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MATHS

BOOKS - MARVEL MATHS (HINGLISH)

TRIGONOMETRIC FUNCTIONS

SOLVED EXAMPLES

1. General value of θ satisfying the equation $\tan^2\theta + \sec 2\theta = 1$ is.....

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2. There exists a value of θ between 0 and 2π that satisfies the equation

$\sin^4\theta - 2\sin^2\theta - 1 = 0$

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3. The domain of the function $f(x) = \frac{x^2}{x^2 - 2x + 1}$ is

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4. Find the values of $x \in (-\pi, \pi)$ which satisfy the equation $8^{1+|\cos x|+|\cos^2 x|+|\cos^{2x}|+} = 4^3$

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5. The lengths of the sides of a triangle are 3, 5 and 7. Show that the triangle is obtuse-angled.

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

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7. If the angle opf a triangle are in the ratio $1:2:3,$ then show that the sides opposite to the respective angle are in the ratio $1:\sqrt{3}:2.$

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8. In any triangle $ABC,$ prove that:

$a\sin(B-C)+bs\in(C-A)+c\sin(A-B)=0$

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9. In any triangle $ABC,$ prove that:

$a^3\sin(B-C)+b^3\sin(C-A)+c^3\sin(A-B)=0$

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10. Show that, in a triangle ABC.

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

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11. Prove that, in a triangle ABC, `b(a cos C - c cos A) = a^2 - c^2

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12. In any triangle ABC, prove that, $c\sin\left(\frac{A-B}{2}\right)=(a-b)\cos\left(\frac{C}{2}\right)$

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13. If θ is any real number, then, in a triangle ABC, prove that

$a\cos(B-\theta)+b\cos(A+\theta)=c\cos\theta.$

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14. Prove that in a $\triangle ABC$,

$$\frac{\sin^2\left(\frac{A-B}{2}\right)}{(a-b)^2}+\frac{\cos^2\left(\frac{A-B}{2}\right)}{(a+b)^2}=\frac{1}{c^2}$$

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15. If $\cos A=\frac{\sin B}{2\sin C}$, then ΔABC is

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16. If in a ABC, $\frac{\sin A}{\sin C}=\frac{\sin(A-B)}{\sin(B-C)}$, prove that a^2, b^2, c^2 are in $A\dot{P}$.

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17. If, in a $\triangle ABC$, it is given that

$$\frac{b+c}{11}=\frac{c+a}{12}=\frac{a+b}{13}$$

then, evaluate cos A.

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18. If $A+B+C=\pi,$ and $\cos A=\cos B.\cos C,$ then $\cot B.\cot C=$

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19. If, in a $\triangle ABC,$

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

then: $\angle A=\ldots.$.

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20. If, in a $\triangle ABC, A=60^\circ,$ then:

$$\left(1+\frac{a}{c}+\frac{b}{c}\right)\left(1+\frac{c}{b}-\frac{a}{b}\right)=$$

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21. In any triangle ABC, if $\frac{1}{a+c}+\frac{1}{b+c}=\frac{3}{a+b+c}$ then show that, $C=60^{\circ}$.

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22. Evaluate

(i) $\sin\left[\left(\frac{\pi}{3}-\sin^{-1}\left(-\frac{1}{2}\right)\right]\right.$

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23. Find the values of the $\cos^{-1}\left[\cos\left(\frac{4\pi}{3}\right)\right]$

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24. $\sin^{-1}\left(\sin=\frac{2\pi}{3}\right)=?$

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25. $\cos\left\{\cos^{-1}\left(\frac{-\sqrt{3}}{2}\right)+\frac{\pi}{6}\right\}$

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26. Evaluate (i) $\sin\left(\cos^{-1}\left(\frac{3}{5}\right)\right)$

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27. Evaluate (ii) $\cos\left\{\tan^{-1}\left(\frac{3}{4}\right)\right\}$

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28. $\tan\left[2.\tan^{-1}\left(\frac{1}{5}\right)-\frac{\pi}{4}\right]=$

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29. Evaluate : $\tan^2\left(\sec^{-1}3\right)+\cot^2\left(\operatorname{cosec}^{-1}4\right)$.

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30. Prove that $\cot^{-1}7+2\cot^{-1}3=\frac{\pi}{4}$

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31. Show that

2. $\cot^{-1}\left(\frac{3}{2}\right)+\sec^{-1}\left(\frac{13}{12}\right)=\frac{\pi}{2}$

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32. Show that : $\sin^{-1}\left(\frac{3}{5}\right)+\sin^{-1}\left(\frac{8}{17}\right)=\cos^{-1}\left(\frac{36}{85}\right)$.

