GCSE Foundation Mathematics
Practice Test 4: 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) 63°
   (b) 156°
   (c) 240°
   (d) 79°
   (e) 195°
   (f) 22°
2. Find the missing angles:
   (a) Two angles on a straight line are 83° and x°. Find x.
   (b) Three angles around a point are 75°, 135°, and y°. Find y.
   (c) Two angles are vertically opposite. One angle is 94°. Find the other angle.
3. In a triangle, two angles are 37° and 59°. Find the third angle.
4. The angles in a triangle are in the ratio $1 : 3 : 5$. 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 60°
   (b) An equilateral triangle (all angles equal)
   (c) A right-angled triangle with one angle of 28°

Section B: Polygons and Angle Rules

6. Find the sum of interior angles for:
   (a) A pentagon (5 sides)
   (b) A heptagon (7 sides)
   (c) A nonagon (9 sides)
   (d) A dodecagon (12 sides)

7. Find the size of each interior angle in:
   (a) A regular heptagon
   (b) A regular decagon
   (c) A regular dodecagon
   (d) A square
8. Find the size of each exterior angle in:
   (a) A regular heptagon
   (b) A regular octagon
   (c) A regular pentagon
   (d) A regular triangle
9. A regular polygon has an exterior angle of 36°. How many sides does it have?
10. In a quadrilateral, three angles are 96°, 84°, and 112°. Find the fourth angle.
11. A regular polygon has an interior angle of 144°. Find:
    (a) The exterior angle
    (b) The number of sides

Section C: Properties of Shapes

12. State the properties of these quadrilaterals:
    (a) Square (sides, angles, diagonals)
    (b) Rectangle (sides, angles, diagonals)
    (c) Kite (sides, angles, diagonals)
    (d) Trapezium (sides, angles)
13. How many lines of symmetry do these shapes have?
    (a) Regular octagon
    (b) Rectangle
    (c) Equilateral triangle
    (d) Rhombus
    (e) Isosceles triangle
    (f) Square
14. What is the order of rotational symmetry for:
    (a) Regular pentagon
    (b) Rectangle
    (c) Regular hexagon
    (d) Equilateral triangle
15. Name these 3D shapes:
    (a) 1 square base and 4 triangular faces
    (b) 2 hexagonal faces and 6 rectangular faces
    (c) 1 circular face and 1 curved surface coming to a point

(d) 6 faces, all squares

(e) 8 faces, all triangular

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

(a) Triangular prism

(b) Hexagonal pyramid

(c) Cube

(d) Square-based pyramid

Section D: Transformations

17. Describe the transformation that maps:

(a) Triangle A to Triangle B (reflection in line $x = 0$)

(b) Triangle B to Triangle C (translation 5 units right, 1 unit down)

(c) Triangle C to Triangle D (rotation 270° clockwise about origin)

(d) Triangle D to Triangle E (enlargement scale factor 2, centre origin)

18. A point P(2, 6) 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 $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$

19. A triangle has vertices at A(2, 2), B(6, 2), and C(4, 6). Find the coordinates after:

(a) Rotation 270° clockwise about the origin

(b) Enlargement scale factor 3, centre origin

(c) Translation by vector $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$

20. A shape is enlarged by scale factor $\frac{2}{3}$. If the original area is 45 cm^2, what is the new area?

21. Triangle A is enlarged to Triangle B with scale factor 5. If Triangle A has a perimeter of 8 cm, what is the perimeter of Triangle B?

Section E: Perimeter and Area

22. Calculate the perimeter of these shapes:

(a) Rectangle: length 13 cm, width 8 cm

(b) Square: side length 12 cm

(c) Triangle: sides 9 cm, 12 cm, 15 cm

(d) Regular hexagon: side length 7 cm

23. Calculate the area of these shapes:

(a) Rectangle: length 16 cm, width 11 cm

(b) Square: side length 14 cm

(c) Triangle: base 18 cm, height 9 cm

(d) Parallelogram: base 14 cm, height 7 cm

24. Calculate the area and circumference of circles with:

(a) Radius 8 cm
(b) Diameter 10 cm
(c) Radius 3.5 cm
(d) Diameter 26 cm

25. A rectangular car park is 30 m long and 20 m wide. Find:

(a) The perimeter
(b) The area
(c) The cost of barriers at £22 per metre
(d) The cost of tarmac at £15 per m^2

26. Find the area of these compound shapes:

(a) A rectangle 16 cm by 10 cm with a square of side 5 cm removed from one corner
(b) An L-shape made from two rectangles: 14 cm by 6 cm and 9 cm by 4 cm
(c) A semicircle with radius 7 cm attached to a rectangle 14 cm by 9 cm

Section F: Volume and Surface Area

27. Calculate the volume of these prisms:

(a) Cuboid: length 12 cm, width 8 cm, height 7 cm
(b) Cube: side length 9 cm
(c) Triangular prism: triangular face area 24 cm^2, length 11 cm
(d) Cylinder: radius 6 cm, height 10 cm

28. Calculate the surface area of:

(a) Cube: side length 8 cm
(b) Cuboid: length 14 cm, width 9 cm, height 7 cm
(c) Cylinder: radius 6 cm, height 11 cm

29. A cylindrical gas tank has radius 2.5 m and height 6 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 512 cm^3. Find:

(a) The side length
(b) The surface area

31. A rectangular swimming pool is 18 m long, 12 m wide, and 2 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 9 cm and 12 cm. Find the hypotenuse.

    (b) Hypotenuse is 20 cm, one side is 12 cm. Find the other side.

    (c) Two shorter sides are 10 cm and 24 cm. Find the hypotenuse.

    (d) Hypotenuse is 35 cm, one side is 28 cm. Find the other side.

33. A ladder of length 7 m leans against a wall. The bottom of the ladder is 2.5 m from the wall. How high up the wall does the ladder reach?

34. A rectangle has length 24 cm and width 7 cm. Find the length of its diagonal.

35. Find the distance between these pairs of points:

    (a) (0, 0) and (6, 8)

    (b) (4, 2) and (10, 10)

    (c) (-2, 3) and (4, 11)

36. A right-angled triangle has legs of length x cm and $(x+7)$ cm, and hypotenuse $(x+8)$ cm. Find the value of x.

37. Determine whether these triangles are right-angled:

    (a) Sides 10 cm, 24 cm, 26 cm

    (b) Sides 6 cm, 9 cm, 12 cm

    (c) Sides 13 cm, 84 cm, 85 cm

    (d) Sides 15 cm, 20 cm, 25 cm

Section H: Problem Solving

38. A circular lake has radius 6 m. A walkway of width 2.5 m surrounds the lake. Find:

    (a) The area of the lake

    (b) The area of the walkway

    (c) The total area including the walkway

39. A regular dodecagon has perimeter 48 cm. Find:

    (a) The length of each side

    (b) Each interior angle

    (c) Each exterior angle

40. A cylindrical fuel tank has radius 7 cm and height 20 cm. Find:

    (a) How much it can hold (volume)

    (b) The area of metal needed to make it (surface area)

    (c) The cost of metal at £0.04 per cm^2

41. Triangle GHI is isosceles with GH = GI. Angle HGI = 45°. Find angles GHI and GIH.

42. A square and a circle have the same area. If the square has side length 14 cm, find the radius of the circle.

43. A triangle has vertices at A(2, 3), B(8, 3), and C(5, 11). 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 9 cm and slant height 15 cm. Find:

    (a) The vertical height

    (b) The volume

    (c) The curved surface area

45. The floor of a sports hall is 12 m by 8 m. Rectangular tiles of size 50 cm by 40 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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