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MIDDLE SCHOOL MATHEMATICS

Geometry Question Bank

50 curated questions covering lines, angles, triangles, polygons, circles, area, volume, and coordinate geometry.

Lines & Angles

Q1. Two angles are supplementary. One angle measure 67° . What is the measure of the other angle?

SOLUTION:

Supplementary angles sum to 180° .

$$180^\circ - 67^\circ = 113^\circ$$

Answer: 113°

Q2. Two angles are complementary. One angle measure 34° . What is the measure of the other angle?

SOLUTION:

Complementary angles sum to 90° .

$$90^\circ - 34^\circ = 56^\circ$$

Answer: 56°

Q3. A straight line is divided by a ray into two angles. One angle is $3x^\circ$ and the other is $5x^\circ$. Find x and both angles.

SOLUTION

Angles on a straight-line sum to 180° .

$$3x + 5x = 180 \rightarrow 8x = 180 \rightarrow x = 22.5^\circ$$

The two angles are $3(22.5) = 67.5^\circ$ and $5(22.5) = 112.5^\circ$.

Answer: $x = 22.5$; angles are 67.5° and 112.5°

Q4. Two parallel lines are cut by a transversal. One co-interior (same-side interior) angle is 112° . Find the other co-interior angle.

SOLUTION:

Co-interior angles are supplementary when lines are parallel.

$$180^\circ - 112^\circ = 68^\circ$$

Answer: 68°

Q5. Alternate interior angles are formed when a transversal crosses two parallel lines. If one alternate interior angle is 75° , what is the other?

SOLUTION:

Alternate interior angles are equal when lines are parallel. 75°

Answer: 75°

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Q6. Two lines intersect forming two pairs of vertical angles. One angle is $(4x + 10)^\circ$. Its vertical angle is $(6x - 20)^\circ$. Find x and the angle measure.

SOLUTION:

Vertical angles are equal.

$$4x + 10 = 6x - 20 \rightarrow 30 = 2x \rightarrow x = 15$$

$$\text{Angle} = 4(15) + 10 = 70^\circ.$$

Answer: $x = 15$; angle = 70°

Q7. An angle and its supplement are in the ratio 2 : 3. Find both angles.

SOLUTION:

Let the angles be $2k$ and $3k$.

$$2k + 3k = 180 \rightarrow 5k = 180 \rightarrow k = 36$$

Angles: 72° and 108° .

Answer: 72° and 108°

Q8. A right angle is divided into three equal parts by two rays. What is the measure of each part?

SOLUTION:

$$90^\circ \div 3 = 30^\circ$$

Answer: 30°

Q9. Lines AB and CD are parallel. A transversal crosses them, making a corresponding angle of 58° with line AB. What is the corresponding angle at line CD?

SOLUTION:

Corresponding angles are equal when lines are parallel. 58°

Answer: 58°

Q10. The angles around a point sum to 360° . Three angles around a point are 95° , 120° , and x° . Find x .

SOLUTION:

$$95 + 120 + x = 360 \rightarrow x = 145^\circ$$

Answer: 145°

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▲ Triangles

Q11 The three interior angles of a triangle are in the ratio 1 : 2 : 3. Find each angle.

SOLUTION:Total = 180° . Let angles be k , $2k$, $3k$.

$$6k = 180 \rightarrow k = 30^\circ \text{ Angles: } 30^\circ, 60^\circ, 90^\circ.$$

Answer: $30^\circ, 60^\circ, 90^\circ$ Q12. In a triangle, two angles are 48° and 73° . Find the third angle.**SOLUTION:**

$$180 - 48 - 73 = 59^\circ$$

Answer: 59° Q13Q13. An exterior angle of a triangle is 115° . The two non-adjacent interior angles are equal. Find them.**SOLUTION:**

The exterior angle equals the sum of the two non-adjacent interior angles.

$$2x = 115 \rightarrow x = 57.5^\circ$$

Answer: 57.5° each

Q14. A right triangle has legs of length 6 cm and 8 cm. Find the hypotenuse.