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33. If $\cot^{-1}\left(\frac{1}{a}\right)+\cot^{-1}\left(\frac{1}{b}\right)+\cot^{-1}\left(\frac{1}{c}\right)=0.$

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34. show that:

$$\cot^{-1}\left(\frac{pq+1}{p-q}\right)+\cot^{-1}\left(\frac{qr+1}{q-r}\right)+\cot^{-1}\left(\frac{rp+1}{r-p}\right)=0.$$

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35. $\tan^{-1}x+\tan^{-1}y+\tan^{-1}z=\frac{\pi}{2}$

show that : $xy+yz+zx=1.$

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36. If $\tan^{-1}x+\tan^{-1}y+\tan^{-1}z=\pi$

show that : $\frac{1}{xy}+\frac{1}{yz}+\frac{1}{zx}=1$

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37. if $\tan^{-1}\left\{\frac{\sqrt{1+x^2}-\sqrt{1-x^2}}{\sqrt{1+x^2}+\sqrt{1-x^2}}\right\}=\alpha$ then x^2 is:

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38. Show that : $\cot^{-1}\left[\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}\right]=\frac{x}{2}$

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39. Prove that:

$$\sin\left[\tan^{-1}\left(\frac{1-x^2}{2x}\right)+\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)\right]=1$$

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40. If $\sin^{-1}x+\sin^{-1}y+\sin^{-1}z=3\pi/2$,

evaluate: $x^{100}+y^{100}+z^{100}+\frac{9}{x^{101}+y^{101}+z^{101}}$.

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HARDER SOLVED EXAMPLES

1. If $\triangle ABC$ is right angled at A, show that: $\frac{b^2+c^2}{b^2-c^2}.\sin(B-C)=1.$

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2. if $\triangle ABC$ is a right angled at C,

evaluate : $\frac{a^2+b^2}{a^2-b^2}\cdot\sin(A-B).$

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3. If, in a $\triangle ABC$, it is given that,

$a^4+b^4+c^4=2a^2\left(b^2+c^2\right).$

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4. If the angles A,B,C of $\triangle ABC$ are in A.P., and its sides a, b, c are in Gp., show that a^2, b^2, c^2 are in A.P.

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5. If one side of a triangle is double the other, and the angles opposite to these sides differ by 60°, show that the triangle is right-angled.

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6. If, in a $\triangle ABC$, it is given that $\tan A$ and $\tan B$ are the roots of the equation $ab(1+x^2) = cx$, show that the triangle is right angled.

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7. If $\triangle PQR$ is right-angled at R and $\frac{\tan P}{2}, \frac{\tan Q}{2}$ are the roots of the equation $ax^2 + bx + c = 0, a \neq 0$, show that $a + b = c$.

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8. If, in a $\triangle ABC$, it is given that a^2, b^2, c^2 are in an A.P., show that $\tan A, \tan B, \tan C$ are in the H.P.

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9. 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 $\frac{1}{p_1^2} + \frac{1}{p_2^2} + \frac{1}{p_3^2} =$

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10. Triangle ABC is isosceles with AB = AC. If the radius of the cicum-circle of $\triangle ABC$ equals AB, find the measure of the angle A.

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11. If H is the orthocenter of ΔABC and if $AH = x, BH = y, CH = z$, then $\frac{a}{x} + \frac{b}{y} + \frac{c}{z} =$

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12. In any triangle ABC, prove that:

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

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13. If, in a $\triangle ABC$,

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

then: $\angle A = \ldots .$

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14. If, in a $\triangle PQR$, right angled at R, $\tan\left(\frac{P}{2}\right)$ and $\tan\left(\frac{Q}{2}\right)$ are the roots of the equation $ax^2 + bx + c = 0, a \neq 0$, then

A. $a + b = c$

B. $b + c = a$

C. $c + a = b$

D. $b = c$

Answer: A

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15. If, in ΔABC, angle A,B,C are in A.P. And $b : c = \sqrt{3} : \sqrt{2}$, then : $\angle A = ...$

A. 30°

B. 45°

C. 75°

D. 60°

Answer: C

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16. If in a triangle ABC, $a = 1 + \sqrt{3}cm, b = 2cm$ and $\angle C = 60^\circ$, then find the other two angles and the thire side

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17. If the sides of a triangle are in the ratio $1 : \sqrt{3} : 2,$ then its angles are in the ratio

A. $1 : 3 : 5$

B. $2 : 3 : 4$

C. $3 : 2 : 1$

D. $1:2:3$

Answer: D

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18. If the angles of a triangle are in the ratio $4:1:1$, then the ratio of the longest side to the perimeter is

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

B. $1:6$

C. $1:\left(2+\sqrt{3}\right)$

D. $2:3$

Answer: A

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19. The perimeter of atriangle ABC is 6 times the arihmetic mean of the sines of its angles .If the side a is 1. the $\angle A$ is

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

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

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

D. π

Answer: A

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20. A triangle park is enclosed on two sides by a fence and, on the third side, by a straight river bank.

