GCSE Maths Practice: Geometry and Measures

Here is a curated list of **100 practice questions** covering these GCSE topics: *Geometry fundamentals, Measurements, Trigonometry, Circles, Quadrilaterals, Polygons, and Vectors*. These questions include varied difficulty levels suitable for revision and exam preparation.

Geometry Fundamentals & Measurements

1. Calculate the perimeter of a rectangle with length 12 cm and width 7 cm.
2. Find the area of a triangle with base 10 cm and height 6 cm.
3. What is the volume of a cuboid with dimensions 5 cm × 3 cm × 4 cm?
4. Find the missing angle in a straight line where the known angle is 115°.
5. Calculate the length of the hypotenuse in a right-angled triangle with legs 9 cm and 12 cm.
6. Determine the surface area of a cube with side length 8 cm.
7. Convert 45° to radians.
8. If a circle has a diameter of 14 cm, find its circumference.
9. A triangle has sides 7 cm, 24 cm, and 25 cm. Is it right-angled?
10. Find the area of a parallelogram with base 8 cm and height 5 cm.

Trigonometry

11. Find the sine of a 30° angle.
12. Use Pythagoras' theorem to find the length of the missing side if the other two sides are 6 cm and 10 cm.
13. Calculate the angle in a right triangle if the opposite side is 5 cm and adjacent side is 12 cm.
14. Find the length of the side opposite a 45° angle in an isosceles right triangle with hypotenuse 10 cm.
15. What is cos(60°)?
16. Calculate the height of a tree if a 20 m shadow forms a 30° angle with the ground.
17. Determine the area of a triangle using two sides and the included angle of 60°.

18. Using sine rule, find the unknown side given an angle of 40° opposite side 7 cm, and the adjacent angle 70°.
19. Apply cosine rule to find the third side of a triangle with sides 8 cm and 6 cm enclosing a 60° angle.
20. Calculate the missing angle in a triangle when two angles are 50° and 60°.

Circles

21. Find the area of a circle with radius 5 cm.
22. Calculate the length of an arc with a central angle of 90° in a circle with radius 8 cm.
23. What is the area of a sector with angle 45° and radius 12 cm?
24. Find the perimeter of a semicircle with diameter 10 cm.
25. Calculate the volume of a cylinder with radius 4 cm and height 10 cm.
26. Find the length of the tangent from a point 13 cm from the center of the circle with radius 5 cm.
27. Calculate the angle between two tangents drawn from an external point to a circle.
28. Find the radius of a circle whose circumference is 31.4 cm (approximate π as 3.14).
29. Calculate the length of a chord that subtends a right angle at the center of a circle with radius 7 cm.
30. Find the equation of a circle with center at (3, -2) and radius 5.

Quadrilaterals

31. Find the interior angles of a square.
32. Calculate the sum of interior angles of any quadrilateral.
33. Find the area of a rhombus with diagonals 12 cm and 10 cm.
34. Calculate the lengths of the sides of a rectangle with perimeter 36 cm if the length is twice the width.
35. Find the missing angle in a parallelogram if one angle is 70°.
36. Determine the coordinates of the midpoint of the diagonal of a rectangle with corners at (1,2) and (7,10).
37. Prove that the diagonals of a square are equal.
38. Find the area of a trapezium with parallel sides 10 cm and 6 cm and height 5 cm.
39. Calculate the perimeter of a kite with sides of length 7 cm and 10 cm.
40. Prove that the diagonals of a parallelogram bisect each other.

Polygons

41. How many sides does a polygon have if the sum of interior angles is 1260°?
42. Find the size of each interior angle in a regular hexagon.
43. Calculate the exterior angle of a regular octagon.
44. Determine the total number of diagonals in a decagon.
45. Calculate the sum of the exterior angles of any polygon.
46. Find the size of an exterior angle in a regular polygon with 15 sides.
47. Calculate the size of each interior angle in a regular pentagon.
48. If one exterior angle is 40°, how many sides does the polygon have?
49. Find the number of sides of a polygon where each interior angle is 140°.
50. Calculate the number of diagonals drawn from one vertex in a 12-sided polygon.

