A Division of Aggarwal Educare
Aggarwal CLASSES™

# Daily Practice Problems

## JEE MATHS

### Topic: Solution of Triangle

**Q.1** If in a triangle the angles are in A.P. and b : c = $\sqrt{3}$ : $\sqrt{2}$ , then $\angle$ A is equal to -

(A) 30º (B) 60º

(C) 15º (D) 75º

**Q.2** In $\Delta$ ABC, if $\sin^2A + \sin^2B = \sin^2C$, then the triangle is -

(A) Equilateral (B) Isosceles

(C) Right angled (D) None of these

**Q.3** If in a $\Delta$ ABC, $\cos A = \frac{\sin B}{2\sin C}$ , then the $\Delta$ABC is -

(A) Equilateral (B) Isosceles

(C) Right angled (D) None of these

**Q.4** If $c^2 = a^2 + b^2$, then

$4s(s-a)(s-b)(s-c) =$

(A) $s^4$ (B) $b^2c^2$

(C) $c^2a^2$ (D) $a^2b^2$

**Q.5** $\frac{1+\cos(A-B)\cos C}{1+\cos(A-C)\cos B} =$

(A) $\frac{a^2+b^2}{a^2+c^2}$ (B) $\frac{b^2+c^2}{b^2-c^2}$

(C) $\frac{c^2-a^2}{a^2+b^2}$ (D) None of these

**Q.6** $r r_1 + r_2 r_3 =$

(A) ba (B) ac

(C) bc (D) abc

**Q.7** $r_1 + r_2 =$

(A) $c \tan\left(\frac{C}{2}\right)$ (B) $c \cot\left(\frac{C}{2}\right)$

(C) $c \sin\left(\frac{C}{2}\right)$ (D) $c \cos\left(\frac{C}{2}\right)$

**Q.8** $16R^2 r r_1 r_2 r_3 =$

(A) abc (B) $a^3 b^3 c^3$

(C) $a^2 b^2 c^2$ (D) $a^2 b^3 c^4$

**Q.9** In $\Delta ABC$, $a \sin(B - C) + b \sin(C - A) + c \sin(A - B) =$

(A) 0 (B) a + b + c

(C) $a^2 + b^2 + c^2$ (D) $2(a^2 + b^2 + c^2)$

**Q.10** In a $\Delta ABC$, if a = 8, b = 15, c = 17 then $\sin\frac{A}{2}$ and cos A are equal to-

(A) $\frac{1}{\sqrt{17}}, \frac{15}{17}$ (B) $\frac{2}{\sqrt{17}}, \frac{13}{17}$

(C) $\frac{2}{\sqrt{17}}, \frac{11}{17}$ (D) None of these

**Q.11** In any $\Delta ABC$, $4\Delta(\cot A + \cot B + \cot C)$ is equal to -

(A) $3(a^2 + b^2 + c^2)$ (B) $2(a^2 + b^2 + c^2)$

(C) $(a^2 + b^2 + c^2)$ (D) None of these

**Q.12** If the sides of a triangle are proportional to the cosine of the opposite angles, then the triangle is-

(A) Right angled (B) equilateral

(C) obtuse angled (D) None of these

**Q.13** In a triangle ABC,

$(a + b + c)(b + c - a) = \lambda bc$ if -

(A) $\lambda < 0$ (B) $\lambda > 0$

(C) $0 < \lambda < 4$ (D) $\lambda > 4$

**Q.14** In $\Delta ABC$, if $(a + b + c)(a - b + c) = 3ac$, then -

(A) $\angle B = 60º$

(B) $\angle B = 30º$

(C) $\angle C = 60º$

(D) $\angle A + \angle C = 90º$

**Q.15** In a triangle ABC, if $b^2 + c^2 = 3a^2$, then cot B + cot C – cot A is equals to -

(A) 1 (B) $\frac{ab}{4\Delta}$ (C) 0 (D) $\frac{ac}{4\Delta}$

**Q.16** If the median of $\Delta ABC$ through A is perpendicular to AB, then-

(A) tan A + tan B = 0 (B) 2tan A + tan B = 0

(C) tan A + 2 tan B = 0 (D) None of these

**Q17** In a $\Delta ABC$, if $r = r_2 + r_3 - r_1$, and $\angle A > \frac{\pi}{3}$ then the range of $\frac{s}{a}$ is equal to-

