Properties of Triangle

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I. Fill in the Blanks

1) In a $\triangle ABC$, $\angle A = 90°$ and AD is an altitude. Complete the relation

$$\frac{BD}{BA} = \frac{AB}{(...)} \quad (1980)$$

2) ABC is a triangle, P is a point on AB, and Q is point on AC such that $\angle AQP = \angle ABC$. Complete the relation $\frac{area\ of \triangle APQ}{area\ of \triangle ABC} = \frac{(...)}{AC^2}$ (1980)
3) ABC is a triangle with $\angle B$ greater than $\angle C$ D and E are the points on BC such that AD is perpendicular to BC and AE is the bisector of angle A .Complete the relation
$\angle DAE = \frac{1}{2}[() - \angle C]$ (1980)
4) the set of all real numbers a such that $a^2 + 2a, 2a + 3$ and $a^2 + 3a + 8$ are the sides of a triangle is ... (1985 - 2 Marks)
5) In a triangle ABC, if $\cot A$,$\cot B$,$\cot C$ are in A.P. ,then a^2,b^2,c^2,are in ... progression (1985 - 2 Marks)
6) A polygon of nine sides, each of length 2, is inscribed in a circle. The radius of the circle is ... (1987 - 2 Marks)
7) If the angles of a triangle are 30° and 45° and the included side is $(\sqrt{3}+1)$ cms, then the area of the triangle is ... (1988 - 2 Marks)
8) If the triangle ABC, $\frac{2\cos A}{a} + \frac{2\cos B}{b} + \frac{2\cos C}{c} = \frac{a}{bc} + \frac{b}{ac}$, then the value of the angle A is ... degrees. (1993 - 2 Marks)
9) In the triangle ABC, AD is the altitude from A. Given $b > c$, $\angle C = 23°$ and $AD = \frac{abc}{b^2-c^2}$ then $\angle B$ = ... (1994 - 2 Marks)
10) A circle is inscribed in a equilateral triangle of a side a. The area of any square inscribed in this circle is ... (1994 - 2 Marks)
11) In a triangle ABC, $a : b : c = 4 : 5 : 6$. The ratio of the radius of the circumstances to that of the incircle is ... (1996 - 1 Marks)

II. MCQ with one correct answer

1) If the bisector of the angle P of a triangle PQR meets QR in S, then
   a) $\frac{QS}{SR} = \frac{PR}{PQ}$
   b) $\frac{QS}{SR} = \frac{PR}{PQ}$
   c) $\frac{QS}{SR} = \frac{PQ}{PR}$
   d) None of these (1979)

2) From the top of a light-house 60 meter high with its base at the sea level the angle of depression of a boat is 15°. The distance of the boat from the foot of the light house.
   a) $\left(\frac{\sqrt{3}-1}{\sqrt{3}+1}\right)60\ metres$
   b) $\left(\frac{\sqrt{3}+1}{\sqrt{3}-1}\right)60\ metres$
   c) $\left(\frac{\sqrt{3}+1}{\sqrt{3}-1}\right)^2 60\ metres$
   d) none of these

(1983 - 2 Marks)

3) In the triangle ABC, angle A is the greater than angle B. If the measures of the angles A and B satisfies the equation $3\sin x - 4\sin^3 x - k = 0, 0 < k < 1$, then the measure of the angle C is
   a) $\frac{\pi}{3}$
   b) $\frac{\pi}{2}$
   c) $\frac{2\pi}{3}$
   d) $\frac{5\pi}{6}$

(1985 - 2 Marks)

4) If the lengths of the sides of triangles are 3,5,7 then the largest angles of the triangle is
   a) $\frac{\pi}{2}$
   b) $\frac{5\pi}{6}$
   c) $\frac{2\pi}{3}$
   d) $\frac{3\pi}{4}$

(1986 - 2 Marks)