If the two fenced side have same length x, then the maximum area of the park is

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

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

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

D. πx^2

Answer: C

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21. If the radius of the circum-circle of an isosceles triangle PQR is equal to $PQ(= PR)$, then the angle P is

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

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

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

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

Answer: D

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22. In $\triangle ABC$, if $3a = b + c$, then $\cot\left(\frac{B}{2}\right)\cot\left(\frac{C}{2}\right)$ =

A. 1

B. 2

C. 3

D. 4

Answer: B

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23. In a $\triangle ABC$, if A,B,C are in A.P.,

then: $\frac{a}{c}(\sin 2C) + \frac{c}{a}(\sin 2A) = \ldots.$

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

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

C. 1

D. $\sqrt{3}$

Answer: D

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24. If $\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = \pi$, prove that $x^2 + y^2 + z^2 + 2xyz = 1$.

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25. If $\cos^{-1}\left(\frac{x}{a}\right) + \cos^{-1}\left(\frac{y}{b}\right) = \alpha$ show that : $\frac{x^2}{a^2} - \frac{2xy}{ab}\cos\alpha + \frac{y^2}{b^2} = \sin^2\alpha.$

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26. Prove that $\tan\left\{\frac{\pi}{4}+\frac{1}{2}\cos^{-1}\left(\frac{a}{b}\right)\right\}+\tan\left\{\left(\frac{\pi}{4}-\frac{1}{2}\frac{\cos^{-1}a}{b}\right)\right\}=\frac{2b}{a}.$

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27. If `0

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28. If $a_1, a_2, a_3, \ldots., a_n$ is an A.P. with common difference d, then prove that

$\tan\left[\tan^{-1}\left(\frac{d}{1+a_1a_2}\right)+\tan^{-1}\left(\frac{d}{1+a_2a_3}\right)+\ldots+\tan^{-1}\left(\frac{d}{1+a_{-1}a_n}\right)\right.$

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29. If $\alpha=\tan^{-1}\left(\frac{x\sqrt{3}}{2y-x}\right)$ and $\beta=\tan^{-1}\left(\frac{2x-y}{y\sqrt{3}}\right)$

evaluate : $\alpha-\beta$.

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30. Find the period of the function

$f(x) = \tan(3x + 5)$.

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31. Find the period of

(i) $\sin 3x + \cos 3x$

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32. Find the period of

$\sin 5x - \cos 5x$.

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33. Find the period of the function

$f(x) = \sin\left(\frac{\pi x}{3}\right) + \cos\left(\frac{\pi x}{2}\right).$

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34. If $m\frac{\tan(\alpha-\theta)}{\cos^2\theta} = n\frac{\tan\theta}{\cos^2(\alpha-\theta)}$ the prove that $2\theta = \alpha - \left[\tan^{-1}\left(\frac{n-m}{n+m}\right)\tan\alpha\right]$

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35. Show that $\cos^{-1}\left(\frac{\cos\alpha+\cos\beta}{1+\cos\alpha\cos\beta}\right) = 2\tan^{-1}\left(\tan\left(\frac{\alpha}{2}\right)\tan\left(\frac{\beta}{2}\right)\right)$

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36. $\tan\left[2.\tan^{-1}\left(\frac{1}{5}\right) - \frac{\pi}{4}\right] =$

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37. $\tan\left[\cos^{-1}\left(\frac{4}{5}\right)+\tan^{-1}\left(\frac{2}{3}\right)\right]=....$

A. 42887

B. $\frac{7}{16}$

C. $\frac{16}{7}$

D. none of these

Answer: D

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38. Solution of the equation

$\tan^{-1}(2x)+\tan^{-1}(3x)=\frac{\pi}{4}$

A. -1

B. $\frac{1}{6}$

C. $-\frac{1}{6}$

D. 1

Answer: B

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39. If $\sin^{-1}\left(\frac{x}{5}\right) + \cos ec^{-1}\left(\frac{5}{4}\right) = \frac{\pi}{2}$, then the value of x is

A. 1

B. 3

C. 4

D. 6

Answer: B

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40. $\cot\left[\csc^{-1}\left(\frac{5}{3}\right) + \tan^{-1}\left(\frac{2}{3}\right)\right]$ = ...