(A) $\left(\frac{1}{2}, 2\right)$ (B) $\left(\frac{1}{2}, \infty\right)$

(C) $\left(\frac{1}{2}, 3\right)$ (D) $(3, \infty)$

**Q.18** If in a triangle ABC,

$\cos A \cos B + \sin A \sin B \sin C = 1$,

then the sides are proportional to-

(A) $1 : 1 : \sqrt{2}$ (B) $1 : \sqrt{2} : 1$

(C) $\sqrt{2} : 1 : 1$ (D) None of these

**Q.19** If $\lambda$ be the perimeter of the $\Delta ABC$ then

$b\cos^2\frac{C}{2} + c\cos^2\frac{B}{2}$ is equal to-

(A) $\lambda$ (B) $2\lambda$

(C) $\lambda/2$ (D) None of these

**Q.20** In any triangle ABC, $\sum\frac{\sin^2 A+\sin A+1}{\sin A}$ is always greater than-

(A) 9 (B) 3

(C) 27 (D) None of these

**Q.21** In a $\Delta ABC$, a cot A + b cot B + c cot C =

(A) r + R (B) r – R

(C) 2 (r + R)(D) 2 (r – R)

**Q.22** If in a $\Delta ABC$, 3a = b + c then $\tan\frac{B}{2}.\tan\frac{C}{2}$ is equal to-

(A) $\tan\frac{A}{2}$ (B) 1

(C) 2 (D) None of these

**Q.23** The equation $ax^2 + bx + c = 0$, where a, b, c are the sides of a $\Delta ABC$ and the equation $x^2 + \sqrt{2}x + 1 = 0$ have a common root. The measure of $\angle C$ is-

(A) 90° (B) 45°

(C) 60° (D) None of these

**Q.24** In a $\Delta ABC$, (c + a + b) (a + b – c) = ab. The measure of $\angle C$ is-

(A) $\frac{\pi}{3}$ (B) $\frac{\pi}{6}$

(C) $\frac{2\pi}{3}$ (D) None of these

**Q.25** The diameter of the circumcircle of a triangle with sides 5 cm, 6 cm and 7 cm is-

(A) $\frac{3\sqrt{6}}{2}$ cm (B) $2\sqrt{6}$ cm

(C) $\frac{35}{48}$ cm (D) None of these

**Q.26** Let A, B and C are the angles of a triangle and $\tan\left(\frac{A}{2}\right)=\frac{1}{3}$, $\tan\left(\frac{B}{2}\right)=\frac{2}{3}$ . Then $\tan\left(\frac{C}{2}\right)$ is equal to-

(A) $\frac{1}{3}$ (B) $\frac{2}{3}$ (C) $\frac{2}{9}$ (D) $\frac{7}{9}$

**Q.27** If A, $A_1$, $A_2$, $A_3$ be the area of the incircle and excircles then $\frac{1}{\sqrt{A_1}}+\frac{1}{\sqrt{A_2}}+\frac{1}{\sqrt{A_3}}$ is equal to-

(A) $\frac{1}{\sqrt{A}}$ (B) $\frac{2}{\sqrt{A}}$

(C) $\frac{3}{\sqrt{A}}$ (D) None of these

**Q.28** If $\alpha, \beta, \gamma$ are the altitudes of a $\Delta ABC$ and 2s denotes its perimeter, then $\alpha^{-1}+\beta^{-1}+\gamma^{-1}$ is equal to-

(A) $\frac{\Delta}{s}$ (B) $\frac{s}{\Delta}$

(C) $s.\Delta$ (D) None of these

**Q.29** If the perpendicular AD divides the base of the $\Delta ABC$ such that BD, CD and AD are in ratio 2 : 3 : 6, then angle A is equal to-

(A) $\frac{\pi}{2}$ (B) $\frac{\pi}{3}$

(C) $\frac{\pi}{4}$ (D) $\frac{\pi}{6}$

**Q.30** Two sides of a triangle are given by the roots of the equation $x^2 - 2\sqrt{3}x + 2 = 0$. The angle between the sides is $\frac{\pi}{3}$. The perimeter of the triangle is-

(A) $6+\sqrt{3}$ (B) $2\sqrt{3}+\sqrt{6}$

(C) $2\sqrt{6}+\sqrt{10}$ (D) None of these

# ANSWER KEY

| Que. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Ans. | D | C | B | D | A | C | B | C | A | A |
| Que. | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Ans. | C | B | C | A | C | C | A | A | C | A |
| Que. | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Ans. | C | D | B | C | D | D | A | B | C | B |