MATHS

BOOKS - OBJECTIVE RD SHARMA MATHS VOL I (HINGLISH)

PROPERTIES OF TRIANGLES AND CIRCLES CONNECTED WITH THEM

Illustration

1. In any Δ ABC, $\sum$ a(sin B - sin C) =

A. 2s

B. $a^2 + b^2 + c^2$

C. 0

D. none of these

Answer:

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2. In any Δ ABC, $\sum$ a sin (B -C) =

A. 2s

B. a+b+c

C. $a^2 + b^2 + c^2$

D. 0

Answer:

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3. In any ΔABC, $\sum a^2 \left(\sin^2 B - \sin^2 C\right) =$

A. 2s

B. $a^2 + b^2 + c^2$

C. 0

D. none of these

Answer: C

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4. In any ΔABC, $\sum (b-c)\cot A/2$`=

A. 0

B. 1

C. -1

D. none of these

Answer:

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5. If in a ΔABC,

$\sin A : \sin C = \sin(A - B) : \sin(B - C)$, then a^2, b^2, c^2 are in

A. A.P

B. G.P.

C. H.P.

D. none of these

Answer: A

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6. In a ΔABC, if a =2, B = 60°and C =75°, then b=

A. $\sqrt{3}$

B. $\sqrt{6}$

C. $\sqrt{9}$

D. $1 + \sqrt{2}$

Answer: B

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7. In a ΔABC, if A = 45° and C = 60°, then $a + \sqrt{2}C =$

A. b

B. 2b

C. $\sqrt{2}b$

D. $\sqrt{3}b$

Answer:

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8. If the angles of a triangle are in the ratio 2 : 3 : 7 ,then the sides are in the ratio

A. $\sqrt{2}:2:\sqrt{3}+1$

B. $2:\sqrt{2}:\sqrt{3}:1$

C. $\sqrt{2}:\sqrt{3}+1:2$

D. $2:3:7$

Answer: A

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9. If two angles of a ΔABC are 45 ° and 60°, then the ratio of the smallest and greatest sides are

A. $\left(\sqrt{3}-1\right):1$

B. $\sqrt{3}:\sqrt{2}$

C. $1:\sqrt{3}$

D. $\sqrt{3}:1$

Answer: A

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10. In a ΔABC, if $\frac{\cos A}{a} = \frac{\cos B}{b} = \frac{\cos C}{c}$ and the side a = 2, then area of the triangle is

A. 1

B. 2

C. $\sqrt{3}/2$

D. $\sqrt{3}$

Answer: D

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11. The perimeter of a ΔABC is 6 times the arithmetic mean of the sines of its angles. If the side a is 1, then the angle A is

A. $\frac{\pi}{6}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{2}$

D. π

Answer: A

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12. If in a ΔABC, c = 3b and C - B = 90°, then tanB=

A. $2+\sqrt{3}$

B. $2-\sqrt{3}$

C. 3

D. $1/3$

Answer: D

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13. If 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. $2:3:1$

C. $3:2:1$

D. $1:2:3$

Answer: D

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14. In a ΔABC, if b + c = 3a, then the value of $\frac{\cot B}{2}\frac{\cot C}{2}$, is

A. 1

B. 2

C. $\sqrt{3}$

D. 3

Answer: B

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15. The angles of a triangle are in the ratio 3 : 5 : 10, the ratio of the smallest side to the greatest side is

A. $1 : \sin 10^\circ$

B. $1 : 2\sin 10^\circ$

C. $1 : \cos 10^\circ$

D. $1 : 2\cos 10^\circ$

Answer: D

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16. In any ΔABC, 2 (bc cos A + ca cos B + ab cos C) =

A. $a^2 + b^2 + c^2$

B. abc

C. a+b+c

D. none of these

Answer:

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17. The sides of a triangle are a,b and $\sqrt{a^2 + b^2 + ab}$ then the greatest angle is

A. 60°

B. 90°

C. 120°

D. none of these

Answer:

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18. In a triangle ABC, a= 4, b = 3, $\angle A = 60^\circ$. Then, c is the root of the equation

A. $c^2 - 3c - 7 = 0$

B. $c^2 + 3c + 7 = 0$

C. $c^2 - 3c + 7 = 0$

D. $c^2 + 3c - 7 = 0$

Answer:

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19. In a ΔABC, if(c+a+b) (a+b-c) =ab, then the measure of angle C is

A. $\frac{\pi}{3}$

B. $\frac{\pi}{6}$

C. $\frac{2\pi}{3}$

D. $\frac{\pi}{2}$

Answer:

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20. In a ΔABC, if the sides a, b, c are the roots of the equation $x^3 - 11x^2 + 38x - 40 = 0$, then $\frac{\cos A}{a} + \frac{\cos B}{b} + \frac{\cos C}{c} =$

A. $\frac{16}{9}$

B. $\frac{3}{4}$

C. $\frac{4}{3}$

D. $\frac{9}{16}$

Answer:

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21. In a ΔABC ,

$$\frac{b^2-c^2}{a\sec A}+\frac{c^2-a^2}{b\sec B}+\frac{a^2-b^2}{c\sec C}=$$

A. 1

B. 0

C. abc

D. none of these

Answer: B

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22. In a ΔABC, if a = 4, b = 5 , c = 6 then angle C is equal to

A. A

B. $\frac{1}{2}A$

C. 2A

D. 3A

Answer:

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23. In a ΔABC, if $\Delta C = 60^\circ$, then

$$\frac{b}{c^2 - a^2} + \frac{a}{c^2 - b^2} =$$

A. a+b+c

B. $\frac{1}{a + b + c}$

C. abc

D. 0

Answer:

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24. In a triangle ABC, 2ac sin $\left(\frac{A - B + C}{2}\right)$ =

A. $a^2 + b^2 - c^2$

B. $c^2 + a^2 - b^2$

C. $b^2 - c^2 - a^2$

D. $c^2 - a^2 - b^2$

Answer:

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25. The angles A, B and C of a triangle are in A.P. If AB= 6 units, BC = 7units, then AC is equal to

A. 5 units

B. 7 units

C. 8 units

D. none of these

Answer:

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26. In a triangle ABC, a (b cos C - c cos B) =

A. a^2

B. $b^2 - c^2$

C. 0

D. none of these

Answer:

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27. The straight roads intersect at an angle of 60°. A bus on one road is 2 km away from the intersection and a car on tire other road is 3 km away from the intersection. Then, the direct distance between the two vehicles, is

A. 1 km

B. $\sqrt{2}$ km

C. 4 km

D. $\sqrt{7}$ km

Answer:

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28. In a ΔABC, $b\frac{\cos^2 C}{2} + c\frac{\cos^2 B}{2}$ is equal to

A. s

B. 2s

C. s/2

D. none of these

Answer:

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29. In a ΔABC, $\sum (b+c)\cos A =$

A. a+b+c

B. a+b-c

C. a-b+c

D. none of these

Answer:

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30. In a ΔABC, $a\left(\cos^2 B + \cos^2 C\right) + \cos A(c\cos C + b\cos B) =$

A. a

B. b

C. c

D. 0

Answer:

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31. In a ΔABC, if a $\frac{\cos^2 B}{2} + b\frac{\cos^2 A}{2} = \frac{3c}{2}$, then

A. a,b,c are in A.P.

B. a,c,b are in A.P.

C. a,b,c are in G.P.

D. none of these

Answer:

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32. In any ΔABC, $\sum \frac{\cos A}{b\cos C + osB}$ is equal to

A. $a^2 + b^2 + c^2$

B. $\frac{a^2 + b^2 + c^2}{abc}$

C. $\frac{a^2 + b^2 + c^2}{2abc}$

D. none of these

Answer:

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33. In a ΔABC, if a=13,b =14, c =15, then $\frac{\sin A}{2} =$

A. $\frac{1}{\sqrt{5}}$

B. $\frac{2}{\sqrt{5}}$

C. $\frac{3}{\sqrt{5}}$

D. $\frac{4}{\sqrt{5}}$

Answer:

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34. If in a ΔABC, Δ = (c + a - b) (a + b - c), then tan A is equal to

A. $\frac{2}{\sqrt{3}}$

B. $\frac{8}{15}$

C. $\frac{15}{16}$

D. none of these

Answer: B

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35. In a ΔABC, $2a\frac{\sin^2 C}{2} + 2c\frac{\sin^2 A}{2} =$

A. 2(s-c)

B. 2(s-b)

C. 2(s-a)

D. s

Answer: B

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36. In a ΔABC, if $\frac{\tan A}{2} = \frac{5}{6}$ and $\frac{\tan B}{2} = \frac{20}{37}$ then $\frac{\tan C}{2} =$

A. $\frac{4}{5}$

B. $\frac{3}{5}$

C. $\frac{2}{5}$

D. none of these

Answer:

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37. In a ΔABC, if a =2x, b =2y and $\Delta C = 120^\circ$, then area of the triangle is

A. xy

B. $\sqrt{3}xy$

C. 3xy

D. 2xy

Answer:

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38. If the area of ΔABC be λ, then $a^2 \sin 2B + b^2 \sin 2A$ is equal t,o

A. 2λ

B. λ

C. 4λ

D. none of these

Answer:

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39. In $\Delta ABC, c^2 = a^2 + b^2,$ then 4s (s -a) (s -b) (s -c) =

A. a^2b^2

B. c^2a^2

C. b^2c^2

D. s^4

Answer:

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40. In a Δ ABC,

$$\frac{\left(a^2 - b^2\right)\sin A \sin B}{2\sin(A - B)} =$$

A. 2Δ

B. 4Δ

C. Δ

D. 3Δ

Answer:

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41. In ΔABC, $(a+b+c)\left(\frac{\tan A}{2}+\frac{\tan B}{2}\right)=$

A. $2c\frac{\cot C}{2}$

B. $2a\frac{\cot A}{2}$

C. $2b\frac{\cot B}{2}$

D. $\frac{\tan C}{2}$

Answer:

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42. In a ΔABC, if $\tan\frac{A}{2}=\frac{5}{6}$ and $\frac{\tan C}{2}=\frac{2}{5}$, then

A. $b^2=ac$

B. $2b=ac$

C. $2ac=b(a+c)$

D. a+b+c

Answer:

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43. In a ΔABC, 2A(cot B + cot C)=

A. b^2

B. c^2

C. a^2

D. $2a^2$

Answer:

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44. In a ΔABC,

$$\left(c^2+a^2-b^2\right)\tan B+\left(a^2+b^2-c^2\right)\tan C=$$

A. 4Δ

B. 8Δ

C. 6Δ

D. 12Δ

Answer:

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45. In ΔABC, 4Δ(cot A+ cot B + cot C) =

A. a+b+c

B. $a^{-1}+b^{-1}+c^{-1}$

C. $a^2+b^2+c^2$

D. none of these

Answer:

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46. In any ΔABC, a cos A +b cos B + c cos C =

A. $\frac{\Delta^2}{abc}$

B. $\frac{4\Delta^2}{abc}$

C. $\frac{8\Delta^2}{abc}$

D. none of these

Answer:

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47. A triangular park is enclosed on two sides of a fence and on the third side by a straight river bank. The two sides having fence are of same length x. The maximum area enclosed by the park is

A. $\frac{3}{2}x^2$

B. $\sqrt{\frac{x^3}{8}}$

C. $\frac{1}{2}x^2$

D. πx^2

Answer:

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48. In any ΔABC, sin A + sin B + sin C =

A. $\frac{2s}{R}$

B. $\frac{s}{R}$

C. $\frac{3s}{R}$

D. none of these

Answer:

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49. In a ΔABC

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

A. $\frac{1}{2R}$

B. $\frac{1}{R}$

C. $\frac{2}{R}$

D. none of these

Answer:

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50. If the radius of the circumcircle of an isosceles triangle PQR is equal to PQ (= PR),then the angle P, is

A. $\frac{\pi}{6}$

B. $\frac{\pi}{3}$

C. $\frac{2\pi}{3}$

D.