A. $\frac{5}{17}$

B. $\frac{6}{17}$

C. $\frac{3}{17}$

D. $\frac{4}{17}$

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41. If x, y, z are in A.P. and $\tan^{-1} x, \tan^{-1} y$ and $\tan^{-1} z$ are also in A.P. then

A. $x = y = z$ or $y = 1$

B. $zx = 1$

C. $x = y = z$ but their common value need not be 0

D. $z + x = y$

Answer: C

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42. If: $\tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right) = 4$ then : x =

A. $\tan 2$

B. $\tan 4$

C. $\tan\left(\frac{1}{4}\right)$

D. $\tan 8$

Answer: D

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43. If $x \neq 0$, then

$\tan\left(\frac{\pi}{4} + \frac{1}{2}\cos^{-1} x\right) + \tan\left(\frac{\pi}{4} - \frac{1}{2}\cos^{-1} x\right) = ...$

A. x

B. $2x$

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

D. none of these

Answer: C

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MULTIPLE CHOICE QUESTIONS - PART - A : BUILDING-UP THE BASE

1. The solution of the equation $\cos^2\theta + \sin\theta + 1 = 0$ lies in the interval

A. $(-\pi/4, \pi/4)$

B. $(\pi/4, 3\pi/4)$

C. $(3\pi/4, 5\pi/4)$

D. $(5\pi/4, 7\pi/4)$

Answer: D

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2. The number of solutions of the equation $\tan x + \sec x = 2\cos x$ lying in the interval $[0, 2\pi]$ is

A. 0

B. 1

C. 2

D. 3

Answer: C

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3. If $K = \cos 20^\circ$ and $\cos x = 2K^2 - 1$, then the possible value of x between 0° and 360° are

A. 140°

B. $40^\circ, 140^\circ$

C. $40^\circ, 320^\circ$

D. $50^\circ, 130^\circ$

Answer: C

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4. The equation $K \cdot \sin\theta + \cos 2\theta = 2K - 7$ possesses a real solution if

A. $2 \leq K \leq 6$

B. $K > 2$

C. $K > 6$

D. $K < 2$

Answer: A

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5. The number of solutions of the equation $\tan x + \sec x = 2\cos x$ lying in the interval $[0, 2\pi]$ is

A. 0

B. 1

C. 2

D. 3

Answer: C

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6. If $\sec\theta + \tan\theta = \sqrt{3}$, then the principal value of $\left(\theta + \frac{\pi}{6}\right)$ is

A. $\pi/4$

B. $\pi/3$

C. $2\pi/3$

D. $3\pi/4$

Answer: B

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7. General solution of the equation,

$\cos x \cdot \cos 6x = -1$ is x =

A. $(2n+1)(\pi/2)$

B. $n\pi$

C. $(2n+1)\pi$

D. $n(\pi/2)$

Answer: C

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8. The smallest positive angle θ satisfying the equation $\sin^2\theta - 2\cos\theta + (1/4) = 0$ is

A. $\pi/2$

B. $\pi/3$

C. $\pi/4$

D. $\pi/6$

Answer: B

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9. If $\tan\theta + \cot\theta = 2$, then θ is

A. 90°

B. 60°

C. 45°

D. 30°

Answer: C

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10. The smallest value of θ satisfying $\sqrt{3}(\cot\theta + \tan\theta) = 4$ is

A. $2\pi/3$

B. $\pi/3$

C. $\pi/6$

D. $\pi/12$

Answer: C

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11. General value of θ obtained from the equation $\cos 2\theta = \sin\alpha$ is

A. $2\theta = (\pi/2) - \alpha$

B. $\theta = 2n\pi \pm (\pi/2 - \alpha)$

C. $\theta = \frac{1}{2}\left[n\pi + (-1)^n \cdot \alpha\right]$

D. $\theta = n\pi \pm \left(\frac{\pi}{4} - \frac{\alpha}{2}\right)$

Answer: D

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12. If $\sin 2\theta = \cos\theta$, where$0^\circ \leq \theta \leq 90^\circ$, then θ=

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13. If $3\sin 2\theta = 2\sin 3\theta$ and $0 < \theta < \pi$, then $\sin\theta =$

