GCSE Foundation Mathematics
Practice Test 5: Geometry and Measures

Instructions:
Answer all questions. Show your working clearly.
Calculators may be used unless stated otherwise.
Time allowed: 90 minutes

Section A: Angles

1. Classify these angles as acute, obtuse, or reflex:

    (a) $67°$

    (b) $128°$

    (c) $310°$

    (d) $18°$

    (e) $247°$

    (f) $81°$

2. Find the missing angles:

    (a) Two angles on a straight line are $124°$ and $x°$. Find x.

    (b) Three angles around a point are $118°$, $97°$, and $y°$. Find y.

    (c) Two angles are vertically opposite. One angle is $53°$. Find the other angle.

3. In a triangle, two angles are $64°$ and $71°$. Find the third angle.

4. The angles in a triangle are in the ratio $2 : 5 : 8$. Find the size of each angle.

5. Find the missing angles in these triangles:

    (a) An isosceles triangle with base angles of $x°$ and vertex angle of $70°$

    (b) An equilateral triangle (all angles equal)

    (c) A right-angled triangle with one angle of $73°$

Section B: Polygons and Angle Rules

6. Find the sum of interior angles for:

    (a) A hexagon (6 sides)

    (b) An octagon (8 sides)

    (c) A decagon (10 sides)

    (d) A 15-sided polygon

7. Find the size of each interior angle in:

    (a) A regular nonagon
    (b) A regular dodecagon
    (c) A regular pentagon
    (d) A regular hexagon

8. Find the size of each exterior angle in:

    (a) A regular nonagon
    (b) A regular dodecagon
    (c) A regular 15-sided polygon
    (d) A regular octagon

9. A regular polygon has an exterior angle of 18°. How many sides does it have?

10. In a quadrilateral, three angles are 73°, 119°, and 91°. Find the fourth angle.

11. A regular polygon has an interior angle of 162°. Find:

    (a) The exterior angle
    (b) The number of sides

Section C: Properties of Shapes

12. State the properties of these quadrilaterals:

    (a) Rhombus (sides, angles, diagonals)
    (b) Parallelogram (sides, angles, diagonals)
    (c) Square (sides, angles, diagonals)
    (d) Kite (sides, angles, diagonals)

13. How many lines of symmetry do these shapes have?

    (a) Regular decagon
    (b) Kite
    (c) Regular pentagon
    (d) Rectangle
    (e) Equilateral triangle
    (f) Rhombus

14. What is the order of rotational symmetry for:

    (a) Regular decagon
    (b) Regular octagon
    (c) Rectangle
    (d) Square

15. Name these 3D shapes:

    (a) 2 circular faces and 1 curved surface
    (b) 1 octagonal base and 8 triangular faces
    (c) 7 faces: 2 pentagonal and 5 rectangular

(d) 1 circular base and 1 curved surface meeting at a point

(e) 20 triangular faces

16. How many faces, edges, and vertices do these shapes have?

    (a) Octagonal prism

    (b) Pentagonal pyramid

    (c) Triangular prism

    (d) Cube

Section D: Transformations

17. Describe the transformation that maps:

    (a) Shape A to Shape B (rotation 90° anticlockwise about origin)

    (b) Shape B to Shape C (reflection in line $y = -x$)

    (c) Shape C to Shape D (translation 6 units right, 3 units up)

    (d) Shape D to Shape E (enlargement scale factor $\frac{3}{2}$, centre origin)

18. A point P(7, 4) is transformed. Find the image coordinates after:

    (a) Reflection in the x-axis

    (b) Reflection in the y-axis

    (c) Reflection in the line $y = x$

    (d) Translation by vector $\begin{pmatrix} -5 \\ 3 \end{pmatrix}$

19. A quadrilateral has vertices at A(3, 2), B(7, 2), C(7, 6), and D(3, 6). Find the coordinates after:

    (a) Rotation 180° about the origin

    (b) Enlargement scale factor $\frac{2}{3}$, centre origin

    (c) Translation by vector $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$

20. A shape is enlarged by scale factor $\frac{3}{4}$. If the original area is 64 cm^2, what is the new area?

21. Shape A is enlarged to Shape B with scale factor $\frac{2}{3}$. If Shape A has a perimeter of 18 cm, what is the perimeter of Shape B?

