GCSE Foundation Mathematics
Practice Test 2: 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) 55°
   (b) 135°
   (c) 290°
   (d) 72°
   (e) 185°
   (f) 28°
2. Find the missing angles:
   (a) Two angles on a straight line are 72° and x°. Find x.
   (b) Three angles around a point are 95°, 125°, and y°. Find y.
   (c) Two angles are vertically opposite. One angle is 82°. Find the other angle.
3. In a triangle, two angles are 52° and 68°. Find the third angle.
4. The angles in a triangle are in the ratio $1 : 2 : 3$. 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 50°
   (b) An equilateral triangle (all angles equal)
   (c) A right-angled triangle with one angle of 42°

Section B: Polygons and Angle Rules

6. Find the sum of interior angles for:
   (a) A quadrilateral (4 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 hexagon
   (b) A regular octagon
   (c) A regular decagon
   (d) A regular triangle
8. Find the size of each exterior angle in:
   (a) A regular hexagon
   (b) A regular octagon
   (c) A regular dodecagon
   (d) A square
9. A regular polygon has an exterior angle of 24°. How many sides does it have?
10. In a quadrilateral, three angles are 78°, 102°, and 95°. Find the fourth angle.
11. A regular polygon has an interior angle of 150°. 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) Kite (sides, angles, diagonals)
    (c) Rectangle (sides, angles, diagonals)
    (d) Parallelogram (sides, angles, diagonals)
13. How many lines of symmetry do these shapes have?
    (a) Square
    (b) Regular pentagon
    (c) Isosceles triangle
    (d) Regular octagon
    (e) Rectangle
    (f) Kite
14. What is the order of rotational symmetry for:
    (a) Regular hexagon
    (b) Square
    (c) Regular pentagon
    (d) Equilateral triangle
15. Name these 3D shapes:
    (a) 6 square faces
    (b) 2 triangular faces and 3 rectangular faces
    (c) 1 circular base and 1 curved surface coming to a point

(d) 8 triangular faces

(e) 1 triangular base and 3 triangular faces

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

(a) Triangular prism

(b) Square-based pyramid

(c) Hexagonal prism

(d) Tetrahedron

Section D: Transformations

17. Describe the transformation that maps:

(a) Triangle A to Triangle B (reflection in the x-axis)

(b) Triangle B to Triangle C (translation 4 units left, 3 units down)

(c) Triangle C to Triangle D (rotation 90° anticlockwise about origin)

(d) Triangle D to Triangle E (enlargement scale factor 3, centre origin)

18. A point P(4, 1) 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 $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$

19. A triangle has vertices at A(2, 1), B(4, 1), and C(3, 5). Find the coordinates after:

(a) Rotation 90° anticlockwise about the origin

(b) Enlargement scale factor 2, centre origin

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

20. A shape is enlarged by scale factor $\frac{1}{3}$. If the original area is 36 cm^2, what is the new area?

21. Triangle A is enlarged to Triangle B with scale factor 4. If Triangle A has a perimeter of 9 cm, what is the perimeter of Triangle B?

Section E: Perimeter and Area

22. Calculate the perimeter of these shapes:

(a) Rectangle: length 9 cm, width 6 cm

(b) Square: side length 8 cm

(c) Triangle: sides 5 cm, 12 cm, 13 cm

(d) Regular pentagon: side length 6 cm

23. Calculate the area of these shapes:

(a) Rectangle: length 15 cm, width 8 cm

(b) Square: side length 11 cm

(c) Triangle: base 12 cm, height 8 cm

(d) Parallelogram: base 10 cm, height 6 cm

24. Calculate the area and circumference of circles with:

    (a) Radius 6 cm
    (b) Diameter 16 cm
    (c) Radius 4.5 cm
    (d) Diameter 18 cm

25. A rectangular field is 18 m long and 12 m wide. Find:

    (a) The perimeter
    (b) The area
    (c) The cost of fencing at £15 per metre
    (d) The cost of grass seed at £6 per m^2

26. Find the area of these compound shapes:

    (a) A rectangle 12 cm by 8 cm with a square of side 3 cm removed from one corner
    (b) An L-shape made from two rectangles: 10 cm by 4 cm and 6 cm by 5 cm
    (c) A semicircle with radius 5 cm attached to a rectangle 10 cm by 7 cm

Section F: Volume and Surface Area

27. Calculate the volume of these prisms:

    (a) Cuboid: length 9 cm, width 6 cm, height 5 cm
    (b) Cube: side length 7 cm
    (c) Triangular prism: triangular face area 18 cm^2, length 10 cm
    (d) Cylinder: radius 4 cm, height 8 cm

28. Calculate the surface area of:

    (a) Cube: side length 6 cm
    (b) Cuboid: length 10 cm, width 7 cm, height 5 cm
    (c) Cylinder: radius 3 cm, height 9 cm

29. A cylindrical oil drum has radius 1.5 m and height 4 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 216 cm^3. Find:

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

31. A rectangular water tank is 15 m long, 10 m wide, and 3 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 5 cm and 12 cm. Find the hypotenuse.

    (b) Hypotenuse is 17 cm, one side is 8 cm. Find the other side.

    (c) Two shorter sides are 9 cm and 12 cm. Find the hypotenuse.

    (d) Hypotenuse is 26 cm, one side is 24 cm. Find the other side.

33. A ladder of length 6 m leans against a wall. The bottom of the ladder is 2 m from the wall. How high up the wall does the ladder reach?

34. A rectangle has length 15 cm and width 8 cm. Find the length of its diagonal.

35. Find the distance between these pairs of points:

    (a) (0, 0) and (5, 12)

    (b) (2, 3) and (8, 11)

    (c) (-1, 2) and (5, 10)

36. A right-angled triangle has legs of length x cm and $(x+3)$ cm, and hypotenuse $(x+6)$ cm. Find the value of x.

37. Determine whether these triangles are right-angled:

    (a) Sides 8 cm, 15 cm, 17 cm

    (b) Sides 7 cm, 24 cm, 26 cm

    (c) Sides 5 cm, 13 cm, 14 cm

    (d) Sides 12 cm, 16 cm, 20 cm

Section H: Problem Solving

38. A circular garden has radius 5 m. A path of width 2 m surrounds the garden. Find:

    (a) The area of the garden

    (b) The area of the path

    (c) The total area including the path

39. A regular octagon has perimeter 32 cm. Find:

    (a) The length of each side

    (b) Each interior angle

    (c) Each exterior angle

40. A cylindrical container has radius 5 cm and height 12 cm. Find:

    (a) How much it can hold (volume)

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

    (c) The cost of material at £0.03 per cm^2

41. Triangle PQR is isosceles with PQ = PR. Angle QPR = 50°. Find angles PQR and PRQ.

42. A square and a circle have the same area. If the square has side length 10 cm, find the radius of the circle.

43. A triangle has vertices at A(1, 2), B(7, 2), and C(4, 8). 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 6 cm and slant height 10 cm. Find:

    (a) The vertical height

    (b) The volume

    (c) The curved surface area

45. The floor of a hall is 8 m by 6 m. Rectangular tiles of size 40 cm by 30 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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