

CHAPTER - 13

Properties of Triangles

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1 C. MCQs WITH ONE CORRECT ANSWER

- 1) In a triangle ABC , $\angle B = \frac{\pi}{3}$ and $\angle C = \frac{\pi}{4}$. Let D divide BC internally in the ratio 1 : 3 then $\frac{\sin \angle BAD}{\sin \angle CAD}$ is equal to
- $\frac{1}{\sqrt{6}}$
 - $\frac{1}{3}$
 - $\frac{1}{\sqrt{3}}$
 - $\sqrt{\frac{2}{3}}$
- (1995S)
- 2) In a triangle ABC , $2ac \sin \frac{1}{2}(A - B + C) =$
- $a^2 + b^2 - c^2$
 - $c^2 + a^2 - b^2$
 - $b^2 - c^2 - a^2$
 - $c^2 - a^2 - b^2$
- (2000S)
- 3) In a triangle ABC , let $\angle C = \frac{\pi}{2}$. If r is the inradius and R is the circumradius of the triangle, then $2(r + R)$ is equal to
- $a + b$
 - $b + c$
 - $c + a$
 - $a + b + c$
- (2000S)
- 4) A pole stands vertically inside a triangular park $\triangle ABC$. If the angle of elevation of the top of the pole from each corner of the park is same, then in $\triangle ABC$ the foot of the pole is at the
- centroid
 - circumcentre
 - incentre
 - orthocentre
- (2000S)
- 5) A man from the top of a 100 metres high tower sees a car moving towards the tower at an angle of depression of 30° . After some time, the angle of depression becomes 60° . The distance (in metres) travelled by the car during this time is
- $100\sqrt{3}$
 - $\frac{200\sqrt{3}}{3}$

- c) $\frac{100\sqrt{3}}{3}$
 d) $200\sqrt{3}$

(2001S)

6) Which of the following pieces of data does NOT uniquely determine an acute-angled triangle $\triangle ABC$ (R being the radius of the circumcircle)?

- a) $a, \sin A, \sin B$
 b) a, b, c
 c) $a, \sin B, R$
 d) $a, \sin A, R$

(2002S)

7) If the angles of a triangle are in the ratio 4: 1: 1, then the ratio of the longest side to the perimeter is

- a) $\sqrt{3}: 2 + \sqrt{3}$
 b) 1: 6
 c) $1: 2 + \sqrt{3}$
 d) 2: 3

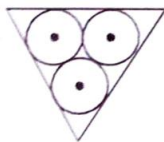
(2003S)

8) The sides of a triangle are in the ratio 1: $\sqrt{3}$: 2, then the angles of the triangle are in the ratio

- a) 1: 3: 5
 b) 2: 3: 4
 c) 3: 2: 1
 d) 1: 2: 3

(2004S)

9) In an equilateral triangle, 3 coins of radii 1 unit each are kept so they touch each other and also the sides of the triangle. Area of the triangle is



- a) $4 + 2\sqrt{3}$
 b) $6 + 4\sqrt{3}$
 c) $12 + \frac{7\sqrt{3}}{4}$
 d) $3 + \frac{7\sqrt{3}}{4}$

(2005S)

10) In a triangle ABC , a, b, c are the lengths of its sides and A, B, C are the angles of triangle ABC . The correct relation is given by

- a) $(b - c) \sin\left(\frac{B-C}{2}\right) = a \cos\left(\frac{A}{2}\right)$
 b) $(b - c) \cos\left(\frac{A}{2}\right) = a \sin\left(\frac{B-C}{2}\right)$
 c) $(b - c) \sin\left(\frac{B+C}{2}\right) = a \cos\left(\frac{A}{2}\right)$

d) $(b - c) \cos\left(\frac{A}{2}\right) = a \sin\left(\frac{B+C}{2}\right)$

(2005S)

- 11) One angle of an isosceles \triangle is 120° and radius of its incircle = $\sqrt{3}$. Then the area of the triangle in sq. units is

- a) $7 + 12\sqrt{3}$
 b) $12 - 7\sqrt{3}$
 c) $12 + 7\sqrt{3}$
 d) 4π

(2006 - 3M, -1)

- 12) Let $ABCD$ be a quadrilateral with area 18, with side AB parallel to the side CD and $2AB = CD$. Let AD be perpendicular to AB and CD . If a circle is drawn inside the quadrilateral $ABCD$ touching all the sides, then the radius is

- a) 3
 b) 2
 c) $\frac{3}{2}$
 d) 1

(2007 - 3 Marks)

- 13) If the angles A, B and C of a triangle are in an arithmetic progression and if \mathbf{a}, \mathbf{b} and \mathbf{c} denote the lengths of the sides opposite to A, B and C respectively, then the value of the expression $\frac{a}{c} \sin 2C + \frac{c}{a} \sin 2A$ is

- a) $\frac{1}{2}$
 b) $\frac{\sqrt{3}}{2}$
 c) 1
 d) $\sqrt{3}$

(2010)

- 14) Let PQR be a triangle of area Δ with $a = 2, b = \frac{7}{2}$ and $c = \frac{5}{2}$, where \mathbf{a}, \mathbf{b} and \mathbf{c} are the lengths of the sides of the triangle opposite to the angles at P, Q and R respectively. Then $\frac{2 \sin P - \sin 2P}{2 \sin P + \sin 2P}$ equals

- a) $\frac{3}{4\Delta}$
 b) $\frac{45}{4\Delta}$
 c) $\left(\frac{3}{4\Delta}\right)^2$
 d) $\left(\frac{45}{4\Delta}\right)^2$

(2012)

- 15) In a triangle the sum of two sides is \mathbf{x} and the product of the same sides is \mathbf{y} . If $x^2 - c^2 = y$, where \mathbf{c} is the third side of the triangle, then the ratio of the inradius to the circum-radius of the triangle is

- a) $\frac{3y}{2(x+c)}$
 b) $\frac{3y}{2c(x+c)}$
 c) $\frac{3y}{4x(x+c)}$
 d) $\frac{3y}{4c(x+c)}$

(JEE Adv. 2014)