Answer:

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51. In a ΔABC, R^2 (sin 2A+sin 2B+sin 2C)=

A. Δ

B. 3Δ

C. 4Δ

D. 2Δ

Answer:

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52. 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

Answer:

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53. If Δ denotes the area of ΔABC, then $b^2 \sin 2C + c^2 \sin 2B$ is equal to

A. Δ

B. 2Δ

C. 3Δ

D. 4Δ

Answer:

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54. If R denotes the circum-radius of a ΔABC, then $\frac{b^2 - c^2}{2aR}$ is equal to

A. cos (B-C)

B. cos B-cosC

C. sin (B - C)

D. none of these

Answer:

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55. If in ΔABC, $b^2 \sin 2C + c^2 \sin 2B = 2bc$,then the triangle is

A. equilateral

B. isosceles with $\angle B = \angle C$

C. right angled at A

D. none of these

Answer:

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56. If a ΔABC is right angled at B, then the diameter of the incircle of the triangle is

A. 2(c+ a - b)

B. c+a - 2b

C. c + a- b

D. none of these

Answer:

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57. In a triangle a = 13 , b = 14, c = 15, r =

A. 4

B. 8

C. 2

D. 6

Answer:

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58. In an equilateral triangle the in-radius and the circum-radius are connected by

A. r=4R

B. $r = \frac{R}{2}$

C. $r = \frac{R}{3}$

D. none of these

Answer:

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59. In an equilateral triangle, the in-radius, circum-radius and one of the ex-radii are in the ratio

A. $2:3:5$

B. $1:2:3$

C. $1:3:7$

D. $3:7:9$

Answer:

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60. If in a triangle $\left(1-\frac{r_1}{r_2}\right)\left(1-\frac{r_1}{r_3}\right)=2$, then the triangle is

A. right angled

B. isosceles

C. equilateral

D. none of these

Answer:

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61. If $\frac{r}{r_1}=\frac{r_2}{r_3}$, then

A. $A = 90^\circ$

B. $B = 90^\circ$

C. C =90°

D. none of these

Answer:

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62. In a triangle ABC, $r_1 + r = r_2 + r_3$. If the measure of angle A is 60°, then $\frac{s}{a} =$

A. $\frac{2}{3}$

B. 2

C. $\frac{4}{3}$

D. $\frac{3}{2}$

Answer:

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63. In a triangle with sides a, b, c if r1 gt r2 gt r3 (which are the ex-radii), then

A. $a > b > c$

B. $a < b < c$

C. $a > b$ and $b < c$

D. $a < b$ and $b > c$

Answer:

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64. If ΔABC is right angled at A,then $r_2 + r_3$=

A. $r_1 - r$

B. $r_1 + r$

C. $r - r_1$

D. R

Answer:

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65. $r + r_3 + r_1 - r_2 =$

A. 4R cos A

B. 4R cos B

C. 4R cos C

D. 4R

Answer:

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66. In a ΔABC, $r_1 + r_2 + r_3 - r$=

A. 4R cos A

B. 4R cos B

C. 4R cos C

D. 4R

Answer:

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67. In a ΔABC,with usual notations, observe the two statements given below:

(I) $rr_1r_2r_3 = \Delta^2$ (II) $r_1r_2 + r_2r_3 + r_3r_1 = s^2$

Which one of the following is correct?

A. both I and II are true

B. I is true, II is false

C. I is false, II is true

D. both I and II are false

Answer:

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68. The value of $\frac{1}{r_1^2}+\frac{1}{r_2^2}+\frac{1}{r_2^3}+\frac{1}{r^2}$, is

A. 0

B. $\frac{a^2+b^2+c^2}{\Delta^2}$

C. $\frac{\Delta^2}{a^2+b^2+c^2}$

D. $\frac{a^2+b^2+c^2}{\Delta^2}$

Answer:

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Section I Solved Mcqs

1. In a ΔABC, $\frac{a+c}{a-c}\frac{\tan B}{2}$ is equal to

A. $\tan\left(\frac{B}{2}+C\right)$

B. $\tan\left(B+\frac{C}{2}\right)$

C. $\cot\left(\frac{B}{2}+C\right)$

D. none of these

Answer:

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2. In a ΔABC ,which one of the following is true?

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

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

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

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

Answer:

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3. In a ΔABC, $a\frac{\cos^2 B}{2} + b\frac{\cos^2 A}{2}$ is equal to

A. s

B. 2s

C. s/2

D. none of these

Answer:

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4. Given an isosceles triangle, whose one angle is-$2\frac{\pi}{3}$ and the radius of its incircle =sqrt3 Then find the area of the triangle

A. $7+12\sqrt{3}$

B. $12-7\sqrt{3}$

C. $12+7\sqrt{3}$

D. 4π

Answer:

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5. Internal bisector of $\angle A$ of triangle ABC meets side BC at D. A line drawn through D perpendicular to AD intersects the side AC at E and the side AB at F. If a, b, c represent sides of ΔABC, then

A. AE is HM of b and c

B. $AD=\frac{2bc}{b+c}\frac{\cos A}{2}$

C. $EF = \frac{4b}{b+c}\frac{\sin A}{2}$

D. All of these

Answer:

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6. In a triangle ABC with fixed base BC, the vertex A moves such that $\cos B + \cos C = 4\sin^2\left(\frac{A}{2}\right)$.

If a,b,c denote the lengths of the triangle opposite to the angles A, B and C respectively, then

A. b+c=4a

B. b+c=2a

C. locus of point A is an ellipse

D. locus of point A is a pair of straight lines

Answer: C

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7. In a ΔABC, if $\frac{\tan A}{2} = \frac{5}{6}$, and $\frac{\tan B}{2} = \frac{20}{37}$, then

A. 2a=b+c

B. $a > b > c$

C. 2c=a+b

D. none of these

Answer:

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8. In ΔABC ,if A:B:C =$3:5:4$,then $a + b + \sqrt{2}c =$

A. 2b

B. 2c

C. 3b

D. 3a

Answer:

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9. If the lengths of the sides of a triangle are a - b , a + b and $\sqrt{3a^2+b^2}$, $(a, b > , 0)$, then the largest angle of the triangle , is

A. $\frac{2\pi}{3}$

B. $\frac{3\pi}{4}$

C. $\frac{\pi}{2}$

D. $\frac{7\pi}{8}$

Answer:

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10. If the angles of the triangle are in A.P. and $3a^2 = 2b^2$, then angle C ,is

A. $\frac{\pi}{6}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{4}$

D. $\frac{5\pi}{12}$

Answer:

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11. In a ΔABC ,a =5 , b= 4 , and $\frac{\tan C}{2} = \sqrt{\frac{7}{9}}$, then c =

A. 6

B. 3

C. 2

D. none of these

Answer:

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12. If in a $!ABC$ sin A = $\frac{4}{5}$ and sin B = $\frac{12}{13}$, then sin C =

A. $\frac{33}{65}$

B. $\frac{56}{65}$

C. $\frac{33}{56}$

D. none of these

Answer:

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13. If in a $!ABC$, a = 6 , b = 3 and cos (A -B) = $\frac{4}{5}$,then its area in square units, is

A. 8

B. 9

C. 6

D. none of these

Answer:

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14. The perimeter of a $!ABC$ is 6 times arithmetic mean of the sines of its angles .If a = 1, then A =

A. $\frac{\pi}{6}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{2}$

D. π

Answer:

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15. If in a $!ABC$, a =2b ,and $|A-B| = \frac{\pi}{3}$ then C =

A. $\frac{\pi}{4}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{6}$

D. none of these

Answer:

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16. If in a $!ABC$, sin A, sin B and sin C are in A.P, then

A. the altitudes are in A.P.

B. the altitudes are in H.P.

C. the medians are in G.P.

D. the medians are in A.P.

Answer:

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17. If in a $!ABC$, the altitudes from the vertices A , B , C on the opposite sides are in H.P., then sin A, sin B , sin C are in

A. H.P.

B. AGP

C. A.P.

D. G.P.

Answer:

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18. In a triangle ABC cos A = $\frac{7}{8}$, cos B = $\frac{11}{16}$ .then , cos C is equal to

A. $-\frac{1}{4}$

B. $-\frac{1}{2}$

C. 0

D. $\frac{1}{4}$

Answer:

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19. If the angles A , B , C are the solutions of the equations $\tan^3 - 3k\tan^2 x - 3\tan x + k = 0$, then the triangle ABC is

A. isosceles

B. equilateral

C. acute angled

D. none of these

Answer:

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20. If the angles of the 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. $2:3$

Answer:

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21. In a triangle ABC , let $\angle C=\frac{\pi}{2}$. If r is the in-radius and R is the circum-radius of the triangle , then 2 (r + R) is equal to

A. a+b

B. b+c

C. c+a

D. a+b+c

Answer:

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22. Let PQ and RS be tangents at the extremities of the diameter PR of a circle of radius r. If PS and RQ intersect at a point X on the circumference of the circle, then 2r equals

A. $\sqrt{PQ.\,RS}$

B. $\frac{PQ+RS}{2}$

C. $\frac{2PQ.\,RS}{PQ+RS}$

D. $\sqrt{\frac{PQ^2+RS^2}{2}}$

Answer:

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23. If a , b , c denote the sides of a $!ABC$ such that the equation $x^2 + \sqrt{2}x + 1 = 0$ and $ax^2 + bx + c = 0$ have a common root , then C =

A. $\frac{\pi}{4}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{2}$

D. none of these

Answer:

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24. If in a $!ABC$,b = 12 units , c = 5 units and != 30 sq. units , then the distance between vertex A and incentre of the triangle is equal to

A. 2 units

B. $2\sqrt{2}$ units

C. $\sqrt{2}$ units

D. none of these

Answer:

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25. In a $!ABC$, 2r = r_1 and A=30 , then cos $\frac{B-C}{2}$ is equal to

A. $\frac{3\sqrt{3}}{2\sqrt{2}}$

B. $\frac{3\left(\sqrt{3}-1\right)}{2\sqrt{2}}$

C. $\frac{3\left(\sqrt{3}-1\right)}{2\sqrt{3}}$

D. none of these

Answer:

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26. If in a $!ABC$, $a^2\cos^2 A = b^2 + c^2$, then

A. $0 < A < \frac{\pi}{4}$

B. $\frac{\pi}{4} < A < \frac{\pi}{2}$

C. $\frac{\pi}{2} < A < \pi$

D. $A = \frac{\pi}{2}$

Answer:

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27. In a triangle ABC , the sides a , b , c are in G.P., then the maximum value of $\angle B$ is

A. 30°

B. 45°

C. 60°

D. 90°

Answer:

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28. The area of a triangle is $\sqrt{3}$ sq. units and $\angle B$ If a^2, b^2, c^2 are in A.P., the length of side AC is

A. $2\sqrt{3}$ units

B. 2 units

C. 3 units

D. $3\sqrt{3}$ units

Answer:

Watch Video Solution

29. If in a $!ABC$, tan $\frac{A}{2}$ and tan $\frac{B}{2}$ are the roots of the equation $6x^2 - 5x + 1 = 0$, then

A. $a^2 + b^2 > c^2$

B. $a^2 - b^2 = c^2$

C. $a^2 + b^2 = c^2$

D. none of these

Answer:

