Year 8 Angles and Constructions – Mixed Practice

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Answers and worked solutions · 30 questions

A. Mixed practice (mixed order)

1. **x = 89°**

The exterior angle equals the sum of the two interior opposite angles

x = 53 + 36 = 89°

2. **10 sides, 10 lines of symmetry, order 10 (regular decagon)**

For a regular polygon these three numbers are always equal

n = 10

3. **y = 62°**

Exterior angle = sum of the interior opposite angles

116 = 54 + y

y = 62°

4. **9 sides, 9 lines of symmetry, order 9 (regular nonagon)**

For a regular polygon these three numbers are always equal

n = 9

5. **y = 50°**

Exterior angle = sum of the interior opposite angles

134 = 84 + y

y = 50°

6. **12 sides, 12 lines of symmetry, order 12 (regular dodecagon)**

For a regular polygon these three numbers are always equal

n = 12

7. **x = 19 (angles on a straight line add up to 180°)**

Angles on a straight line add up to 180°: 4x − 26 + 130 = 180

4x = 76

x = 19

8. **y = 65°**

Exterior angle = sum of the interior opposite angles

114 = 49 + y

y = 65°

9. **4 sides, 4 lines of symmetry, order 4 (square)**

For a regular polygon these three numbers are always equal

n = 4

10. **x = 12 (corresponding angles are equal)**

Corresponding angles are equal: 3x + 9 = 45

3x = 36

x = 12

11. x = 31°; the angles are 31° and 62°

Exterior angle = sum of interior opposite angles: x + 2x = 93
3x = 93, x = 31
The angles are 31° and 62°

12. x = 13 (angles on a straight line add up to 180°)

Angles on a straight line add up to 180°: 5x – 20 + 135 = 180
5x = 65
x = 13

13. 8 sides, 8 lines of symmetry, order 8 (regular octagon)

For a regular polygon these three numbers are always equal
n = 8

14. x = 117°

The exterior angle equals the sum of the two interior opposite angles
x = 69 + 48 = 117°

15. Yes. For a regular polygon the number of sides equals the number of lines of symmetry.

Think about the properties
For a regular polygon the number of sides equals the number of lines of symmetry.
Decide

16. 6 sides, 6 lines of symmetry, order 6 (regular hexagon)

For a regular polygon these three numbers are always equal
n = 6

17. The exterior angle equals the sum of both interior opposite angles: 38 + 44 = 82°.

Error: only one of the opposite angles was used
Exterior angle = A + C
= 82°

18. x = 37°; the angles are 37° and 111°

Exterior angle = sum of interior opposite angles: x + 3x = 148
4x = 148, x = 37
The angles are 37° and 111°

19. 33° each

Arc from the vertex across both arms; equal arcs from those points; join the vertex to where they cross
66 ÷ 2 = 33°

20. x = 24 (angles on a straight line add up to 180°)

Angles on a straight line add up to 180°: 2x – 3 + 135 = 180
2x = 48
x = 24

21. x = 129°

The exterior angle equals the sum of the two interior opposite angles
x = 67 + 62 = 129°

22. No. Counter-example: angles 120°, 30° and 30° give an exterior angle of 60° at one corner.

Think about the properties
Counter-example: angles 120°, 30° and 30° give an exterior angle of 60° at one corner.
Decide

23. x = 25°; the angles are 25° and 75°

Exterior angle = sum of interior opposite angles: x + 3x = 100
4x = 100, x = 25
The angles are 25° and 75°

24. x = 17 (angles on a straight line add up to 180°)

Angles on a straight line add up to 180°: 4x + 47 + 65 = 180
4x = 68
x = 17

25. 3 sides, 3 lines of symmetry, order 3 (equilateral triangle)

For a regular polygon these three numbers are always equal
n = 3

26. x = 75°

The exterior angle equals the sum of the two interior opposite angles
x = 33 + 42 = 75°

27. Yes. A rectangle has two pairs of parallel sides, so it is a special parallelogram.

Think about the properties
A rectangle has two pairs of parallel sides, so it is a special parallelogram.
Decide

28. 4.85 cm from P; 90°

Arcs (radius more than half PQ) from P and Q cross on both sides; join the crossing points
The bisector meets PQ at its midpoint, 4.85 cm from P, at 90°

29. The exterior angle equals the sum of both interior opposite angles: 69 + 68 = 137°.

Error: only one of the opposite angles was used
Exterior angle = A + C
= 137°

30. a kite

Match the properties: a kite