A. $\sqrt{2}/3$

B. $\sqrt{3}/\sqrt{5}$

C. $\sqrt{15}/4$

D. $\sqrt{2}/\sqrt{5}$

Answer: C

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14. If $\cot\theta = \sin 2\theta$ and $\theta \neq n\pi$, then : θ =

A. $45^\circ, 60^\circ$

B. $45^\circ, 90^\circ$

C. only 45°

D. only 90°

Answer: B

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15. The general solution of $\tan 3x = 1$, is

A. $n\pi + (\pi/4)$

B. $n(\pi/3) + (\pi/12)$

C. $n\pi$

D. $n\pi \pm (\pi/4)$

Answer: B

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16. Value(s) of θ satisfying the equation

$\sin 7\theta = \sin 4\theta - \sin \theta$, where $0 < \theta < (\pi/2)$, are

A. $\pi/9, \pi/4$

B. $\pi/3, \pi/9$

C. $\pi/6, \pi/9$

D. $\pi/3, \pi/4$

Answer: A

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17. Solution set of equation $2\sin^2\theta = 3\cos\theta$ in the interval $[0, 2\pi]$ is

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

B. $\{\pi/3, 5\pi/3, \cos^{-1}(-2)\}$

C. $\{\pi/3, 5\pi/3\}$

D. none of these

Answer: C

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18. The general solution of equation $\sin^{50}x - \cos^{50}x = 1$

A. $2n\pi + (\pi/2)$

B. $2n\pi + (\pi/3)$

C. $n\pi + (\pi/2)$

D. $n\pi + (\pi/3)$

Answer: C

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19. Number of solution of the equation

$\sin 2x + \cos 2x + \sin x + \cos x + 1 = 0$

In the interval, $(0, \pi/2)$ is

A. 0

B. 1

C. 2

D. none of these

Answer: A

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20. General solution of the equation $\sec\theta - 1 = \left(\sqrt{2} - 1\right)\tan\theta$ is given by.

A. $\theta = 2n\pi$

B. $\theta = 2n\pi + (\pi/4)$

C. $\theta = 2n\pi$ or $\theta = 2n\pi + (\pi/4)$

D. none of these

Answer: C

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21. If $\sin\left(\frac{\pi}{4}\cot\theta\right) = \cos\left(\frac{\pi}{4}\tan\theta\right)$, then the general value of θ is-

A. $n\pi + (\pi/2)$

B. $n\pi + (\pi/3)$

C. $n\pi + (\pi/4)$

D. none of these

Answer: D

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22. The most general solution of the simultaneous equations $\tan\theta = -1$ and $\sqrt{2}\cos\dot{\theta} = 1$ is

A. $n\pi + (7\pi/4)$

B. $n\pi + (-1)^n \cdot (7\pi/4)$

C. $2n\pi + (7\pi/4)$

D. none of these

Answer: C

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23. The real roots of the equation $\cos^7 x + \sin^4 x = 1$ in the interval $(-\pi, \pi)$ are _____, _____, and _____

A. $-\pi/2, 0$

B. $-\pi/2, \pi/2$

C. $\pi/2, 0$

D. $0, \pi/4, \pi/2$

Answer: B

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24. The general value of θ which satisfies both equations $\cot^3\theta + 3\sqrt{3} = 0$ and $\operatorname{cosec}^5\theta + 32 = 0$ is

A. $2n\pi - (-\pi/6)$

B. $n\pi - (\pi/6)$

C. $n\pi + (-1)^n \cdot (\pi/6)$

D. none of these

Answer: A

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25. If $\frac{1}{6}\sin x, \cos x, \tan x$ are in G.P. then x=,

A. $n\pi \pm (\pi/3)$

B. $2n\pi \pm (\pi/3)$

C. $n\pi + (-1)^n \cdot (\pi/3)$

D. none of these

Answer: B

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26. If $\csc x = 1 + \cot x$, then x =

A. $n\pi + (\pi/2)$

B. $n\pi - (\pi/2)$

C. $2n\pi + (\pi/2)$

D. $2n\pi - (\pi/2)$

Answer: C

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27. If $\cot\theta - \tan\theta = \sec\theta$, then $\theta =$

A. $n\pi + (-1)^n \cdot (\pi/6)$

B. $n\pi + (\pi/2)$

C. $2n\pi + (3\pi/2)$

D. none of these

Answer: A

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28. Solution set of the equation $\tan(\pi.\tan x) = \cot(\pi.\cot x)$ is

A. ϕ

B. $\{0\}$

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

D. none of these

Answer: A

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29. Number of solution in $[0, \pi/2]$ of the equation $\cos 3x \cdot \tan 5x = \sin 7x$ is