Vectors

51. Given vectors a = (3, -2) and b = (-1, 4), find a + b.
52. Calculate 2a - 3b for vectors a = (1, 5) and b = (4, -2).
53. Find the magnitude of vector (6, 8).
54. Find the direction of vector (5, 5) measured anti-clockwise from the positive x-axis.
55. If vector a = (2, 3), find a unit vector in the same direction.
56. Find the scalar product of vectors a = (3, 4) and b = (2, -1).
57. Determine if vectors (3, 5) and (6, 10) are parallel.
58. Find vector AB given A(2, 3) and B(7, 9).
59. Determine the midpoint between points A(1, 4) and B(5, 10).
60. Find the resultant vector when a force of 5 N acts at 30° and 8 N acts at 120°.

Mixed Problems

61. Find the volume of a cone with radius 3 cm and height 7 cm.
62. The radius of a circle is increasing at a rate of 0.1 cm/s. Find the rate at which the area is increasing when radius is 5 cm.
63. Find the distance between the points (3, 4) and (7, 1).

64. Calculate the vector perpendicular to (3, 2).
65. Find the length and angle of the vector $(4, 4\sqrt{3})$.
66. A triangle has sides 5 cm, 7 cm, and 10 cm. Determine if the triangle is obtuse.
67. Find the equation of a line perpendicular to the vector (2, -3).
68. Calculate the volume of a sphere with diameter 10 cm.
69. Find the length of the diagonal of a rectangular prism 3 cm × 4 cm × 12 cm.
70. Calculate the height of a trapezium given bases 8 cm, 5 cm and area 52.5 cm^2.

Challenge Problems

71. Given vectors a = (1, 2) and b = (3, -1), find the angle between them.
72. Find the shortest distance between the point (3, 4) and the line $y = 2x + 1$.
73. Calculate the area of a triangle formed by points A(3, 2), B(7, 4), and C(5, 7).
74. Prove that the diagonals of a rhombus are perpendicular.
75. A polygon has 20 sides. Find the measure of each exterior and interior angle.
76. Find the center and radius of the circle given by the equation $x^2 + y^2 - 4x + 6y - 12 = 0$.
77. Use sine rule to solve a triangle where side a = 8 cm, angle A = 45°, and angle B = 60°.
78. Calculate the area of the sector formed by a 120° angle in a circle radius 10 cm.
79. Find the equation of the line through points (1, 3) and (4, 7).
80. Calculate the length of the segment joining (4, 1) to the midpoint of (8, 3) and (2, 7).

Applied Geometry

81. Find the height of an equilateral triangle with side length 10 cm.
82. Calculate the bearing from point A at (2, 3) to point B at (6, 7).
83. Find the sum of the interior angles of a polygon with n sides if each exterior angle is 30°.
84. Calculate the side length of a square whose diagonal is $10\sqrt{2}$ cm.
85. Determine the vector from point C(3, 5) to point D(7, 1).
86. Find the perimeter of a regular pentagon with side length 8 cm.
87. Calculate the volume of a prism with triangular base area of 24 cm^2 and length 15 cm.
88. Find the equation of reflection line that maps point P(3, 1) to Q(3, -5).

89. Calculate the angle between vectors (2, 0) and (1, √3).

90. Find the radius of a circle inscribed in a square of side 10 cm.

Exam-style Questions

91. Prove that the diagonals of a rectangle are equal in length.

92. Find the number of sides of a polygon if each interior angle measures 156°.

93. Calculate the missing angle in the quadrilateral where three angles are 85°, 95°, and 75°.

94. Find the magnitude of vector 3i + 4j.

95. Calculate the area of a trapezium with parallel sides of 12 cm and 8 cm and height 6 cm.

96. Find the shortest distance from the point (5, 5) to the x-axis.

97. Determine the volume of a cylinder with height 12 cm and radius 3 cm.

98. Calculate the exterior angle of a regular polygon with 18 sides.

99. Find the sum of interior angles of a polygon formed by joining 7 triangles.

100. Given a vector v = (4, -3), find the vector -2v.