Watch Video Solution

30. In a $!ABC$ the length of the median AD to the side BC is 4 units. If $\angle A = 60^\circ$ and the area of the triangle is $2\sqrt{3}$ sq. units. The length of side BC, is

A. $2\sqrt{3}$

B. $4\sqrt{3}$

C. 6

D. 8

Answer:

Watch Video Solution

31. 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 $\pi/3$. The perimeter of the triangle is

A. $6 + \sqrt{3}$

B. $2\sqrt{3} + \sqrt{6}$

C. $2\sqrt{3} + \sqrt{10}$

D. none of these

Answer:

Watch Video Solution

32. If in $!ABC$, $\frac{c+a}{b}+\frac{c+b}{a}=\frac{c}{r}$ then

A. $\angle B=\frac{\pi}{2}$

B. $\angle C=\frac{\pi}{2}$

C. $\angle A=\frac{\pi}{2}$

D. none of these

Answer:

Watch Video Solution

33. In a $!ABC$, there is a point D on the side BC such that $\frac{BD}{DC}=\frac{1}{3}$.If $\angle B=\frac{\pi}{3}, \angle C=\frac{\pi}{4}$ and $\sin\angle(CAD)=\lambda\sin\angle BAD$ then λ is equal to

A. $\frac{1}{\sqrt{6}}$

B. $\sqrt{6}$

C. $\frac{1}{\sqrt{3}}$

D. $\sqrt{3}$

Answer:

Watch Video Solution

34. If G is the centroid of a ΔABC, then $GA^2 + GB^2 + GC^2$ is equal to

A. $a^2 + b^2 + c^2$

B. $\frac{a^2 + b^2 + c^2}{3}$

C. $\frac{a^2 + b^2 + c^2}{2}$

D. $\frac{(a + b + c)^2}{3}$

Answer:

Watch Video Solution

35. In an equilateral triangle the ratio of circum-radius and in-radius is

A. $3:1$

B. $1:1$

C. $2:\sqrt{3}$

D. $2:1$

Answer:

Watch Video Solution

36. In an equilateral triangle circum-radius :In-radius : Ex-radii is equal to

A. $1:1:1$

B. $1:2:3$

C. $2:1:3$

D. $3:2:4$

Answer:

Watch Video Solution

37. In a scalene triangle ABC , AD and CF are the altitudes drawn from A and C on the sides BC and AB respectively. If the area of the triangle ABC and BDF are 18sq.units and 2 sq. units respectively and DF = $2\sqrt{2}$, then R =

A. $\frac{9}{4}$

B. $\frac{9}{2}$

C. 9

D. none of these

Answer:

Watch Video Solution

38. The sides of a $!ABC$ are in A.P. such that a lt minimum (b,c). Then , cos A may be equal to

A. $\frac{3c-4b}{2b}$

B. $\frac{3c-4b}{2c}$

C. $\frac{4c-3b}{2b}$

D. $\frac{4c-3b}{2c}$

Answer:

Watch Video Solution

39. If a right angled triangle ABC of maximum Δ area is inscribed in a circle of radius R , then

A. $\Delta = 2R^2$

B. $r = \left(\sqrt{2}-1\right)R$

C. $\frac{1}{r_1}+\frac{1}{r_2}+\frac{1}{r_3}=\frac{\sqrt{2}-1}{R}$

D. $s = \left(\sqrt{2}-1\right)R$

Answer:

Watch Video Solution

40. In $\triangle ABC,\ \angle A = \frac{\pi}{2},\ b = 4,\ c = 3$, then the value of $\frac{R}{r}$ is equal to

A. $\frac{5}{2}$

B. $\frac{7}{2}$

C. $\frac{9}{2}$

D. $\frac{35}{24}$

Answer:

Watch Video Solution

41. If in a $!ABC$,CD is the bisector of $\angle ACB,$ then CD =

A. $\frac{a+b}{2ab}\frac{\cos C}{2}$

B. $\frac{a+b}{ab}\frac{\cos C}{2}$

C. $\frac{2ab}{a+b}\frac{\cos C}{2}$

D. $\frac{b \sin A}{\sin\left(B + \frac{C}{2}\right)}$

Answer:

Watch Video Solution

42. Let ABC be a triangle and O be its orthocentre .If R and R_1 are the circum-radii of triangle ABC and AOB , then

A. $R_1 > R$

B. $R_1 = R$

C. $R_1 < R$

D. none of these

Answer: B

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43. If the area$(!)$ and an angle(θ) of a triangle are given , when the side opposite to the given angle is minimum , then the length of the remaining two sides are

A. $\sqrt{\frac{2!}{\sin\theta}}, \sqrt{\frac{3!}{\sin\theta}}$

B. $\sqrt{\frac{2!}{\sin\theta}}, \sqrt{\frac{2!}{\sin\theta}}$

C. $\sqrt{\frac{4!}{\sin\theta}}, \sqrt{\frac{4!}{\sin\theta}}$

D. $\sqrt{\frac{6!}{\sin\theta}}, \sqrt{\frac{6!}{\sin\theta}}$

Answer:

Watch Video Solution

44. If the sides of a triangle are in A.P. and the greatest angle of the triangle exceeds the least by 90°, then sine of the third angle is

A. $\frac{\sqrt{5}}{4}$

B. $\frac{\sqrt{6}}{4}$

C. $\frac{\sqrt{7}}{4}$

D. none of these

Answer:

Watch Video Solution

45. In the $!ABC$, the altitudes are in H.P., then

A. angles A,B,C are in A.P.

B. sides a,b,c are in A.P.

C. sinA,sinB,sinC are in A.P

D. none of these

Answer:

Watch Video Solution

46. In a $\Delta ABC, \angle B = \frac{2\pi}{3}$ and cos A + cos c = λ. Then , the exhaustive set of value of λ is

A. $(1, 3/2]$

B. $\left(3/2, \sqrt{3}\right)$

C. $\left(1/2, \sqrt{3}/2\right)$

D. none of these

Answer:

Watch Video Solution

47. In $!ABC$, least value of $\frac{e^A}{A} + \frac{e^B}{B} + \frac{e^C}{C}$ is equal to

A. $\frac{9}{\pi} e^{\pi/3}$

B. $\frac{\pi}{3} e^{\pi/3}$

C. $\frac{\pi}{9} e^{\pi/3}$

D. none of these

Answer:

Watch Video Solution

48. If circum-radius and in-radius of a triangle ABC be 10 and 3 units respectively , then a cot A + cot B + cot C is equal to

A. 13

B. 26

C. 39

D. none of these

Answer:

Watch Video Solution

49. In ΔABC , x , y , and z are the distance of incentre from angular points A , B ,and C respectively . If $\frac{xyz}{abc} = \frac{\lambda r}{s}$, then λ=

A. 1

B. 2

C. 3

D. none of these

Answer: A

Watch Video Solution

50. If ! denote the area of any triangle with semi-perimeter , then

A. $! < \frac{s^2}{2}$

B. $! > \frac{s^2}{4}$

C. $! < \frac{s^2}{4}$

D. $! < s^2$

Answer:

Watch Video Solution

51. In any $!ABC$, sin $\frac{A}{2}$ is

A. less than $\frac{b+c}{a}$

B. less than or equal to $\frac{a}{b+c}$

C. greater than $\frac{2a}{a+b+c}$

D. none of these

Answer:

Watch Video Solution

52. In a $!ABC$, $AB=2$, $BC=4$, $CA=3$. If D is the mid-point of BC, then the correct statement(s) is/are

A. $\cos B \neq \frac{11}{16}$

B. $\cos C \neq \frac{7}{8}$

C. $AD \neq 2.4$

D. $AD^2 = 2.5$

Answer:

Watch Video Solution

53. If in a $!ABC$,$a^2 + b^2 + c^2 = ac + \sqrt{3}ab$ then the triangle is

A. equilateral

B. right angled and isosceles

C. right angled and not isosceles

D. none of these

Answer:

Watch Video Solution

54. In a $!ABC$ bisector of angle C meets the side AB at D and circumcricle at E. The maximum value of CD . DE is equal to

A. $\frac{b^2}{4}$

B. $\frac{c^2}{4}$

C. $\frac{a^2}{4}$

D. none of these

Answer:

Watch Video Solution

55. In triangle ABC, AD and BE are the medians drawn through the angular points A and B respectively. $\angle DAB = 2\angle ABE = 36^\circ$ and $AD = 6$ units then circumradius of the triangle is equal to

A. $\left(3 - \sqrt{5}\right)\cos ecC$

B. $\left(3+\sqrt{5}\right)\cos ecC$

C. $2\left(3-\sqrt{5}\right)\cos ecC$

D. $2\left(3+\sqrt{5}\right)$cosecC

Answer:

Watch Video Solution

56. If the median AM , angle bisector AD and altitude AH drawn from vertex A of a triangle ABC divide angle A into four equal (D lying between H and M) , then

A. $A=\frac{\pi}{3}$

B. $A=\frac{\pi}{2}$

C. $\frac{AC}{AB}=\sqrt{2}+1$

D. $\frac{AC}{AB}=\frac{1}{\sqrt{2}+1}$

Answer:

Watch Video Solution

57. Which of the following pieces of data does not uniquely determine an acute-angled triangle ABC (R being the radius of the circumcircle)?

A. a,sinA,sinB

B. a,b,c

C. a,sinB,R

D. a,sinA,R

Answer:

Watch Video Solution

58. If a chord AB of a circle subtends an angle $\theta(\neq \pi/3)$ at a point C on the circumference such that the triangle ABC has maximum area , then

A. $A = \frac{\pi}{3} + \frac{\theta}{2}, B = \frac{2\pi}{3} - \frac{3\theta}{2}$

B. $A = \frac{\pi}{4} + \frac{\theta}{2}, B = \frac{3\pi}{4} - \frac{3\theta}{2}$

C. $A = \frac{\pi}{6} + \theta, B = \frac{5\pi}{6} + 2\theta\Big)$

D. none of these

Answer:

Watch Video Solution

59. In a $!ABC$, medians AD and BE are drawn. If AD = 4, $\angle DAB = \pi/6$ and $\angle ABE = \pi/3$ then the area of $!ABC$ is

A. $\frac{64}{3\sqrt{3}}$

B. $\frac{8}{3\sqrt{3}}$

C. $\frac{16}{3\sqrt{3}}$

D. $\frac{32}{3\sqrt{3}}$

Answer:

Watch Video Solution

60. In a $!ABC$ if sin A cos B = $\frac{1}{4}$ and 3 tan A = B , then the triangle is

A. right angled at A

B. right angled at B

C. right angled at C

D. not right angled

Answer:

Watch Video Solution

61. In a $!ABC$ if $r_1 = 36, r_2 = 18$ and $r_3 = 12$, then the area of the triangle , in square units, is

A. 216

B. 316

C. 326

D. none of these

Answer:

Watch Video Solution

62. In a $!ABC$ if r_1 = 36 ,$r_2 = 18$ and $r_3 = 12$, then the perimeter of the triangle , is

A. 36

B. 18

C. 72

D. none of these

Answer:

Watch Video Solution

63. If in a $\Delta ABC, AD, BE$ and CF are the altitudes and R is the circumradius, then find the radius of the DEF.

A. $\frac{R}{2}$

B. 2R

C. R

D. none of these

Answer:

Watch Video Solution

64. In a $!ABC$ if a = 7 , b = 8 and c = 9 , then the length of the line joining B to the mid-points of AC is

A. 6

B. 7

C. 5

D. none of these

Answer:

Watch Video Solution

65. If the perimeter of a triangle and the diameter of an ex-circle are equal , then the triangle is

A. right angled isosceles

B. right angled

C. equilateral

D. isosceles

Answer:

Watch Video Solution

66. If D id the mid-point of the side BC of a triangle ABC and AD is perpendicular to AC , then

A. $b^2 = a^2 - c^2$

B. $a^2 + b^2 = 5c^2$

C. $3b^2 = a^2 - c^2$

D. $3a^2 = b^2 - 3c^2$

Answer:

Watch Video Solution

67. ABC is a triangle. D is the middle point of BC. If AD is perpendicular to AC, The value of cos A cos C , is

A. $\left(3\frac{c^2 - a^2}{ac}\right.$

B. $\frac{a^2 - c^2}{2ac}$

C. $\left(2\frac{c^2 - a^2}{3ac}\right.$

D. none of these

Answer:

Watch Video Solution

68. If the median of a triangle through A is perpendicular to AB, then

A. 2tanA+tanB=0

B. 2tanA-tanB=0

C. tanA-2tanB=0

D. tanA+2tanB=0

Answer:

Watch Video Solution

69. In a $!ABC$, if $r_1 = 2r_2 = 3r_3$, then a:b:c =

A. $3:4:5$

B. $5:3:4$

C. $5:4:3$

D. none of these

Answer:

Watch Video Solution

70. In a $!ABC$ if $r_1 < r_2 < r_3$, then

A. $a > b > c$

B. $a < b < c$

C. $a < c < b$

D. none of these

Answer:

Watch Video Solution

71. In a $!ABC$ if $r_1 = 8, r_2 = 12$ and $r_3 = 24,$ then a =

A. 16

B. 20

C. 12

D. none of these

Answer:

Watch Video Solution

72. If I is the incentre of a ΔABC such that $\angle A = 60^\circ$, then AI =

A. r

B. $\frac{r}{2}$

C. 2r

D. none of these

Answer: C

Watch Video Solution

73. If I_1 is the centre of the escribed circle touching side BC of ΔABC in which $\angle A = 60^\circ$, then I_1 A =

A. r_1

B. $\frac{r_1}{2}$

C. $2r_1$

D. none of these

Answer: C

Watch Video Solution

74. In a $!ABC$, if 2R + r $=r_1$, then

A. $\angle A = \pi/2$

B. $\angle B = \pi/2$

C. $\angle C = \pi/2$

D. none of these

Answer:

Watch Video Solution

75. The sides of the triangle are $\sin\alpha$, $\cos\alpha$ and $\sqrt{1+\sin\alpha\cos\alpha}$ for some $0 < \alpha < \frac{\pi}{2}$. Then the greatest angle of the triangle is

A. 150°

B. 90°

C. 120°

D. 60°

Answer:

Watch Video Solution

76. In a $!ABC$, if 3a = b + c, then $\cot \frac{B}{2} \cot \frac{C}{2} =$

A. 1

B. 2

C. 3

D. 4

Answer:

Watch Video Solution

77. In $!ABC$, if $\frac{\sin^2 A}{2}, \frac{\sin^2 B}{2}, \frac{\sin^2 C}{2}$ be in H.P., then a, b, c will be in

A. A.P.

B. G.P.

C. H.P.

D. none of these

Answer:

Watch Video Solution

78. In a $!ABC$, if $\frac{1}{b+c}+\frac{1}{c+a}=\frac{3}{a+b+c}$, then $\angle C=$

A. 90°

B. 60°

C. 45°

D. 30°

Answer:

Watch Video Solution

79. Observe the following statements: (I) In $!ABC, b\frac{\cos^2 C}{2} + \cos^2\frac{B}{2} = s$, (II) In $!ABC\frac{\cot A}{2} = \frac{b+c}{2} \Rightarrow B = 90^\circ$

Which of the following is correct?

A. both I and II are true

B. I is true, II is false

C. I is false, II is true

D. both I and II are false

Answer:

Watch Video Solution

80. In a triangle , if $r_1 = 2r_2 = 3r_3$, then $\frac{a}{b} + \frac{b}{c} + \frac{c}{a}$ is equal to

A. $\frac{75}{60}$

B. $\frac{155}{60}$

C. $\frac{176}{60}$

D. $\frac{191}{60}$

Answer:

Watch Video Solution

81. Sides a , b , c of $!ABC$ are in A.P. and $\cos\theta_1 = \frac{a}{b+c}\cos\theta_2 = \frac{b}{a+c}, \cos\theta_3 = \frac{c}{a+b}$, then $\frac{\tan^2(\theta_1)}{2} + \frac{\tan^2(\theta_3)}{2}$=

A. $2/3$

B. 1

C. $\sqrt{5}/3$

D. none of these

Answer:

Watch Video Solution

82. Consider a triangle ABC and let a , b , and c denote the lengths of the sides opposite to vertices A , B and C respectively. suppose a = 6 , b = 10 and the area of the triangle is $15\sqrt{3}$. If $\angle ACB$ is obtuse and if r denotes the radius of the in circle of the triangle , then r^2 is equal to

A. 2

B. 4

C. 3

D. 6

Answer:

Watch Video Solution

83. If the angle A , B and C of a triangle are in arithmetic progession and if a , b and c denote the lengths of the sides to A , B and C respectively , then the value of the expression $\frac{a}{b}$ sin 2C + $\frac{c}{a}$sin 2A is

A. $\frac{1}{2}$

B. $\frac{\sqrt{3}}{2}$

C. 1

D. $\sqrt{3}$

Answer:

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84. Let ABC be a triangle such that $\angle ACB = \frac{\pi}{6}$ and let a , b and c denote the lengths of the side opposite to A ,B and C respectively. The value of x for which $a = x^2 + x + 1, b = x^2 - 1$ and $c = 2x + 1$ is

A. $-\left(2 + \sqrt{3}\right)$

B. $1 + \sqrt{3}$

C. $2 + \sqrt{3}$

D. $4\sqrt{3}$

Answer:

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85. For a regular polygon , let r and R be the radii of the inscribed and circumscribed circles. A false statement among the following is

A. There is a regular polygon with $\frac{r}{R} = \frac{2}{3}$

B. There is a regular polygon with $\frac{r}{R} = \frac{\sqrt{3}}{2}$

C. There is a regular polygon with $\frac{r}{R} = \frac{1}{2}$

D. There is a regular polygon with $\frac{r}{R} = \frac{1}{\sqrt{2}}$

Answer:

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86. Let PQR be a triangle of ! area with a = 2 , b = $\frac{7}{2}$ and c = $\frac{5}{2}$, where a , b and c are the lengths of the sides of the triangle opposite to the angles P

, Q and R respectively. Then , $\frac{2\sin P - \sin 2P}{2\sin P + \sin P}$ equals

A. $\frac{3}{4!}$

B. $\frac{45}{4!}$

C. $\left(\frac{3}{4!}\right)^2$

D. $\left(\frac{45}{4!}\right)^2$

Answer:

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87. ABCD is a trapezium such that AB and CD are parallel and $BC \perp CD$.

if $\angle ADB = \theta$,BC=p and CD=q, then AB is equal to

A. $\frac{(p^2+q^2)\sin\theta}{p\cos\theta + q\sin\theta}$

B. $\frac{p^2 + q^2\cos\theta}{p\cos thet + q\sin\theta}$

C. $\frac{p^2+q^2}{p^2\cos\theta + q^2\sin\theta}$

D. $\frac{(p^2+q^2)\sin\theta}{(p\cos\theta + q\sin\theta)^2}$

Answer:

Watch Video Solution

88. In a triangle PQR ,P is the largest angle and cos P = $\frac{1}{3}$. further the triangle toches the side PQ. QR and RP at N , L and M respectively , such that the lengths of PN , QL , and RM are consecutive even integers. Then possible length(s) of the side(s) of the triangle is(are)

A. 16,18

B. 18,22

C. 22,24

D. 16,20

Answer:

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89. In a triangle the sum of two sides is x and the product of the same two sides is y .If $x^2 - c^2 = y$, where c is the third side of the triangle , then the ratio of the in-radius to the circum-radius of the triangle is

A. $\frac{3y}{2x(x+c)}$

B. $\frac{3y}{2c(x+c)}$

C. $\frac{3y}{4x(x+c)}$

D. $\frac{3y}{4c(x+c)}$

Answer:

Watch Video Solution

90. In $!ABC$, if $\frac{\sin A}{c\sin B} + \frac{\sin B}{c} + \sin C\frac{)}{b} = \frac{c}{ab} + \frac{b}{ac} + \frac{a}{bc}$ then the value of A , is

A. 120°

B. 90°

C. 60°

D. 30°

Answer:

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91. In $!ABC$, if 2b = a + c and A - C = 90°, then sin B equals

A. $\frac{\sqrt{7}}{5}$

B. $\frac{\sqrt{5}}{8}$

C. $\frac{\sqrt{7}}{4}$

D. $\frac{\sqrt{5}}{3}$

Answer:

Watch Video Solution

92. In a $!XYZ$,let x , y , z be the length of the side opposite to angles. X , Y, Z respectively and 2s = x + y + z. If $\frac{s-x}{4}=\frac{s-y}{3}=\frac{s-z}{2}$ and area of the incircle of the triangle XYZ is $\frac{8\pi}{3}$, the area of ΔXYZ is

A. $6\sqrt{6}$ sq. units

B. $3\sqrt{6}$ sq. units

C. $12\sqrt{6}$ sq. units

D. $6\sqrt{3}$ sq. units

Answer:

Watch Video Solution

93. If s−x/4= s−y/3=s-z/2 and area of incircle of the triangle XYZ is 8(pi)/3 thenThe radius of the circumcircle of $!XYZ$

A. $\frac{35}{\sqrt{6}}$

B. $\left(\frac{35}{2\sqrt{6}}\right.$

C. $\frac{35}{4\sqrt{6}}$

D. $\frac{35}{6\sqrt{6}}$

Answer:

Watch Video Solution

94. If $r = \sqrt{\frac{8}{3}}$ and $R = \frac{35}{4\sqrt{6}}$ then the value of $\sin\frac{X}{2}\sin\frac{Y}{2}\sin\frac{Z}{2}$ =

A. $\frac{6}{35}$

B. $\frac{4}{35}$

C. $\frac{2}{35}$

D. $\frac{8}{35}$

Answer:

Watch Video Solution

95. If x=5,y=6,z=7.The value of $\sin^2\left(\frac{X+Y}{2}\right)$, is

A. $\frac{3}{5}$

B. $\frac{4}{5}$

C. $\frac{2}{5}$

D. $\frac{1}{5}$

Answer:

Watch Video Solution

Solved Mcq

1. P is a point on the altitude of $!ABC$ such that $\angle CBP = \frac{B}{3}$,then A.P.is equal to

A. $2a\frac{\sin C}{3}$

B. $2b\frac{\sin A}{3}$

C. $2c\frac{\sin B}{3}$

D. $2c\frac{\sin C}{3}$

Answer:

View Text Solution

2. If p , q , r are the legths of the internal bisectors of angles A ,B , C respectively of a $!ABC$, then

A. $\frac{1}{a}+\frac{1}{b}-\frac{1}{c}$

B. $\frac{1}{a}+\frac{1}{c}-\frac{1}{b}$

C. $\frac{1}{a}+\frac{1}{b}+\frac{1}{c}$

D. $\frac{1}{b}+\frac{1}{c}-\frac{1}{a}$

Answer:

View Text Solution

Section Ii Assertion Reason Type

1. Statement-1: In a triangle ABC, if $\sin^2 A + \sin^2 B + \sin^2 C = 2$, then one of the angles must be 90 °.

Statement-2: In any triangle ABC

cos 2A + cos 2B + cos 2C = -1 - 4 cos A cos B cos C

A. Statement-1 is True, Statement-2 is true, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement- 2 is True.

Answer:

Watch Video Solution

2. Statement-1: In any ΔABC if A is obtuse, then tanBtanC < 1

Statement-2: In any $!ABC$, we have

tan A + tan B + tan C = tan A tan B tan C

A. Statement-1 is True, Statement-2 is true, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement- 2 is True.

Answer:

Watch Video Solution

3. Let a and b denote llie lengths of the legs of a right triangle with following properties:

(i) All three sides of the triangle are integers.

