°**

Question 13

3x + 10 + 2x - 20 = 180	M1
5x = 190 or equivalent	M1
x = 38 cao	A1

Answer: **x = 38**

Question 14

exterior angle 180 - 165 = 15	M1
360 ÷ 15	M1
24 cao	A1

Answer: **24**

Question 15

360 - 58 - 86 - 87 or 360 - 231	M1
129° cao	A1

Answer: **129°**

Question 16

360 ÷ 7 = 360/7 (exterior) or 900 ÷ 7	M1
180 - 360/7 or 900 ÷ 7	M1
900/7° cao	A1

Answer: **900/7°**

Question 17

use 360/n = 360/10 or compute interior then 180-interior	M1
36 degrees cao	A1

Answer: **36 degrees**

Question 18

compute remaining sum: 360 - (95 + 85) = 180	M1
each equal angle = 90 degrees cao	A1

Answer: **90 degrees**

Question 19

180 cao	B1

Answer: **180 degrees**

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