A. 7

B. 6

C. 5

D. none of these

Answer: B

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30. The general solution of the equation $\tan x + \tan 2x + \tan x . \tan 2x = 1$ is

A. $n\pi + (\pi/4)$

B. $n\pi + (\pi/3)$

C. $n(\pi/3) + (\pi/12)$

D. $n(\pi/2) \pm (\pi/6)$

Answer: C

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31. If $5\cos 2\theta + 2\cos^2(\theta/2) + 1 = 0$

A. $\pi/3$

B. $\pi/3, \cos^{-1}(3/5)$

C. $\cos^{-1}(3/5)$

D. $\pi/3, \pi - \cos^{-1}(3/5)$

Answer: D

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32. The solution of the equation

$\cos^2 x - 2\cos x = 4\sin x - \sin 2x (0 \leq x \leq \pi)$, is

A. $\pi + \tan^{-1}(-1/2)$

B. $\pi - \cot^{-1}(1/2)$

C. $\pi - \tan^{-1} 2$

D. none of these

Answer: A

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33. If $\sqrt{3}.\sin x + \cos x = \sqrt{3}$, then the general solution is x=

A. $n\pi \pm (\pi/3)$

B. $n\pi \pm (\pi/6)$

C. $n\pi + (-1)^n \cdot (\pi/3) - (\pi/6)$

D. $n\pi + (-1)^n \cdot (\pi/4) + (\pi/3)$

Answer: C

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34. If $81^{\sin^2 x} + 81^{\cos^2 x} = 30$, where $(\pi/2) \leq x \leq \pi$, then x =

A. $\pi/3$ or $\pi/6$

B. $2\pi/3$ or $5\pi/6$

C. $\pi/6$ or $5\pi/6$

D. none of these

Answer: D

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35. The general solution of the equation

$\sin\theta + \cos\theta = 1$ is $\theta =$

A. $n\pi + \left[(-1)^n + 1\right](\pi/4)$

B. $2n\pi + (\pi/2)$

C. $2n\pi$

D. $n\pi + \left[(-1)^n - 1\right](\pi/4)$

Answer: D

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36. If $\sqrt{3}\cdot\cos\theta + \sin\theta = \sqrt{2}$, then the general value of θ is

A. $n\pi + (-1)^n \cdot (\pi/4)$

B. $(-1)^n \cdot (\pi/4) - (\pi/3)$

C. $n\pi + (\pi/4) - (\pi/3)$

D. $n\pi + (-1)^n \cdot (\pi/4) - (\pi/3)$

Answer: D

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37. The equation $\sqrt{3} \cdot \sin x + \cos x = 4$ has

A. only one solution

B. two solutions

C. infinitely many solutions

D. no solution

Answer: D

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38. General solution of the equation

$\sin^3\theta \cdot \cos\theta - \sin\theta \cdot \cos^3\theta = 1/4$ is $\theta =$

A. $n(\pi/4) + (\pi/8)$

B. $n(\pi/2) \pm (\pi/8)$

C. $n(\pi/4) + (-1)^{n+1} \cdot (\pi/8)$

D. $n(\pi/8) + (-1)^n \cdot (\pi/8)$

Answer: C

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39. The number of solutions of the equation

$3\sin^2 x - 7\sin x + 2 = 0$

in the interval $[0, 5\pi]$, is

A. 0

B. 5

C. 6

D. 10

Answer: C

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40. General solution of $\tan 5\theta = \cot 2\theta$

A. $n(\pi/7) + (\pi/2)$

B. $n(\pi/7) + (\pi/3)$

C. $n(\pi/7) + (\pi/14)$

D. $n(\pi/7) - (\pi/14)$

Answer: C

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41. If $\tan 2\theta \cdot \tan \theta = 1$, then general value of θ is

A. $\pi/3$

B. $(6n \pm 1)\pi/6$

C. $(4n \pm 1)\pi/6$

D. $n\pi \pm (\pi/6)$

Answer: D

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42. If $\sin 6\theta + \sin 4\theta + \sin 2\theta = 0$

Then the general value of θ is

A. $n(\pi/4)$ or $n\pi \pm ((\pi/3)$

B. $n(\pi/4)$ or $n\pi \pm ((\pi/6)$

C. $n(\pi/4)$ or $2n\pi \pm ((\pi/6)$

D. none of these

Answer: A

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43. If $\sin\theta = 1/2$ and $\cos\theta = -\sqrt{3}/2$,

then the general value of θ is

A. $2n\pi + (5\pi/6)$

B. $2n\pi + (\pi/6)$

C. $2n\pi + (7\pi/6)$

D. $2n\pi + (\pi/4)$

Answer: A

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44. If $2\sin^2\theta - 3\sin\theta - 2 = 0$, then general value of θ is