(ii) The perimeter of the triangle is numerically equal to its area.

(iii) a ltb.

Statement-1: The number of such triangle is 2

Statement-2: Maximum possible perimeter of the triangle is 30^{o}.

A. Statement-1 is True, Statement-2 is true, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement- 2 is True.

Answer:

Watch Video Solution

4. Statement-1: If the measures of two angles of a triangle are 45 ° and 60 °, then the ratio of the smallest and the greatest sides are $\left(\sqrt{3}-1\right):1$

Statement-2: The greatest side of a triangle is opposite to its greatest angle.

A. Statement-1 is True, Statement-2 is true, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement- 2 is True.

Answer:

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5. Statement-1: In a $!ABC$,

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

Statement-2: In a $!ABC$, a = b cos C + c cos B

A. Statement-1 is True, Statement-2 is true, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement- 2 is True.

Answer:

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6. Statement-1: In a $!ABC$, if

$2a^2+4b^2+c^2=4ab+2ac$, then $\cos A=\frac{1}{4}$

Statement-2: In a ΔABC if $\cos A = \frac{1}{4}$, then $(a+b+c)(b+c-a) = \frac{5}{2}bc$

A. Statement-1 is True, Statement-2 is true, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement- 2 is True.

Answer:

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7. Statement-1: If the lengths of two sides of a triangle are roots of the equation $x^2 - 12x + 35$=0 and the angle opposite to third side is obtuse, then the square of the length of the third side is greater than 74.

Statement- 2: In a $!ABC$, $\cos C = \frac{a^2+b^2-c^2}{2ab}$

A. Statement-1 is True, Statement-2 is true, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement- 2 is True.

Answer:

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8. Statement-1: In a $!ABC$, if

tan A : tan B : tan C = 1 : 2: 3, then A = 45°

Statement-2: If p: q: r = 1 : 2: 3, then p = 1

A. Statement-1 is True, Statement-2 is true, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement- 2 is True.

Answer:

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9. Statement-1: In any $!ABC$, if a : b : c = 4 : 5 : 6, then R:r=16:17.

Statement-2: In any $!ABC$, $\frac{R}{r} = \frac{abc}{4s}$

A. Statement-1 is True, Statement-2 is true, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement- 2 is True.

Answer:

Watch Video Solution

10. Statement-1: In any $!ABC$, a cos A + b cos B + c cos C $\leq$ s

Statement-2 : In any $!ABC$, $\frac{\sin A}{2}\frac{\sin B}{2}\frac{\sin C}{2} \leq \frac{1}{8}$

A. Statement-1 is True, Statement-2 is true, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement- 2 is True.

Answer:

Watch Video Solution

11. Statement-1: In $!ABC, r_1 + r_2 + r_3 - r = 4R$

Statement-2: In $!ABC, r_1r_2 + r_2r_3 + r_3r_1 = !^2$

A. Statement-1 is True, Statement-2 is true, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement- 2 is True.

Answer:

Watch Video Solution

12. Statement- 1: If the sines of the angles of a triangle are in A.P., then the altitudes ef the triangle are also in A.P.

Statement-2: Twice the area of a triangle is equal to the product of the lengths of a side and the altitude on it.

A. Statement-1 is True, Statement-2 is true, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement- 2 is True.

Answer: D

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13. In $!ABC$ it is given that a:b:c = cos A:cos B:cos C

Statement-1: $!ABC$ is equilateral.

Statement-2: cosA $= \frac{b^2+c^2-a^2}{2bc}, \cos B = \frac{c^2+a^2-b^2}{2ac}, \cos C = \frac{a^2+b^2-c^2}{2ab}$

A. Statement-1 is True, Statement-2 is true, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement- 2 is True.

Answer:

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Exercise

1. In triangle ABC,$b = \sqrt{3}$ c=1 and $\angle A = 30^\circ$ then the measure of the largest angle of the triangle,is

A. 60°

B. 135°

C. 90°

D. 120°

Answer: D

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2. The area of the triangle ABC,in which a=1,b=2$\angle C = 60^\circ$ is

A. 4sq.units

B. $\frac{1}{2}$ sq.units

C. $\frac{\sqrt{3}}{2}$ sq. units

D. $\sqrt{3}$ sq. units

Answer: C

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3. In a triangle ABC,vertex angles A,B,C and side BC are given .The area of ΔABC is

A. $\frac{s(s-a)(s-b)(s-c)}{2}$

B. $\frac{b^2 \sin C \sin A}{\sin B}$

C. ab sin C

D. $\frac{1}{2}\frac{a^2 \sin B \sin C}{\sin A}$

Answer: D

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4. The area of the circle and the area of a regular polygon of n sides and the perimeter equal to the circle are in the ratio of

A. $\tan\left(\frac{\pi}{n}\right) : \frac{\pi}{n}$

B. $\cos\left(\frac{\pi}{n}\right) : \frac{\pi}{n}$

C. $\sin\left(\frac{\pi}{n}\right) : \frac{\pi}{n}$

D. $\cot\left(\frac{\pi}{n}\right) : \frac{\pi}{n}$

Answer: A

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5. If $\cot\frac{A}{2} = \frac{b+c}{a}$,then the ΔABC,is

A. isosceles

B. equliteral

C. right angled

D. none of these

Answer: C

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6. In a ΔABC, $\tan\left(\frac{A}{2}\right) = \frac{5}{6}, \tan\left(\frac{C}{2}\right) = \frac{2}{5}$,then

A. a,b,c are in H.P

B. a,b,c are in A.P

C. b,a,c are in A.P

D. a,b,c are in G.P

Answer: B

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7. In a triangle ABC , the line joining the circumcentre and incentre is parallel to BC, then cos B + cos C is equal to:

A. $3/2$

B. 1

C. $3/4$

D. $1/2$

Answer: B

Watch Video Solution

8. In a triangle ABC,r=

A. $(s-a)\frac{\tan B}{2}$

B. $(s-b)\frac{\tan B}{2}$

C. $(s-b)\frac{\tan C}{2}$

D. $(s-a)\frac{\tan C}{2}$

Answer: B

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9. The ex-radii of a triangle r_1, r_2, r_3 are the hamonic progression ,then the sides a,b,c are

A. inH.P.

B. in A.P.

C. in G.P.

D. none of these

Answer: B

Watch Video Solution

10. In any triangle ABC, prove that:

$a^3\cos(B-C)+b^3\cos(C-A)+c^3\cos(A-B)=3abc$

A. 3abc

B. 3(a+b+c)

C. abc(a+b+c)

D. 0

Answer: A

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11. If $c^2 = a^2 + b^2$, $2s = a + b + c$, then $4s(s-a)(s-b)(s-c)$

A. s^4

B. b^2c^2

C. c^2a^2

D. a^2, b^2

Answer: D

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12. The sides of a triangle are 13,14,15, then the radius of its in-circle is

A. $67/8$

B. $65/4$

C. 4

D. 24

Answer: C

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13. If a cos A=b cos B , then the triangle ,is

A. equliteral

B. right angled

C. isosceles

D. isosceles or right angled

Answer: D

Watch Video Solution

14. The in-radius of the triangle whose sides are 3,5,6,is

A. $\sqrt{8/7}$

B. $\sqrt{8}$

C. $\sqrt{7}$

D. $\sqrt{7/8}$

Answer: A

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15. In an equilaterial triangle of side $2\sqrt{3}$ cms, the circum-radius ,is

A. 1cm

B. $\sqrt{3}$ cm

C. 2cm

D. $2\sqrt{3}$ cm

Answer: C

Watch Video Solution

16. If the angles of a triangle are in the ratio 1:2:3,the corresponding sides are in the ratio

A. $2:3:1$

B. $\sqrt{3}:2:1$

C. $2:\sqrt{3}:1$

D. $1:\sqrt{3}:2$

Answer: D

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17. In any $!ABC$, $(\Sigma)\left(\frac{\sin^2 A+\sin A+1}{\sin A}\right)$ is always greater than

A. 9

B. 3

C. 27

D. none of these

Answer: A

Watch Video Solution

18. In any $!ABC$, $(\Sigma)\left(\frac{\sin^2 A+\sin A+1}{\sin A}\right)$ is always greater than

A. 9

B. 3

C. 27

D. none of these

Answer: A

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19. In a right angled $!ABC \sin^2 A+\sin^2 B+\sin^2 C=$

A. 0

B. 1

C. -1

D. none of these

Answer: D

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20. In any ΔABC if $2\cos B = \frac{a}{c}$,then the triangle ,is

A. right angled

B. equilaterial

C. isosceles

D. none of these

Answer: C

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21. If in a ΔABC ,a sin A=b sin B, then the triangle, is

A. right angled

B. equilaterial

C. isosceles

D. none of these

Answer: A

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22. In any $!ABC$,If $\cot\left(\frac{A}{2}\right), \cot\left(\frac{B}{2}\right), \cot\left(\frac{C}{2}\right)$ are in A.P.,then a,b,c are in

A. A.P.

B. G.P.

C. H.P.

D. none of these

Answer: A

Watch Video Solution

23. In any $!ABCb^2 \sin 2C + c^2 \sin 2B =$

A. $!$

B. $2!$

C. $3!$

D. $4!$

Answer: D

Watch Video Solution

24. If in a triangle ABC, $\frac{\cos A}{a} = \frac{\cos B}{b} = \frac{\cos C}{c}$,then the triangle is

A. right angled

B. obtuse angled

C. equilaterial

D. isosceles

Answer: C

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25. If in a $\triangle ABC, \Delta = a^2 - (b-c)^2$, then tan A=

A. $\frac{15}{16}$

B. $\frac{8}{15}$

C. $\frac{8}{17}$

D. $\frac{1}{2}$

Answer: B

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26. If the angles A,B,C of a triangle are in A.P.and sides a,b,c are in G.P. ,then a2,b2,c2 are in

A. A.P.

B. H.P.

C. G.P.

D. none of these

Answer: A

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27. In a triangle the lengths of the two larger are 10 and 9 respectively.If the angles are in A.P., the , length of the third side can be (A) $5-\sqrt{6}$ (B) $3\sqrt{3}$ (C) 5 (D) $5+\sqrt{6}$

A. $5\pm\sqrt{6}$

B. $3\sqrt{3}$

C. 5

D. $\sqrt{5} \pm 6$

Answer: A

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28. There can exist a triangle ABC satisfying the conditions :

A. $b \sin A = a, A < \frac{\pi}{2}$

B. $b \sin A > a, A > \frac{\pi}{2}$

C. $b \sin A > a, A < \frac{\pi}{2}$

D. $b \sin A > a, A > \frac{\pi}{2}, b > a$

Answer: A

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29. In a triangle the length of the two larger sides are 24 and 22, respectively.If the angles are in A.P.,then the third side ,is