SOLUTION:**Using the Pythagorean theorem:**

$$c^2 = 6^2 + 8^2 = 36 + 64 = 100 \rightarrow c = 10 \text{ cm}$$

Answer: 10 cm

Q15. The hypotenuse of a right triangle is 13 cm and one leg is 5 cm. Find the other leg.

SOLUTION:

$$b^2 = 13^2 - 5^2 = 169 - 25 = 144 \rightarrow b = 12 \text{ cm}$$

Answer: 12 cm

Q16. Find the area of a triangle with base 14 cm and height 9 cm.

SOLUTION:

$$A = \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 14 \times 9 = 63 \text{ cm}^2$$

Answer: 63 cm^2

Q17. An isosceles triangle has two equal sides of 10 cm and a base of 12 cm. Find its height from apex to base.

SOLUTION:

The height bisects the base.

$$h = \sqrt{(10^2 - 6^2)} = \sqrt{(100 - 36)} = \sqrt{64} = 8 \text{ cm}$$

Answer: 8 cm

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Q18. The perimeter of an equilateral triangle is 54 cm. Find the length of each side.
SOLUTION:

$$s = 54 \div 3 = 18 \text{ cm}$$

Answer: 18 cm

Q19. Can a triangle have sides of length 4 cm, 7 cm, and 12 cm? Explain.
SOLUTION:

Triangle Inequality: sum of any two sides must exceed the third.

$$4 + 7 = 11 < 12 \rightarrow \text{Not a valid triangle}$$

Answer: No — $4 + 7 < 12$

Q20. A right triangle has a hypotenuse of 17 cm and one leg of 8 cm. Find its area.
SOLUTION:

$$\text{other leg} = \sqrt{(17^2 - 8^2)} = \sqrt{(289 - 64)} = \sqrt{225} = 15 \text{ cm}$$

$$A = \frac{1}{2} \times 8 \times 15 = 60 \text{ cm}^2$$

Answer: 60 cm²

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◻ Quadrilaterals & Polygons

Q21. Find the sum of the interior angles of a hexagon.

SOLUTION:

$$\text{Sum} = (n - 2) \times 180 = (6 - 2) \times 180 = 720^\circ$$

Answer: 720°

Q22. Each interior angle of a regular polygon is 140°. How many sides does it have?

SOLUTION:

$$\text{Interior angle} = (n-2) \times 180/n = 140$$

$$180n - 360 = 140n \rightarrow 40n = 360 \rightarrow n = 9$$

Answer: 9 sides (nonagon)

Q23. A rectangle has a length of 15 cm and a width of 8 cm. Find its area and perimeter.

SOLUTION:

$$\text{Area} = 15 \times 8 = 120 \text{ cm}^2$$

$$\text{Perimeter} = 2(15 + 8) = 46 \text{ cm}$$

Answer: Area = 120 cm², Perimeter = 46 cm

Q24. A parallelogram has a base of 11 cm and a height of 6 cm. Find its area.

SOLUTION:

$$A = \text{base} \times \text{height} = 11 \times 6 = 66 \text{ cm}^2$$

Answer: 66 cm²

Q25. A trapezoid has parallel sides of 8 cm and 14 cm, and a height of 5 cm. Find its area.

SOLUTION:

$$A = \frac{1}{2} (b_1 + b_2) \times h = \frac{1}{2} (8 + 14) \times 5 = \frac{1}{2} \times 22 \times 5 = 55 \text{ cm}^2$$

Answer: 55 cm²

Q26. A rhombus has diagonals of 10 cm and 24 cm. Find its area.

SOLUTION:

$$A = (d_1 \times d_2) / 2 = (10 \times 24) / 2 = 120 \text{ cm}^2$$

Answer: 120 cm²

Q27. Each exterior angle of a regular polygon is 30°. How many sides does it have?