A. $n\pi + (-1)^n \cdot (\pi/6)$

B. $n\pi + (-1)^n \cdot (\pi/2)$

C. $n\pi + (-1)^n \cdot (5\pi/6)$

D. $n\pi + (-1)^n \cdot (7\pi/6)$

Answer: D

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45. The set of values of x for which $\frac{\tan 3x - \tan 2x}{1 + \tan 3x \tan 2x} = 1$, is

A. ϕ

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

C. $n\pi + (\pi/4)$

D. $2n\pi + (\pi/4)$

Answer: A

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46. General solution of the equation

$(\sqrt{3}-1)\sin\theta+(\sqrt{3}+1)\cos\theta=2$ is

A. $2n\pi\pm(\pi/4)+(\pi/12)$

B. $n\pi+(-1)^n\cdot(\pi/4)+(\pi/12)$

C. $2n\pi\pm(\pi/4)-(\pi/12)$

D. $n\pi+(-1)^n\cdot(\pi/4)-(\pi/12)$

Answer: A

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47. The most general value of θ satrisfying the two equations

$\cos\theta=-1/\sqrt{2}$ and $\tan\theta=1$ is

A. $2n\pi+(5\pi/4)$

B. $2n\pi+(\pi/4)$

C. $n\pi + (5\pi/4)$

D. $(2n+1)\pi + (\pi/4)$

Answer: A

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48. If $\cos\theta + \cos 2\theta + \cos 3\theta = 0$

then the general value of θ is

A. $2n\pi \pm (\pi/3)$

B. $n\pi + (-1)^n \cdot (2\pi/3)$

C. $n\pi + (-1)^n \cdot (\pi/3)$

D. $2n\pi \pm (2\pi/3)$

Answer: D

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49. General solution of the equation

$2\sin^2 x + \sqrt{3} \cdot \cos x + 1 = 0$ is x =

A. $2n\pi \pm (7\pi/6)$

B. $2n\pi \pm (5\pi/3)$

C. $2n\pi \pm (5\pi/6)$

D. none of these

Answer: C

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50. If $3\tan(\theta - 15^\circ) = \tan(\theta + 15^\circ)$,

then the general value of θ is

A. $n\pi + (-1)^n \cdot (\pi/4)$

B. $n(\pi/2) + (-1)^n \cdot (\pi/4)$

C. $n(\pi/2) + (-1)^n \cdot (\pi/6)$

D. none of these

Answer: B

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51. The general solution of $8\tan^2\frac{x}{2} = 1 + \sec x$ is

A. $x = 2n\pi \pm \cos^{-1}(-1/3)$

B. $x = 2n\pi \pm (\pi/6)$

C. $x = 2n\pi \pm \cos^{-1}(1/3)$

D. none of these

Answer: C

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52. General solution of the equation

$\sin x + \cos x = \sqrt{2} \cdot \cos \alpha$ is x =

A. $2n\pi + (\pi/4) \pm \alpha$

B. $2n\pi + (\pi/3) \pm \alpha$

C. $2n\pi + (\pi/6) \pm \alpha$

D. none of these

Answer: A

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53. General solution of the equation

$\tan\theta + \tan 2\theta + \sqrt{3} \cdot \tan\theta \cdot \tan 2\theta = \sqrt{3}$ is θ =

A. $(3n+1)\pi/9$

B. $n\pi/9$

C. $(3n-1)\pi/9$

D. none of these

Answer: A

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54. General solution of the equation

$\tan\theta + \tan 4\theta + \tan 7\theta = \tan\theta \cdot \tan 4\theta \cdot \tan 7\theta \text{is} \theta =$

A. $n\pi/4$

B. $n\pi/12$

C. $n\pi/6$

D. none of these

Answer: B

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55. Quadratic equation $8\sec^2\theta - 6\sec\theta + 1 = 0$ has

A. exactly 2 roots

B. exactly 4 roots

C. infinitely many roots

D. no roots

Answer: D

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56. Number of solutions of the equation

$\sin 5x \cdot \cos 3x = \sin 6x \cdot \cos 2x,$

In the interval $[0, \pi]$ is

A. 3

B. 4

C. 5

D. none of these

Answer: C

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57. $\tan|x| = |\tan x|$, if

