MATHS

BOOKS - MTG WBJEE MATHS (HINGLISH)

SOLUTION OF TRIANGLES

Wb Jee Workout Category 1 Single Option Correct Type

1. If $a = 2\sqrt{2}, b = 6, A = 45^\circ$, then

A. no trinagle is possible

B. one triangle is possible

C. two triangle are possible

D. either no triangle or two triangles are possible

Answer: a

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2. In a triangle ABC, if sin A $\sin B = \frac{ab}{c^2}$, then the triangle is :

A. equilateral

B. isosceles

C. right angled

D. obtuse angled

Answer: c

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3. In a $\Delta ABC, 2ac\sin\left(\frac{A-B+C}{2}\right)$ is equal to (a) $a^2+b^2-c^2$ (b) $c^2+a^2-b^2$ (c) $b^2-c^2-a^2$ (d) $c^2-a^2-b^2$

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

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

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

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

Answer: b

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4. If in $a\Delta ABC$, $\sin A$, $\sin b$, $\sin C$ are in A.P ., then

A. the altitudes are in A.P

B. the altitudes are in H.P.

C. the angles are in A.P.

D. the angles are in H.P

Answer: b

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5. Let p,q,r be the altitudes of a triangle with area S and permeter 2t . Then , the value of $\frac{1}{p}+\frac{1}{q}+\frac{1}{r}$ is

A. $\frac{S}{t}$

B. $\frac{t}{S}$

C. $\frac{S}{2t}$

D. $\frac{2S}{t}$

Answer: b

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6. In any ΔABC , find the value of $\frac{a^2 \sin(B-C)}{\sin B + \sin C} + \frac{b^2 \sin(C-A)}{\sin C + \sin A} + \frac{c^2 \sin(A-B)}{\sin A + \sin B}$

A. 0

B. 1

C. abc

D. $1/abc$

Answer: a

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7. If in a triangle ABC, $\angle C = 60^\circ$, then $\frac{1}{a+c} + \frac{1}{b+c} - \frac{3}{a+b+c} =$

A. 2

B. 3

C. 0

D. 1

Answer: c

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8. In a triangle ABC, $\cos A + \cos B + \cos C$

A. $1 + \frac{r}{R}$

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

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

D. $\frac{r}{R}$

Answer: a

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9. In a ΔABC, $r_1+r_2+r_3-r$=

A. 2R

B. R

C. 4r

D. 4R

Answer: d

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10. In a δABC, a,c, A are given and b_1, b_2 are two values of third side b such that $b_2 = 2b_1$. Then, the value of sin A.

A. $\sqrt{\frac{9c^2 - a^2}{8a^2}}$

B. $\sqrt{\frac{9a^2 - c^2}{8c^2}}$

C. $\sqrt{\frac{8a^2 - 9c^2}{8a^2}}$

D. none of these

Answer: b

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11. 2 tan A+ tan B =0

A. 2 tan A - tan B=0

B. tan A -2 tan B =0

C. tan A+2 tan B=0

D. tan A+2tanB=0

Answer: d

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

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

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

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

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

Answer: d

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13. If in triangle AB, $\cos A\cos B + \sin A\sin B\sin C = 1$. Show that $a:b:c = 1:1:\sqrt{2}$

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

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

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

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

Answer: a

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14. The sides of a triangle ABC are 6 , 7 , 8 and the smallest angle being C then the length of altitude from C is

A. $\frac{7}{2}\sqrt{15}$

B. $\frac{7}{3}\sqrt{15}$

C. $\frac{7}{4}\sqrt{15}$

D. none of these

Answer: c

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15. If the area of the circle is A_1 and the area of the regular pentagon inscribed in the circle is A_2, then find the ratio $\frac{A_1}{A_2}$.

A. $\frac{\pi}{5}\cos\frac{\pi}{10}$

B. $\frac{2\pi}{5}\sec\frac{\pi}{10}$

C. $\frac{2\pi}{5}\text{cosec}\frac{\pi}{10}$

D. none of these

Answer: b

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16. The radii r_1, r_2, r_3 of the escribed circles of the triangle ABC are in H.P. If the area of the triangle is $24cm^2$ and its perimeter is 24 cm, then the length of its largest side is

A. 10

B. 9

C. 8

D. none of these

Answer: a

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17. If r_1, r_2 and r_3 are exradii of any triangle , then $r_1r_2 + r_2r_3 + r_3r_1$ is equal to