SOLUTION:

$$\text{Sum of exterior angles} = 360^\circ.$$

$$n = 360 \div 30 = 12 \text{ sides}$$

Answer: 12 sides (dodecagon)

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Q28. A square has a diagonal of $10\sqrt{2}$ cm. Find the length of its side and its area.

SOLUTION:

$$d = s\sqrt{2} \rightarrow s = d/\sqrt{2} = 10\sqrt{2}/\sqrt{2} = 10 \text{ cm}$$

$$\text{Area} = 10^2 = 100 \text{ cm}^2$$

Answer: Side = 10 cm, Area = 100 cm²

Q29. Three angles of a quadrilateral are 95° , 85° , and 110° . Find the fourth angle.

SOLUTION:

Sum of angles in a quadrilateral = 360° .

$$360 - 95 - 85 - 110 = 70^\circ$$

Answer: 70°

Q30. A rectangular garden is 20 m long and 12 m wide. Find the cost of fencing it at ₹15 per metre.

SOLUTION:

$$\text{Perimeter} = 2(20 + 12) = 64 \text{ m}$$

$$\text{Cost} = 64 \times 15 = ₹960$$

Answer: ₹960

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 CirclesQ31. Find the circumference of a circle with radius 7 cm. (Use $\pi = 22/7$)**SOLUTION:**

$$C = 2\pi r = 2 \times (22/7) \times 7 = 44 \text{ cm}$$

Answer: 44 cmQ32 Find the area of a circle with diameter 14 cm. (Use $\pi = 22/7$)**SOLUTION:**

$$r = 7 \text{ cm } A = \pi r^2 = (22/7) \times 49 = 154 \text{ cm}^2$$

Answer: 154 cm²Q33. The circumference of a circle is 88 cm. Find its radius. (Use $\pi = 22/7$)**SOLUTION:**

$$C = 2\pi r \rightarrow r = C / (2\pi) = 88 / (2 \times 22/7) = 88 \times 7/44 = 14 \text{ cm}$$

Answer: 14 cmQ34. A sector of a circle has a radius of 6 cm and a central angle of 60° . Find the arc length.
(Use $\pi = 3.14$)**SOLUTION:**

$$\text{Arc} = (\theta/360) \times 2\pi r = (60/360) \times 2 \times 3.14 \times 6 = (1/6) \times 37.68 = 6.28 \text{ cm}$$

Answer: 6.28 cm

Q35. A chord is 16 cm long. The radius of the circle is 10 cm. Find the perpendicular distance from the center to the chord.

SOLUTION:

The perpendicular from center bisects the chord.

$$\text{half-chord} = 8 \text{ cm}$$

$$d = \sqrt{(10^2 - 8^2)} = \sqrt{(100 - 64)} = \sqrt{36} = 6 \text{ cm}$$

Answer: 6 cmQ36. Two concentric circles have radii 5 cm and 3 cm. Find the area of the ring (annulus) between them. (Use $\pi = 3.14$)**SOLUTION:**

$$\text{Area} = \pi(R^2 - r^2) = 3.14(25 - 9) = 3.14 \times 16 = 50.24 \text{ cm}^2$$

Answer: 50.24 cm²

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Q37. A semicircle has a diameter of 20 cm. Find its perimeter. (Use $\pi = 3.14$)

SOLUTION:

$$\text{Perimeter} = \pi r + 2r = (3.14 \times 10) + 20 = 31.4 + 20 = 51.4 \text{ cm}$$

Answer: 51.4 cm

Q38. The area of a circle is 314 cm². Find its radius. (Use $\pi = 3.14$)

SOLUTION:

$$A = \pi r^2 \rightarrow r^2 = 314/3.14 = 100 \rightarrow r = 10 \text{ cm}$$

Answer: 10 cm

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**Area & Perimeter (Mixed)**