A. $12 + 2\sqrt{13}$

B. $12 - \sqrt{13}$

C. $2\sqrt{13} + 2$

D. $2\sqrt{13} - 2$

Answer: A

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30. If in a triangles $a\cos^2\left(\frac{C}{2}\right) + c\cos^2\left(\frac{A}{2}\right) = \frac{3b}{2}$, then the sides of the triangle are in

A. A.P.

B. G.P.

C. H.P.

D. none of these

Answer: A

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31. If twice the square of the diameter of the circle is equal to half the sum of the squares of the sides of incribed triangle ABC,then $\sin^2 A + \sin^2 B + \sin^2 C$ is equal to

A. 1

B. 2

C. 4

D. 8

Answer: C

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32. In a triangle ABC ,angle A is greater than B.If the measures of angles Aand B satisfy the equation $3\sin x - 4\sin^3 x - k = 0, 0 < k < 1$, then the measure of angle C, is

A. $\pi/3$

B. $\pi/2$

C. $2\pi/3$

D. $5\pi/6$

Answer: C

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33. If in a triangle ABC ,

$$2\frac{\cos A}{a} + \frac{\cos B}{b} + 2\frac{\cos C}{c} = \frac{a}{bc} + \frac{b}{ca},$$

then the value of the angle A, is

A. $\pi/3$

B. $\pi/4$

C. $\pi/2$

D. $\pi/6$

Answer: C

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34. If A gt 0 ,B gt 0 and A+B=$\frac{\pi}{3}$,then the maximum value of tan A tan B , is

A. $1/3$

B. 1

C. ∞

D. $1/\sqrt{3}$

Answer: A

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35. If $\cos(\theta-\alpha), \cos\theta, \cos(\theta+\alpha)$ are in H.P.,then $\cos\theta\sec(\alpha/2)$ is equal to

A. -1

B. $\pm\sqrt{2}$

C. ± 2

D. ± 3

Answer: B

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36. If sin β is the GM between $\sin\alpha$ and $\cos\alpha$, then cos 2β is equal to

A. $2\sin^2\left(\frac{\pi}{4}-\alpha\right)$

B. $2\cos^2\left(\frac{\pi}{4}-\alpha\right)$

C. $2\cos^2\left(\frac{3\pi}{4}+2\alpha\right)$

D. $2\sin^2\left(\frac{\pi}{4}+\alpha\right)$

Answer: A

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37. If sinA=sin^2Band2cos^2A=3cos^2B then the triangle ABC is right angled (b) obtuse angled (c)isosceles (d) equilateral

A. right angled

B. obtuse angled

C. isosceles

D. equilateral

Answer: B

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38. If in a $!ABC$,

(sinA+sinB+sinC)(sinA+sinB-sinC)=3sinAsinB` then

A. $A = 60^\circ$

B. $B = 60^\circ$

C. $C = 60^\circ$

D. none of these

Answer: C

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39. In a $!ABC$, sin A + sin B + sin C = $1+\sqrt{2}$ and ,cos A +cos B +cos C =$\sqrt{2}$if ,the triangle is

A. equilateral

B. isosceles

C. right angled

D. right angled isosceles

Answer: D

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40. Point D,E are taken on the side BC of an acute angled triangle ABC„ such that $BD = DE = EC.$ If $\angle BAD = x, \angle DAE = y$ and $\angle EAC = z$ then the value of $\frac{\sin(x+y)\sin(y+z)}{\sin x \sin z}$ is _____

A. 1

B. 2

C. 4

D. none of these

Answer: C

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41. In a triangle ABC, if $3a = b + c,$ then the value of $\cot\frac{B}{2}\cot\frac{C}{2}$ is-

A. 1

B. $\sqrt{3}$

C. 2

D. none of these

Answer: C

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42. If A+ B+ C=π, n $\in$ Z,then tan nA+ tan +nB +tan nC is equal to

A. 0

B. 1

C. tan nA tan nB tan nC

D. none of these

Answer: C

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43. If A,B,C are angles of a triangle ,then the minimum value of $\tan^2\left(\frac{A}{2}\right)+\tan^2\left(\frac{B}{2}\right)+\tan^2\left(\frac{C}{2}\right)$, is

A. 0

B. 1

C. $1/2$

D. none of these

Answer: B

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44. In a triangle ABC ,cos A + cos B + cos C =$\frac{3}{2}$, then the triangle ,is

A. isosceles

B. right angled

C. equilaterial

D. none of these

Answer: C

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45. In any triangle ABC, if cosA cos B + sin A sin B sinC =1 then prove that the triangle in an isosceles right angled.

A. isosceles

B. right angled

C. isosceles right angles

D. equilateral

Answer: C

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46. If in a triangle ABC ,$\frac{b+c}{11}=\frac{c+a}{12}=\frac{a+b}{13}$ then cosA is equal to

A. $\frac{1}{5}$

B. $\frac{5}{7}$

C. $\frac{19}{35}$

D. none of these

Answer: A

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47. If p_1, p_2, p_3 are altitudes of a triangle ABC from the vertices A,B,C and ! the area of the triangle, then $p_1^2+p_2^{-2}+p_3^{-2}$ is equal to

A. $\frac{a+b+c}{\Delta}$

B. $\frac{a^2+b^2+c^2}{4\Delta^2}$

C. $\frac{a^2+b^2+c^2}{\Delta^2}$

D. none of these

Answer: B

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48. If p_1, p_2, p_3 are altitudes of a triangle ABC from the vertices A,B,C and ! the area of the triangle, then $p_1 . p_2, p_3$ is equal to

A. abc

B. 8R

C. $a^2b^2c^2$

D. $\frac{a^2 \cdot b^2 \cdot c^2}{8R^3}$

Answer: D

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49. P_1, P_2, P_3 are altitudes of a triangle ABC from the vertices A, B, C and Δ is the area of the triangle,

The value of $P_1^{-1} + P_2^{-1} + P_3^{-1}$ is equal to-

A. $\frac{s-a}{!}$

B. $\frac{s-b}{!}$

C. $\frac{s-c}{!}$

D. $\frac{s}{!}$

Answer: C

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50. If median of the ΔABC through A is perpendicular to BC, then which one of the following is correct ?

A. tanA+tanB=0

B. 2tanA+tanB=0

C. tanA+2tanB=0

D. none of these

Answer: C

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51. In ΔABC if $\frac{\sin A}{\sin C} = \frac{\sin(A-B)}{\sin(B-C)}$, then a^2, b^2, c^2 are in :

A. a,b,c are in A.P

B. a^2, b^2, c^2 are in A.P

C. a,b,c are in H.P

D. a^2, b^2, c^2 are in H.P

Answer: B

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52. If in a $!ABC$, $a\tan A + b\tan B = (a+b)\tan\left(\frac{A+B}{2}\right)$, then

A. A = B

B. A = -B

C. A = 2B

D. B = 2A

Answer: A

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53. If in a $!ABC$, $\cos A = \frac{\sin B}{2\sin C}$ then the $!ABC$, is

A. equilateral

B. isosceles

C. right angled

D. none of these

Answer: B

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54. If in a triangle ABC, $\frac{a^2 - b^2}{a^2 + b^2}$ then the triangle is

A. right angled or isosceles

B. right angled and isosceles

C. equilaterial

D. none of these

Answer: A

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55. If in a triangle ABC, b + c = 3a, then $\tan\left(\frac{B}{2}\right)\tan\left(\frac{C}{2}\right)$ is equal to

A. 1/2

B. 1/3

C. 1/4

D. 1/5

Answer: A

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56. Let ABC be a triangle such that $\angle A = 45^\circ, \angle B = 75^\circ,$ then $a + c\sqrt{2}$ is equal to

A. 0

B. b

C. 2b

D. $-b$

Answer: C

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57. If in a ΔABC, $\cos A + 2\cos B + \cos C = 2$, then a,b, c are in

A. A.P.

B. H.P.

C. G.P

D. none of these

Answer: A

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58. If the altitudes of a triangle are in A.P,then the sides of the triangle are in

A. A.P.

B. G.P.

C. H.P.

D. none of these

Answer: C

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59. In any $!ABC$,the distance of the orthocentre from the vertices A, B,C are in the ratio

A. sin A : sin B : sin C

B. cos A : cos B : cos C

C. tan A : tan B: tan C

D. none of these

Answer: B

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60. If R is the radius of circumscribing circle of a regular polygon of n-sides,then R =

A. $\frac{a}{2}\sin\left(\frac{\pi}{n}\right)$

B. $\frac{a}{2}\cos\left(\frac{\pi}{n}\right)$

C. $\frac{a}{2}\cos ec\left(\frac{\pi}{n}\right)$

D. $\frac{a}{2}\cos ec\left(\frac{\pi}{n}\right)$

Answer: C

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61. If r is the radius of inscribed circle of a regular polygon of n-sides ,then r is equal to

A. $\frac{a}{2}\cot\left(\frac{\pi}{2n}\right)$

B. $\frac{a}{2}\cot\left(\frac{\pi}{n}\right)$

C. $\frac{a}{2}\tan\left(\frac{\pi}{n}\right)$

D. $\frac{a}{2}\cos\left(\frac{\pi}{n}\right)$

Answer: B

Watch Video Solution

62. The area of a regular polygon of n sides is (where r is inradius, R is circumradius, and a is side of the triangle) $\frac{nR^2}{2}\sin\left(\frac{2\pi}{n}\right)$ (b) $nr^2\tan\left(\frac{\pi}{n}\right)$ $\frac{na^2}{4}\frac{\cot\pi}{n}$ (d) $nR^2\tan\left(\frac{\pi}{n}\right)$

A. $\frac{nR^2}{2}\sin\left(\frac{2\pi}{n}\right)$

B. $nr^2\tan\left(\frac{2\pi}{2n}\right)$

C. $\frac{nr^2}{2}\sin\left(\frac{2\pi}{n}\right)$

D. $nR^2\tan\left(\frac{\pi}{n}\right)$

Answer: A

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63. If r, r_1, r_2, r_3 have their usual meanings , the value of $\frac{1}{r_1}+\frac{1}{r_2}+\frac{1}{r_3}$, is

A. 1

B. 0

C. $\frac{1}{r}$

D. none of these

Answer: C

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64. If p_1, p_2, p_3 are respectively the perpendicular from the vertices of a triangle to the opposite sides, then find the value of $p_1p_2p_3$.

A. $\frac{a^2b^2c^2}{R^2}$

B. $\frac{a^2b^2c^2}{4R^2}$

C. $\frac{4a^2b^2c^3}{R^2}$

D. $\frac{a^2b^2c^2}{8R^2}$

Answer: D

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65. If p_1, p_2, p_3 are respectively the perpendiculars from the vertices of a triangle to the opposite sides , then $\frac{\cos A}{p_1} + \frac{\cos B}{p_2} + \frac{\cos C}{p_3}$ is equal to

A. $1/r$

B. $1/R$

C. $1/!$

D. none of these

Answer: B

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66. If in ΔABC, $8R^2 = a^2 + b^2 + c^2$, then the triangle ABC is

A. right angled

B. isosceles

C. equilaterial

D. none of these

Answer: A

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67. If A_1, A_2, A_3 denote respectively the areas of an inscribed polygon of 2n sides , inscribed polygon of n sides and circumscribed poylgon of n sides ,then A_1, A_2, A_3 are in

A. A.P.

B. G.P.

C. H.P.

D. none of these

Answer: B

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68. If the angles of a triangle are in A.P.with common difference equal $1/3$ of the least angle ,the sides are in the ratio

A. $\sqrt{2}:2\sqrt{3}:\sqrt{6}+\sqrt{2}$

B. $2\sqrt{2}:\sqrt{3}:\sqrt{6}-\sqrt{2}$

C. $2\sqrt{2}:2\sqrt{3}:\sqrt{6}-\sqrt{2}$

D. $2\sqrt{2}:2\sqrt{3}:\sqrt{6}+\sqrt{2}$

Answer: D

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69. In a triangle ABC, A = 8, b = 10 and c = 12. What is the angle C equal to ?