A. $\frac{\Delta}{r}$

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

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

D. $\frac{r^2}{\Delta^2}$

Answer: b

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18. The distance of the incentre of the triangle ABC from A is

A. $4R\sin(A/2)$

B. $4R\sin](B+C)/2]$

C. $4R\sin(B/2)\sin(C/2)$

D. none of these

Answer: c

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19. The distance of the circumcentre of an acute angled ΔABC from its sides BC, CA, AB are in the ratio

A. $\cos A : \cos B : \cos C$

B. $\sec A : \sec B : \sec C$

C. $\sin A : \sin B : \sin C$

D. $\cos ecA : \cos ecB : \cos ecC$

Answer: a

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20. In triangle ABC , if $AB = 2, BC = 4$ and $AC = 5,$ then the value of $\frac{\sin A - \sin B}{\sin C}$ is equal to

A. $1/2$

B. $-1/2$

C. $2/5$

D. $-2/5$

Answer: b

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Wb Jee Workout Category 2 Single Option Correct Type

1. In any ΔABC, $\sin\frac{A}{2}$ is

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

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

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

D. none of these

Answer: b

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

A. equilateral

B. right angled and isosceles

C. right angled but not isosceles

D. none of these

Answer: c

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

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

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

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

Answer: b

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4. AD is a median of the ΔABC . If AE and AF are medians of the triangles ABD and ADC repectively , and $AD = m_1, AE = m_2, AF = m_3,$ then $m_2^2 + m_3^2 - 2m_1^2 =$

A. a^2

B. $\frac{a^2}{2}$

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

D. $\frac{a^2}{8}$

Answer: d

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5. An isosceles triangle of wood of base 2a and height h is placed with its base on the ground vertex directly above . The triangle faces the sun whose altitude is 30° . Then the tangent of the angle at the apex of the shadow is

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

B. $\frac{2\sqrt{3}ah}{3h^2 - a^2}$

C. $\frac{a^2 + h^2}{2\sqrt{3}}$

D. $\frac{2\sqrt{3}ah}{3h^2 + a^2}$

Answer: b

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6. A park is in the form of a rectangle $120mx100m$. At the centre of the park there is a circular lawn. The area of park excluding lawn is $8700m^2$. Find the radius of the circular lawn. $\left(Use\pi\frac{22}{7}\right)$

A. c^2

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

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

D. none of these

Answer: c

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7. I is the incentre of ΔABC and P_1, P_2 and P_3 respectively are the radii of the circumcircles of the $\Delta IBC, \Delta ICA$ and ΔIAB. Then $P_1P_2P_3$=

A. Rr^2

B. $2R^2r$

C. $2Rr$

D. R^2r

Answer: b

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8. The two adjacent sides of a cyclic quadrilateral are $2 and 5$ and the angle between them is 60^0. If the area of the quadrilateral is $4\sqrt{3}$, find the remaining two sides.

A. 2,3

B. 3,5

C. 2,3

D. 3,4

Answer: c

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9. Triangle ABC is right angle at A. The points P and Q are on hypotenuse BC such that

$BP = PQ = QC$.if $AP = 3$ and $AQ = 4$,

then length BC is equal to

A. $3\sqrt{5}$

B. $5\sqrt{3}$

C. $4\sqrt{5}$

D. 7

Answer: a

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10. If $a^2 + b^2 + c^2 = 8R^2$, then the triangle is

A. right angled

B. isosceles

C. equilateral

D. none of these

Answer: a

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11. If the angles of a triangle ABC satisfy the equation $81^{\sin^2 x} + 81^{\cos^2 x} = 30$, then the triangle can not be

A. equilateral

B. isosceles

C. obtuse angled

D. right angled

Answer: d

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12. In ΔABC, if $2R + r = r_2$ then $\angle B =$

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

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

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

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

Answer: d

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13. The sum of radii of inscribed and circumscribed circles of an n sided regular polygon of side a is

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

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

C. $\frac{a}{4}\cot\left(\frac{\pi}{2n}\right)$

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

Answer: a

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14. In a triangle ABC , if $r_1 = 3$ and $s = 4$, then cosA =

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

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

C. $\frac{24}{25}$

D. $\frac{7}{25}$

Answer: d

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15. In a triangle ABC, if the median and altitude from A trisect angle A, then $(B-C)$ is (in degrees) equal to.....