Q39. A composite figure consists of a rectangle 8 cm × 5 cm with a semicircle on one of the shorter ends (diameter 5 cm). Find the total area. (Use $\pi = 3.14$)

SOLUTION:

$$\text{Rectangle area} = 8 \times 5 = 40 \text{ cm}^2$$

$$\text{Semicircle area} = \frac{1}{2} \times \pi \times (2.5)^2 = \frac{1}{2} \times 3.14 \times 6.25 = 9.8125 \approx 9.81 \text{ cm}^2$$

$$\text{Total} \approx 49.81 \text{ cm}^2$$

Answer: $\approx 49.81 \text{ cm}^2$

Q40. A path 2 m wide runs around the outside of a rectangular garden 30 m × 20 m. Find the area of the path.

SOLUTION:

$$\text{Outer rectangle} = (30+4) \times (20+4) = 34 \times 24 = 816 \text{ m}^2$$

$$\text{Inner} = 30 \times 20 = 600 \text{ m}^2$$

$$\text{Path area} = 816 - 600 = 216 \text{ m}^2$$

Answer: 216 m²

Q41. A right-angled triangle has legs 9 cm and 12 cm. Find its perimeter.

SOLUTION:

$$\text{Hypotenuse} = \sqrt{(81+144)} = \sqrt{225} = 15 \text{ cm}$$

$$\text{Perimeter} = 9 + 12 + 15 = 36 \text{ cm}$$

Answer: 36 cm

Q42. The area of a square is 225 cm². Find its perimeter.

SOLUTION:

$$s = \sqrt{225} = 15 \text{ cm}$$

$$\text{Perimeter} = 4 \times 15 = 60 \text{ cm}$$

Answer: 60 cm

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**Volume & Surface Area**

Q43. Find the volume of a rectangular box 10 cm × 6 cm × 4 cm.

SOLUTION:

$$V = l \times w \times h = 10 \times 6 \times 4 = 240 \text{ cm}^3$$

Answer: 240 cm³

Q44. Find the total surface area of a cube with edge length 5 cm.

SOLUTION:

$$A = 6s^2 = 6 \times 25 = 150 \text{ cm}^2$$

Answer: 150 cm²Q45. A cylinder has radius 7 cm and height 10 cm. Find its volume. (Use $\pi = 22/7$)**SOLUTION:**

$$V = \pi r^2 h = (22/7) \times 49 \times 10 = 1540 \text{ cm}^3$$

Answer: 1540 cm³

Q46. Find the volume of a triangular prism whose base is a right triangle with legs 6 cm and 8 cm, and whose length is 12 cm.

SOLUTION:

$$\text{Base area} = \frac{1}{2} \times 6 \times 8 = 24 \text{ cm}^2 \quad V = 24 \times 12 = 288 \text{ cm}^3$$

Answer: 288 cm³Q47. A rectangular swimming pool is 25 m long, 10 m wide, and 2 m deep. How many litres of water does it hold? (1 m³ = 1000 L)**SOLUTION:**

$$V = 25 \times 10 \times 2 = 500 \text{ m}^3 = 500\,000 \text{ litres}$$

Answer: 500 000 litres

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 Coordinate Geometry

Q48. Find the distance between points A(3, 4) and B(7, 1).

SOLUTION:

$$d = \sqrt{(7-3)^2 + (1-4)^2} = \sqrt{(4)^2 + (-3)^2} = \sqrt{16 + 9} = \sqrt{25} = 5 \text{ units}$$

Answer: 5 units

Q49. Find the midpoint of the segment joining P(-2, 6) and Q(8, -4).

SOLUTION:

$$M = ((-2+8)/2, (6+(-4))/2) = (3, 1)$$

Answer: (3, 1)

Q50. A triangle has vertices at A(0, 0), B(6, 0), and C(0, 8). Find its area.

SOLUTION:

The triangle is right-angled at A, with legs along the axes.

$$A = \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 6 \times 8 = 24 \text{ sq units}$$

Answer: 24 sq. units