A. $A/2$

B. 2A

C. 3A

D. none of these

Answer: B

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70. If the sides a, b, c of a triangle ABC are the roots of the equation $x^3 - 13x^2 + 54x - 72 = 0$, then the value of $\frac{\cos A}{a} + \frac{\cos B}{b} + \frac{\cos C}{c}$ is equal to :

A. $\frac{169}{144}$

B. $\frac{61}{72}$

C. $\frac{61}{144}$

D. $\frac{169}{72}$

Answer: C

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71. The area of a $!ABC$ is $b^2 - (c-a)^2$. Then ,tan B =

A. $\frac{4}{3}$

B. $\frac{3}{4}$

C. 8/15

D. none of these

Answer: C

Watch Video Solution

72. In a ΔABC, $\frac{\sin A}{\sin C} = \frac{\sin(A-B)}{\sin(B-C)}$, then a^2, b^2, c^2 are in

A. A.P.

B. G.P.

C. H.P.

D. none of these

Answer: A

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73. If in a triangle ABC, $3\sin A = 6\sin B = 2\sqrt{3}\sin C$, then the angle A is

A. 0°

B. 30°

C. 60°

D. 90°

Answer: D

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74. The side of a Δ are in AP. And its area is $\frac{3}{5}\times$ (area of an equilateral triangle of the same perimeter). Find the ratio of its sides.

A. $1:2:3$

B. $3:5:7$

C. $1:3:5$

D. none of these

Answer: B

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75. In a triangle $\sin^4 A + \sin^4 B + \sin^4 C = \sin^2 B \sin^2 C + 2\sin^2 C \sin^2 A + 2\sin^2 A \sin^2 B$, then its angle A is equal to-

A. $\frac{\pi}{6}, \frac{5\pi}{6}$

B. $\frac{\pi}{3}, \frac{5\pi}{6}$

C. $\frac{5\pi}{6}, \frac{2\pi}{3}$

D. none of these

Answer: A

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76. In any triangle ABC , $\frac{\frac{\tan A}{2} - \frac{\tan B}{2}}{\frac{\tan A}{2} + \frac{\tan B}{2}}$ is equal to

A. $\frac{a-b}{a+b}$

B. $\frac{a-b}{c}$

C. $\frac{a-b}{a+b+c}$

D. $\frac{c}{a+b}$

Answer: B

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77. If the sides a,b and c of a $!ABC$ are in A.P.,then $\left(\frac{\tan A}{2} + \frac{\tan C}{2}\right) : \frac{\cot B}{2}$, is

A. $3:2$

B. $1:2$

C. $3:4$

D. none of these

Answer: D

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78. If the sides of the triangle are the roots of the equation $x^3 - 2x^2 - x - 16=0$, then the product of the in-radius and circum-radius of the triangle ,is

A. 3

B. 6

C. 4

D. 2

Answer: C

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79. If AD, BE and CF are the medians of a ABC ,then $\left(AD^2+BE^2+CF^2\right):\left(BC^2+CA^2+AB^2\right)$ is equal to

A. $4:3$

B. $3:2$

C. $3:4$

D. $2:3$

Answer: C

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80. If a ΔABC is right angled at B, then the diameter of the incircle of the triangle is

A. $\frac{\pi}{4}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{2}$

D. none of these

Answer: C

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81. If a^2, b^2, c^2 are in A.P.,then which of the following is also in A.P.?

A. sin A , sin B, sin C

B. tan A , tan B, tan C

C. cot A , cot B , cot C

D. none of these

Answer: C

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82. If in a $!ABC$,

$\sin^3 A + \sin^3 B + \sin^3 C = 3 \sin A \sin B \sin C$, then

$$\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$$

A. 0

B. $(a+b+c)^3$

C. (a+b+c)(ab+bc+ca)

D. none of these

Answer: A

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83. If the ex-radii of a triangle are in H.P.,then the corresponding sides are in

A. A.P.

B. G.P.

C. H.P.

D. none of these

Answer: A

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84. If I is the incentre of a $!ABC$, then $IA : IB : IC$ is equal to

A. $\cos ec\frac{A}{2} : \cos ec\frac{B}{2} : \cos ec\frac{C}{2}$

B. $\frac{\sin A}{2} : \frac{\sin B}{2} : \frac{\sin C}{2}$

C. $\frac{\sec A}{2} : \frac{\sec B}{2} : \frac{\sec C}{2}$

D. none of these

Answer: A

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85. In a $!ABC$, the HM of the ex-radii is equal to

A. 3r

B. 2R

C. R + r

D. none of these

Answer: A

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86. In a $!ABC$ if $r_1 : r_2 : r_3 = 2 : 4 : 6,$ then $a : b : c$=

A. $3 : 5 : 7$

B. $1 : 2 : 3$

C. $5 : 8 : 7$

D. none of these

Answer: C

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87. If in a $!ABC$, $\angle A = \pi/3$ and AD is a median , then

A. $2AD^2 = b^2 + c^2 + bc$

B. $4AD^2 = b^2 + c^2 + bc$

C. $6AD^2 = b^2 + c^2 + bc$

D. none of these

Answer: B

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88. In a $!ABC \frac{\cos^2 A}{2} + \frac{\cos^2 B}{2} + \frac{\cos^2 C}{2} =$

A. $2 - \frac{r}{R}$

B. $2-\frac{r}{2R}$

C. $2+\frac{r}{2R}$

D. none of these

Answer: C

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89. The base of a triangle is 80cm and one of the base angles is 60° .If the sum of the lenghts of the other two sides is 90cm,then the length of the shortest side is

A. 15cm

B. 19cm

C. 21cm

D. 17cm

Answer: D

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90. In a $!ABC$ if $r_1 = 16, r_2 = 48$ and $r_3 = 24$, then its in-radius ,is

A. 7

B. 8

C. 6

D. none of these

Answer: B

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91. किसी $\triangle ABC$ में सिद्ध करे कि

$$\frac{(a+b+c)^2}{a^2+b^2+c^2} = \frac{\cot\frac{A}{2}+\cot\frac{B}{2}+\cot\frac{C}{2}}{\cot A+\cot B+\cot C}$$

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

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

C. s

D. !

Answer: A

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92. In a $!ABC$ if a =26, b= 30 and cos C = $\frac{63}{65}$, then r_2 =

A. 84

B. 45

C. 48

D. 24

Answer: C

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93. In a $!ABC$ if a = 13, b =14 and c = 15, then reciprocals of r_1, r_2, r_3 are in the ratio

A. $6:7:8$

B. $6:7:8$

C. $8:7:6$

D. none of these

Answer: C

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94. In a ABC , if$\sin A and \sin B$ are the roots of the equation $c^2x^2 - c(a+b)x + ab = 0,$ then find $\angle C.$

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95. If a,b,c denote the sides of a $!ABC$ and the equations $ax^2 + bx + c = 0$ and $x^2 + \sqrt{2}x + 1 = 0$ have a common root, then $^\circ C =$

A. 30°

B. 45°

C. 90°

D. 60°

Answer: B

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96. In a ΔABC if $b + c = 2a$ and $\angle A = 60^\circ$ then ΔABC is

A. equilateral

B. right angled

C. isosceles

D. scalene

Answer: A

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97. In a ΔABC, if $b = 20, c = 21$ and $\sin A = \frac{3}{5}$, then the value of a is

A. 12

B. 13

C. 14

D. 15

Answer: B

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98. Let A, B and C are the angles of a plain 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. $7/9$

B. $2/9$

C. $1/3$

D. $2/3$

Answer: A

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Chapter Test

1. If the sides of a triangle are in the ratio $3:7:8$, then find $R:r$

A. $2:7$

B. $7:2$

C. $3:7$

D. $7:3$

Answer: B

Watch Video Solution

2. The area of the reactangle polygen of n sides is (where R is the radius of the circumpolygon)

A. $\frac{1}{2}R^2 \sin\left(\frac{2\pi}{n}\right)$

B. $\frac{n}{2}R^2 \sin\left(\frac{\pi}{n}\right)$

C. $\frac{n}{2}R \sin\left(\frac{2\pi}{n}\right)$

D. $\frac{nR^2}{2}\sin\left(\frac{2\pi}{n}\right)$

Answer: D

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3. If the angles of a rectangle are 30° and 45° and the included side of $(\sqrt{3}+1)$ cms, then the area of the triangle, is

A. $\frac{1}{\sqrt{3}-1}$

B. $\sqrt{3}+1$

C. $\frac{1}{\sqrt{3}+1}$

D. none of these

Answer: A

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4. In a triagnle 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

A. $\frac{1}{\sqrt{6}}$

B. $\frac{1}{3}$

C. $\frac{1}{\sqrt{3}}$

D. $\sqrt{\left(\frac{2}{3}\right)}$

Answer: A

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5. If A is the area and 2s the sum of the sides of a triangle,then

A. $A \leq \frac{s^2}{3\sqrt{3}}$

B. $A \leq \frac{s^2}{2}$

C. $A > \frac{s^2}{\sqrt{3}}$

D. none of these

Answer: A

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6. If in a triangle ABC, right angled at B, s-a=3, s-c=2, then the values of a and c are respectively

A. 2,3

B. 3,4

C. 4,3

D. 6,8

Answer: B

Watch Video Solution

7. If the sides of a triangle are a, b and $\sqrt{a^2+ab+b^2}$, then find the greatest angle

A. 60°

B. 90°

C. 120°

D. 135°

Answer: C

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8. In a $\Delta ABC \sum (b+c)\frac{\tan A}{2}\tan\left(\frac{B-C}{2}\right) =$

A. a

B. b

C. c

D. 0

Answer: D

Watch Video Solution

9. In $\triangle ABC, \angle A = \frac{\pi}{3}$ and $b : c = 2 : 3, \tan\theta = \frac{\sqrt{3}}{5}, 0 < \theta < \frac{\pi}{2}$ then

A. $B = 60^\circ + \theta$

B. $C = 60^\circ + \theta$

C. $C = 60^\circ - \theta$

D. $C = 60^\circ - \theta$

Answer: B

Watch Video Solution

10. In a $\Delta ABC, AD$ is the altitude from A. Given $b > c, \angle C = 23^\circ$ and $AD = \frac{abc}{b^2 - c^2}$, then $\angle B = ...$

A. 53°

B. 113°

C. 87°

D. none of these

Answer: B

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11. If the angles A, B, C (in that order) of triangle ABC are in arithmetic progression, and $L = \lim_{A \to C} \frac{\sqrt{3 - 4\sin A \sin C}}{|A - C|}$ then find the value of $100L^2$.