A. 15°

B. $22\frac{1}{2}^\circ$

C. 30°

D. 45°

Answer: c

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Wb Jee Workout Category 3 One Or More Than One Option Correct Type

1. In a triangle ABC, $a^4 + b^4 + c^4 = 2c^2(a^2 + b^2)$ prove that $C = 45^\circ$ or 135°

A. 60°

B. 45°

C. 120°

D. 135°

Answer: (b,d)

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2. 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 H.M of b and c

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

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

D. triangle AEF is isosceles

Answer: (a,b,c,d)

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3. In a triangle ABC , if $\tan A = 2\sin 2C$ and $3\cos A = 2\sin B \sin C$, then C=

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

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

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

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

Answer: (b,c)

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4. In a right angled triangle aBC with $\angle A = 90^\circ$, which of the following results are true ?

A. $r_1^2 = r_1 r_2 + r_2 r_3 + r_3 r_1$

B. $(r_1 + r_2)(r_1 + r_3) = 2r_1^2$

C. $\left(1 + \frac{r_2}{r_1}\right)\left(1 + \frac{r_3}{r_1}\right) = 2$

D. $\left(1 - \frac{r_1}{r_2}\right)\left(1 - \frac{r_1}{r_3}\right) = 2$

Answer: (a,b,c,d)

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5. In ΔABC, $AB = 9$, $AC = 17.5$, altitude from A to line BC cut at M, AM = 3. Then

A. radius of circle which circumscribe ΔABC is 26.25

B. radius of cirele which circumscribe ΔABM is 4.5

C. orthocentre of ΔABC lies outside ΔABC

D. orthocentre of ΔABC lies inside ΔABC

Answer: (a,b,c)

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6. The altitudes from the vertices A,B,C of an acute angled triangle ABC to the opposite sides meet the circumcircle at D,E,F respectively . Then $\frac{EF}{BC}=$

A. $\sin A$

B. $\cos A$

C. $2\sin A$

D. $2\cos A$

Answer: d

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7. In triangle ABC m_1, m_2, m_3 are the lenghts of the medians through A,B and C respectively . If $C = \frac{\pi}{2}$, then $\frac{m_1^2 + m_2^2}{m_3^2}$=

A. 2

B. 3

C. 4

D. 5

Answer: d

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8. If AD, BE, CF are internal bisectors of the angles of ΔABC then

$$\frac{\cos\left(\frac{A}{2}\right)}{AD} + \frac{\cos\left(\frac{B}{2}\right)}{BE} + \frac{\cos\left(\frac{C}{2}\right)}{CF} =$$

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

B. $2\left(\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right)$

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

D. $3\left(\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right)$

Answer: a

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

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

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

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

Answer: a

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10. Three circles touch one-another externally. The tangents at their point of contact meet at a point whose distance from a point contact is 4.

Then, the ratio of the product of the radii of the sum of the radii of circles is

A. $6:1$

B. $9:1$

C. $12:1$

D. $16:1$

Answer: d

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Wb Jee Previous Years Questions Category 1 Single Option Correct Type

1. In $a\Delta ABC$, $\tan A$ and $\tan B$ are the roots of $pq\left(x^2+1\right)=r^2x$. Then Δ ABC is

A. a right angled triangle

B. an acute angled triangle

C. an obtuse angled triangle

D. an equilateral triangle

Answer: a

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2. In a $\Delta ABC, a, b, c$ are the sides of the triangle opposite to the angles A,B,C respectively. Then, the value of $a^3 \sin(B-C) + b^3 \sin(C-A) + c^3 \sin(A)$ is equal to (B) 1 (C) 3 (D) 2

A. 0

B. 1

C. 3

D. 2

Answer: a

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3. If in a triangle $\Delta ABC, a^2 \cos^2 A - b^2 - c^2 = 0$ then

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

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

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

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

Answer: b

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4. If in a $\Delta ABC, AD, BE$ and CF are the altitudes and R is the circumradius, then the radius of the circumcircle of ΔDEF is

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

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

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

D. none of these

Answer: a

5. The angles of a triangle are in the ratio $2:3:7$ and the radius of the circumscribed circle is 10 cm . The length of the smallest side is

A. 2 m

B. 5 cm

C. 7 cm

D. 10 cm

Answer: d

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Wb Jee Previous Years Questions Category 2 Single Option Correct Type

1. 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. b+c

B. c+a

C. a+b

D. a+b+c

Answer: c

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