GCSE Foundation Mathematics
Practice Test 3: 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) 38°
   (b) 145°
   (c) 315°
   (d) 89°
   (e) 205°
   (f) 12°
2. Find the missing angles:
   (a) Two angles on a straight line are 58° and x°. Find x.
   (b) Three angles around a point are 105°, 110°, and y°. Find y.
   (c) Two angles are vertically opposite. One angle is 67°. Find the other angle.
3. In a triangle, two angles are 48° and 85°. Find the third angle.
4. The angles in a triangle are in the ratio $3 : 4 : 5$. 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 30°
   (b) An equilateral triangle (all angles equal)
   (c) A right-angled triangle with one angle of 58°

Section B: Polygons and Angle Rules

6. Find the sum of interior angles for:
   (a) A triangle (3 sides)
   (b) A hexagon (6 sides)
   (c) An octagon (8 sides)
   (d) An undecagon (11 sides)

7. Find the size of each interior angle in:
   (a) A regular pentagon
   (b) A regular octagon
   (c) A regular nonagon
   (d) A regular hexagon
8. Find the size of each exterior angle in:
   (a) A regular pentagon
   (b) A regular nonagon
   (c) A regular decagon
   (d) A regular hexagon
9. A regular polygon has an exterior angle of 45°. How many sides does it have?
10. In a quadrilateral, three angles are 92°, 88°, and 105°. Find the fourth angle.
11. A regular polygon has an interior angle of 135°. Find:
    (a) The exterior angle
    (b) The number of sides

Section C: Properties of Shapes

12. State the properties of these quadrilaterals:
    (a) Parallelogram (sides, angles, diagonals)
    (b) Trapezium (sides, angles)
    (c) Rhombus (sides, angles, diagonals)
    (d) Rectangle (sides, angles, diagonals)
13. How many lines of symmetry do these shapes have?
    (a) Regular hexagon
    (b) Isosceles triangle
    (c) Square
    (d) Regular pentagon
    (e) Rhombus
    (f) Kite
14. What is the order of rotational symmetry for:
    (a) Regular octagon
    (b) Equilateral triangle
    (c) Square
    (d) Rectangle
15. Name these 3D shapes:
    (a) 2 parallel circular faces and 1 curved surface
    (b) 1 pentagonal base and 5 triangular faces
    (c) 6 faces, all rectangles

(d) 5 faces: 2 triangular and 3 rectangular

(e) 4 faces, all triangular

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

(a) Cube

(b) Pentagonal pyramid

(c) Octagonal prism

(d) Triangular pyramid

Section D: Transformations

17. Describe the transformation that maps:

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

(b) Triangle B to Triangle C (translation 2 units left, 4 units up)

(c) Triangle C to Triangle D (rotation 180° about origin)

(d) Triangle D to Triangle E (enlargement scale factor $\frac{1}{2}$, centre origin)

18. A point P(5, 3) 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 $\begin{pmatrix} -4 \\ 1 \end{pmatrix}$

19. A triangle has vertices at A(1, 3), B(5, 3), and C(3, 7). Find the coordinates after:

(a) Rotation 180° about the origin

(b) Enlargement scale factor $\frac{1}{2}$, centre origin

(c) Translation by vector $\begin{pmatrix} 2 \\ -5 \end{pmatrix}$

20. A shape is enlarged by scale factor 4. If the original area is 12 cm^2, what is the new area?

21. Triangle A is enlarged to Triangle B with scale factor $\frac{1}{2}$. If Triangle A has a perimeter of 24 cm, what is the perimeter of Triangle B?

Section E: Perimeter and Area

22. Calculate the perimeter of these shapes:

(a) Rectangle: length 11 cm, width 7 cm

(b) Square: side length 9 cm

(c) Triangle: sides 7 cm, 9 cm, 11 cm

(d) Regular octagon: side length 5 cm

23. Calculate the area of these shapes:

(a) Rectangle: length 14 cm, width 9 cm

(b) Square: side length 13 cm

(c) Triangle: base 16 cm, height 7 cm

(d) Parallelogram: base 12 cm, height 8 cm

24. Calculate the area and circumference of circles with:

    (a) Radius 7 cm
    (b) Diameter 12 cm
    (c) Radius 2.5 cm
    (d) Diameter 22 cm

25. A rectangular playground is 25 m long and 16 m wide. Find:

    (a) The perimeter
    (b) The area
    (c) The cost of fencing at £18 per metre
    (d) The cost of artificial grass at £12 per m^2

26. Find the area of these compound shapes:

    (a) A rectangle 14 cm by 9 cm with a square of side 4 cm removed from one corner
    (b) An L-shape made from two rectangles: 12 cm by 5 cm and 8 cm by 6 cm
    (c) A semicircle with radius 6 cm attached to a rectangle 12 cm by 8 cm

Section F: Volume and Surface Area

27. Calculate the volume of these prisms:

    (a) Cuboid: length 10 cm, width 7 cm, height 6 cm
    (b) Cube: side length 8 cm
    (c) Triangular prism: triangular face area 20 cm^2, length 9 cm
    (d) Cylinder: radius 5 cm, height 12 cm

28. Calculate the surface area of:

    (a) Cube: side length 7 cm
    (b) Cuboid: length 12 cm, width 8 cm, height 6 cm
    (c) Cylinder: radius 5 cm, height 8 cm

29. A cylindrical grain silo has radius 3 m and height 8 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 343 cm^3. Find:

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

31. A rectangular fish tank is 12 m long, 6 m wide, and 2.5 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 6 cm and 8 cm. Find the hypotenuse.

    (b) Hypotenuse is 15 cm, one side is 9 cm. Find the other side.

    (c) Two shorter sides are 7 cm and 24 cm. Find the hypotenuse.

    (d) Hypotenuse is 29 cm, one side is 21 cm. Find the other side.

33. A ladder of length 8 m leans against a wall. The bottom of the ladder is 3.5 m from the wall. How high up the wall does the ladder reach?

34. A rectangle has length 20 cm and width 15 cm. Find the length of its diagonal.

35. Find the distance between these pairs of points:

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

    (b) (3, 1) and (9, 9)

    (c) (-3, 4) and (2, 16)

36. A right-angled triangle has legs of length x cm and $(x+5)$ cm, and hypotenuse $(x+7)$ cm. Find the value of x.

37. Determine whether these triangles are right-angled:

    (a) Sides 9 cm, 12 cm, 15 cm

    (b) Sides 8 cm, 17 cm, 19 cm

    (c) Sides 20 cm, 21 cm, 29 cm

    (d) Sides 11 cm, 60 cm, 61 cm

Section H: Problem Solving

38. A circular fountain has radius 3 m. A border of width 1.5 m surrounds the fountain. Find:

    (a) The area of the fountain

    (b) The area of the border

    (c) The total area including the border

39. A regular decagon has perimeter 40 cm. Find:

    (a) The length of each side

    (b) Each interior angle

    (c) Each exterior angle

40. A cylindrical storage tank has radius 4 cm and height 15 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 £0.025 per cm^2

41. Triangle DEF is isosceles with DE = DF. Angle EDF = 35°. Find angles DEF and DFE.

42. A square and a circle have the same perimeter. If the square has side length 12 cm, find the radius of the circle.

43. A triangle has vertices at A(3, 1), B(9, 1), and C(6, 9). 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 8 cm and slant height 17 cm. Find:

    (a) The vertical height

    (b) The volume

    (c) The curved surface area

45. The floor of a classroom is 9 m by 7 m. Square tiles of side 35 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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