A. 1

B. 2

C. 3

D. 4

Answer: A

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12. If the radius of the incircle of a triangle withits sides 5k, 6k and 5k is 6, then k is equal to

A. 3

B. 4

C. 5

D. 6

Answer: B

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13. Two sides of a triangle are $2\sqrt{2}$ and $2\sqrt{3}cm$ and the angle opposite to the shorter side of the two is $\frac{\pi}{4}$. The largest possible length of the third side is

A. $\left(\sqrt{6}+\sqrt{2}\right)cm$

B. $\left(\sqrt{6}+\sqrt{2}\right)cm$

C. $\left(\sqrt{6}-\sqrt{2}\right)cm$

D. none of these

Answer: A

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14. In a $\triangle ABC, a=13cm, b=12$ and $c=5cm$ The distance of A from BC is

A. $\frac{144}{13}$

B. $\frac{65}{12}$

C. $\frac{60}{13}$

D. $\frac{25}{13}$

Answer: C

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15. In a $\triangle ABC, B = \frac{\pi}{8}, C = \frac{5\pi}{8}$. The altitude from A to the side BC, is

A. $\frac{a}{2}$

B. 2a

C. $\frac{1}{2}(b+c)$

D. b+c

Answer: A

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16. In a ΔABC, $A = \frac{2\pi}{3}, b - c = 3\sqrt{3}cm$ and $area(\Delta ABC) = \frac{9\sqrt{3}}{2}cm^2$. Then a is

A. $6\sqrt{3}$

B. 9cm

C. 18cm

D. 12cm

Answer: B

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17. In ΔABC if $a = (b-c)\sec\theta$ then $\frac{2\sqrt{bc}}{b-c}\sin\left(\frac{A}{2}\right) =$

A. $\cos\theta$

B. $\cot\theta$

C. $\tan\theta$

D. $\sin\theta$

Answer: C

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18. In a $\Delta ABC, (a+b+c)(b+c-a) = \lambda bc.$ (where symbols have their usual meaning)& $\lambda \in I$, then greatest value of λ is

A. $\lambda < 0$

B. $\lambda > 4$

C. $\lambda > 0$

D. $0 < \lambda < 4$

Answer: D

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19. If in ΔABC, a=2b and A=3B, then A is equal to

A. 90°

B. 60°

C. 30°

D. 45°

Answer: A

Watch Video Solution

20. Let the angles A, B and C of triangle ABC be in $A\dot{P}$ and let $b:c$ be $\sqrt{3}:\sqrt{2}$. Find angle A.

A. 75°

B. 45°

C. 60°

D. 15°

Answer: A

Watch Video Solution

21. If in a ΔABC, AD, BE and CF are the altitudes and R is the circumradius, then find the radius of the DEF.

A. $\frac{R}{2}$

B. 2R

C. R

D. $\frac{3}{2}R$

Answer: A

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22. If in a $\triangle ABC = \frac{a}{\cos A} = \frac{b}{\cos B}$, then

A. 2 sin A sin B sin C=1

B. $\sin^2 A + \sin^2 B = \sin^2 C$

C. 2 sin A cos B=sin C

D. none of these

Answer: C

Watch Video Solution

23. In a $\triangle ABC$, $\frac{s}{R} =$

A. sin A+sin B+ sin C

B. cos A +cos B+ cos C

C.

D. none of these

Answer: A

Watch Video Solution

24. If in a $\triangle ABC$, $A = \frac{\pi}{3}$ and AD is the median, then

A. $2AD^2 = b^2 + c^2 + bc$

B. $4AD^2 = b^2 + c^2 + bc$

C. $6AD^2 = b^2 + c^2 + bc$

D. none of these

Answer: B

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25. If any $\triangle ABC$, the value of $a(b^2+c^2)\cos A + b(c^2+a^2)\cos B + c(a^2+b^2)\cos C =$

A. $3abc^2$

B. $3a^2bc$

C. 3abc

D. $3ab^2C$

Answer: C

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26. If the angle of a right angled triangle are in A.P. then the ratio of the in -radius and the perimeter, is

A. $(2-\sqrt{3}):2\sqrt{3}$

B. $1:8\sqrt{3}(2+\sqrt{3})$

C. $(2+\sqrt{3}):4\sqrt{3}$

D. none of these

Answer: A

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27. The sum of the radii of inscribed and circumscribed circle of an n sides regular polygon of side a is

A. $\frac{a}{4}\cot\frac{\pi}{2n}$

B. $a\cot\frac{\pi}{n}$

C. $\frac{a}{2}\cot\frac{\pi}{2n}$

D. $a\cot\frac{\pi}{2n}$

Answer: D

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28. If $0 < x < \frac{\pi}{2}$ then the largest angle of a triangle whose sides are 1, sin x, cos x is

A. $\frac{\pi}{3}$

B. $\frac{\pi}{2}$

C. x

D. $\frac{\pi}{2} - x$

Answer: B

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29. The sides of a tringle are $3x + 4y, 3y \text{ and } 5x + 5y$ where $x, y > 0$, then the triangle is-

A. right angled

B. obtuse angled

C. equilateral

D. none of these

Answer: B

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30. The perimeter of a triangle is 16 cm. One of the sides is of length 6 cm. If the area of the triangle is 12 sq. cm, then the triangle is

A. right angled

B. isoscles

C. equilateral

D. scalene

Answer: B

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31. In a $\triangle ABC$, if $\frac{a}{b^2-c^2}+\frac{c}{b^2-a^2}=0$, then $\angle B=$

A. $\frac{\pi}{2}$

B. $\frac{\pi}{4}$

C. $\frac{2\pi}{3}$

D. $\frac{\pi}{3}$

Answer: D

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32. In a $\triangle ABC, a^2\sin 2C+c^2\sin 2A=$

A. Δ

B. 2Δ

C. 3Δ

D. 4Δ

Answer: D

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33. In a $\triangle ABC$, $\frac{\cos C + \cos A}{c + a} + \frac{\cos B}{b} =$

A. $\frac{1}{a}$

B. $\frac{1}{b}$

C. $\frac{1}{c}$

D. $\frac{c + a}{b}$

Answer: B

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34. In in a $\triangle ABC$, sides a,b,c are in A.P. then $\tan\frac{A}{2}\tan\frac{C}{2}$

A. $1/4$

B. $1/3$

C. 3

D. 4

Answer: B

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35. In a triangle ABC, cos A+cos B+cos C=

A. $1+\frac{r}{R}$

B. $1-\frac{r}{R}$

C. $1-\frac{R}{r}$

D. $1+\frac{R}{r}$

Answer: A

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36. If $A + B + C = \pi$, and $\cos A = \cos B . \cos C$, then $\cot B . \cot C =$

A. 2

B. 3

C. $1/2$

D. 5

Answer: C

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37. In triangle ABC, $a(b^2 + c^2)\cos A + b(c^2 + a^2)\cos B + c(a^2 + b^2)\cos C =$

A. abc

B. 2abc

C. 3abc

D. 4abc

Answer: C

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38. The sides of a triangle are $x^2 + x + 1, 2x + 1, and x^2 - 1$. Prove that the greatest angle is 120^0.

A. 120°

B. 60°

C. 40°

D. 30°

Answer: A

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39. In a $\triangle ABC$, if $C = 60^\circ$, then $\frac{a}{b+c} + \frac{b}{c+a} =$

A. 2

B. 1

C. 4

D. none of these

Answer: B

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40. In a $\triangle ABC$, if a,c,b are in A.P. then the value of $\frac{a\cos B - b\cos A}{a-b}$, is

A. 3

B. 2

C. 1

D. none of these

Answer: B

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41. If a triangle is right angled at B, then the diameter of the incircle of the triangle, is

A. c+a-b

B. 2(c+a-b)

C. c+a-2b

D. c+a+2b

Answer: A

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42. If the angle of a righta angled triangle are in A.P. then the ratio of the in -radius and the perimeter, is

A. $(2+\sqrt{3}), 2\sqrt{3}$

B. $(2+\sqrt{3}), \sqrt{3}$

C. $(2-\sqrt{3}) : 2\sqrt{3}$

D. $(2-\sqrt{3}) : 4\sqrt{3}$

Answer: C

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43. If the angles of a triangle are in the ratio $7:2:1$, then prove that the ratio of smallest side to the largest side is $\sqrt{5}-1 : \sqrt{5}+1$.

A. $(\sqrt{5}+1) : (\sqrt{5}-1)$

B. $(\sqrt{5}-1) : (\sqrt{5}+1)$

C. $(\sqrt{5}+2) : (\sqrt{5}-2)$

D. $(\sqrt{5}-2) : (\sqrt{5}+2)$

Answer: B

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44. If in ΔABC, $a = 5, b = 4$ and $\cos(A - B) = \frac{31}{32}$, then

A. $1/4$

B. $1/8$

C. $1/6$

D. $1/2$

Answer: B

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45. In a $\triangle ABC$ if $c = (a + b)\sin\theta$ and $\cos\theta = \frac{k\sqrt{ab}}{a + b}$, then $k =$

A. $2\cos\frac{C}{2}$

B. $2\cos\frac{B}{2}$

C. $2\cos\frac{A}{2}$

D. $\cos \frac{C}{2}$

Answer: A

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46. In $\triangle ABC$, if $\frac{s-a}{\Delta} = \frac{1}{8}, \frac{s-b}{\Delta} = \frac{1}{12}$ and $\frac{s-c}{\Delta} = \frac{1}{24}$, then $b =$

A. 16

B. 20

C. 24

D. 28

Answer: A

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47. In a triangle ABC if $2a = \sqrt{3}b + c$, then possible relation is

A. $c^2 = a^2 + b^2 - ab$

B. $a^2 = b^2 + c^2$

C. $b^2 = a^2 + c^2 - \sqrt{3}ac$

D. none of these

Answer: B

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48. If in a triangle ABC, $a\cos^2\left(\frac{C}{2}\right)os^2\left(\frac{A}{2}\right) = \frac{3b}{2}$, then the sides $a, b, andc$ are in A.P. b. are in G.P. c. are in H.P. d. satisfy $a + b = \cdot$

A. A.P.

B. G.P.

C. H.P.

D. none of these

Answer: A

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49. The sides of a right angled triangle arein $A.P$, then they are in the ratio

A. $3:4:5$

B. $4:5:6$

C. $3:4:6$

D. none of these

Answer: A

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50. In a triangle ABC, $B = 90^\circ$ then the value of $\tan\left(\frac{A}{2}\right) =$

A. $\sqrt{\frac{b+c}{b-c}}$

B. $\sqrt{\frac{b-c}{b+c}}$

C. $\sqrt{\frac{a+c}{a-c}}$

D. $\sqrt{\frac{a-c}{a+c}}$

Answer: B

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51. In a triangle ABC, $B = 90^\circ$ then the value of $\tan\left(\frac{A}{2}\right) =$

A. xyz

B. x^2yz

C. $x^2y^2z^2$

D. none of these

Answer: D

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52. In a $\triangle ABC$ if $a = 5, b = 4$ and $\tan\frac{C}{2} = \frac{\sqrt{7}}{3} then c =$

A. $\sqrt{6}$

B. $\sqrt{5}$

C. 6

D. 5

Answer: C

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53. In a $\triangle ABC$, if $\angle C = 60^\circ$ then $\frac{a}{b+c} + \frac{b}{c+a}$=

A. 2

B. 4

C. 3

D. 1

Answer: D

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54. If p_1, p_2, p_3 are altitude of a triangle ABC from the vertices A,B,C and Δ the area of the triangle, then $\frac{1}{p_1^2} + \frac{1}{p_2^2} + \frac{1}{p_3^2} =$

A. $\frac{\cot A + \cos B + \cot C}{\Delta}$

B. $\frac{\Delta}{\cot A + \cos B + \cot C}$

C. $\Delta(\cot A + \cos B + \cot C)$

D. none of these

Answer: A

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55. In ΔABC with usual notation $\frac{r_1}{bc}+\frac{r_2}{ca}+\frac{r_3}{ab}$ is

A. $\frac{1}{2R}-\frac{1}{r}$

B. 2R-r

C. r-2R

D. $\frac{1}{r}-\frac{1}{2R}$

Answer: D

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