Section E: Perimeter and Area

22. Calculate the perimeter of these shapes:

    (a) Rectangle: length 17 cm, width 11 cm

    (b) Square: side length 15 cm

    (c) Triangle: sides 13 cm, 14 cm, 15 cm

    (d) Regular decagon: side length 3.5 cm

23. Calculate the area of these shapes:

    (a) Rectangle: length 19 cm, width 13 cm

    (b) Square: side length 17 cm

    (c) Triangle: base 22 cm, height 11 cm

    (d) Parallelogram: base 16 cm, height 9 cm

24. Calculate the area and circumference of circles with:

    (a) Radius 9 cm

    (b) Diameter 15 cm

    (c) Radius 6.5 cm

    (d) Diameter 28 cm

25. A rectangular sports field is 45 m long and 30 m wide. Find:

    (a) The perimeter

    (b) The area

    (c) The cost of boundary marking at £8 per metre

    (d) The cost of maintenance at £4 per m^2

26. Find the area of these compound shapes:

    (a) A rectangle 18 cm by 12 cm with a rectangle 6 cm by 4 cm removed from the centre

    (b) A T-shape made from two rectangles: 15 cm by 4 cm and 6 cm by 8 cm overlapping

    (c) A quarter circle with radius 8 cm attached to a square 8 cm by 8 cm

Section F: Volume and Surface Area

27. Calculate the volume of these prisms:

    (a) Cuboid: length 14 cm, width 9 cm, height 8 cm

    (b) Cube: side length 11 cm

    (c) Triangular prism: triangular face area 30 cm^2, length 8 cm

    (d) Cylinder: radius 7 cm, height 14 cm

28. Calculate the surface area of:

    (a) Cube: side length 9 cm

    (b) Cuboid: length 16 cm, width 11 cm, height 8 cm

    (c) Cylinder: radius 7 cm, height 12 cm

29. A cylindrical chemical tank has radius 4.5 m and height 10 m. Find:

    (a) The volume in m^3

    (b) The volume in litres (1 m^3 = 1000 litres)

    (c) The curved surface area

    (d) The total surface area

30. A cube has volume 729 cm^3. Find:

    (a) The side length

    (b) The surface area

31. A rectangular reservoir is 25 m long, 15 m wide, and 4 m deep. Find:

    (a) The volume of water needed to fill it

    (b) The area of the bottom

    (c) The area of the four walls

Section G: Pythagoras' Theorem

32. Use Pythagoras' theorem to find the missing side in these right-angled triangles:

    (a) Two shorter sides are 15 cm and 20 cm. Find the hypotenuse.
    (b) Hypotenuse is 41 cm, one side is 40 cm. Find the other side.
    (c) Two shorter sides are 16 cm and 30 cm. Find the hypotenuse.
    (d) Hypotenuse is 37 cm, one side is 35 cm. Find the other side.

33. A wire of length 10 m is stretched from the top of a 9.5 m pole to a point on the ground. How far is this point from the base of the pole?

34. A rectangle has length 35 cm and width 12 cm. Find the length of its diagonal.

35. Find the distance between these pairs of points:

    (a) (0, 0) and (15, 20)
    (b) (5, 7) and (17, 12)
    (c) (-4, 1) and (8, 16)

36. A right-angled triangle has legs of length x cm and $(x + 9)$ cm, and hypotenuse $(x + 15)$ cm. Find the value of x.

37. Determine whether these triangles are right-angled:

    (a) Sides 14 cm, 48 cm, 50 cm
    (b) Sides 16 cm, 30 cm, 35 cm
    (c) Sides 33 cm, 56 cm, 65 cm
    (d) Sides 28 cm, 45 cm, 53 cm

Section H: Problem Solving

38. A circular plaza has radius 8 m. A decorative border of width 3 m surrounds the plaza. Find:

    (a) The area of the plaza
    (b) The area of the border
    (c) The total area including the border

39. A regular 15-sided polygon has perimeter 75 cm. Find:

    (a) The length of each side
    (b) Each interior angle
    (c) Each exterior angle

40. A cylindrical water heater has radius 8 cm and height 25 cm. Find:

    (a) How much water it can hold (volume)
    (b) The area of metal needed to make it (surface area)
    (c) The cost of metal at £0.05 per cm^2

41. Triangle JKL is isosceles with JK = JL. Angle KJL = 25°. Find angles JKL and JLK.

42. A regular hexagon and a circle have the same perimeter. If the hexagon has side length 6 cm, find the radius of the circle.

43. A triangle has vertices at A(4, 5), B(12, 5), and C(8, 17). Find:

    (a) The length of each side

    (b) The perimeter

    (c) The area

    (d) Whether the triangle is right-angled

44. A cone has base radius 12 cm and slant height 20 cm. Find:

    (a) The vertical height

    (b) The volume

    (c) The curved surface area

45. A warehouse floor is 15 m by 12 m. Square tiles of side 60 cm are used to cover the floor. How many tiles are needed?

Answer Space

Use this space for your working and answers.

END OF TEST

Total marks: 100

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