A. $\left(-n\pi, -(2n-1)\frac{\pi}{2}\right)$

B. $\left((2n-1)\frac{\pi}{2}, n\pi\right)$

C. $\left(-(2n-1)\frac{\pi}{2}, -n\pi\right)$

D. $\left(n\pi, (2n-1)\frac{\pi}{2}\right)$

Answer: C

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58. Number of solutions of the equation

$|\cot x| = \cot x + \csc x$, where $0 \leq x \leq 2\pi$ is

A. 0

B. 1

C. 2

D. 3

Answer: C

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59. If $x + \cos\theta = \sin\theta$ has a real solution, then

A. $-\sqrt{2} \leq x \leq \sqrt{2}$

B. $x > \sqrt{2}$

C. $x \leq -\sqrt{2}$

D. none of these

Answer: A

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60. General solution of the equation

$4\cot 2\theta = \cot^2\theta - \tan^2\theta$ is θ =

A. $n\pi \pm (\pi/2)$

B. $n\pi \pm (\pi/3)$

C. $n\pi \pm (\pi/4)$

D. none of these

Answer: C

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61. If, in ΔABC, $a = 16, b = 24, c = 20,$

then : $\sin\left(\frac{A}{2}\right)$ = ...

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

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

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

D. none of these

Answer: A

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62. If, in ΔABC, $a = 18, b = 24, c = 30$,

then : $\sin A$= ....

A. $1/5$

B. $3/5$

C. $2/5$

D. none of these

Answer: B

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63. If, in ΔABC, $a = 8, b = 15, c = 17$.

then : $\sin\left(\frac{A}{2}\right)$ and cos A are respectively

A. $\frac{1}{\sqrt{17}}, \frac{15}{17}$

B. $\frac{2}{\sqrt{17}}, \frac{13}{17}$

C. $\frac{2}{\sqrt{17}}, \frac{11}{17}$

D. none of these

Answer: A

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64. If ΔABC, $a = 18, b = 24, c = 30$

then the area of the triangle is

A. 196

B. 216

C. 64

D. none of these

Answer: B

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65. If, in ΔABC, $a = \sqrt{2}, b = \sqrt{3}, c = \sqrt{5}$, then the area of ΔABC is

A. $\frac{1}{2}\sqrt{6}$

B. $\frac{1}{2}\sqrt{9}$

C. $\frac{1}{2}\sqrt{7}$

D. none of these

Answer: A

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66. If the area of an acute-angled triangle is $75m^2$ and two of its sides are 20 m and 15m, then the angle between them is

A. 30°

B. 60°

C. 150°

D. none of these

Answer: A

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67. If, ΔABC, $B = 90^\circ$, $C = 60^\circ$, b=1 find a and c

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68. In triangle ABC,a= 5,b=7 and sin A =3/4 how many such triangle are possible

A. 1

B. 0

C. 2

D. infinitely many

Answer: B

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69. In a ΔABC, if $A = 45^\circ$ and $B = 75^\circ$, then $a + \sqrt{2}c =$

A. b

B. 2b

C. 3b

D. none of these

Answer: B

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

A. 1

B. 2

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

D. $\sqrt{3}$

Answer: C

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71. If in ΔABC, $a = 4, b = 3, A = 60^\circ$ then c is a 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: A

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

A. 0°

B. 30°

C. 60°

D. 90°

Answer: D

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73. A circle is inscribed in an equilateral triangle of side a. The area of any square inscribed in this circle is (A) $\frac{a^2}{12}$ (B) $\frac{a^2}{6}$ (C) $\frac{a^2}{3}$ (D) $2a^2$

A. $a^2/6$

B. $a^2/3$

C. $2a^2/3$

D. $2a^2/5$

Answer: A

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74. If, in ΔABC, angle A,B,C are in A.P. And $b:c=\sqrt{3}:\sqrt{2}$, then : $\angle A=....$

A. 75°

B. 45°

C. 60°

D. none of these

Answer: A

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75. If, in ΔABC, $a = 2b$ and $A = 3B$, then A :

A. 90°

B. 60°

C. 30°

D. none of these

Answer: A

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76. If ΔABC, is right angled at C, then:

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

A. a^2b^2

B. b^2c^2

C. c^2a^2

D. s^4

Answer: A

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77. If $\sin(A+B+C) = 1, \tan(A-B) = 1/\sqrt{3}$ and $\sec(A+C) = 2$, then

A. $A = 90^\circ, B = 60^\circ, C = 30^\circ$

B. $A = 120^\circ, B = 60^\circ, C = 0^\circ$

C. $A = 60^\circ, B = 30^\circ, C = 0^\circ$

D. none of these

Answer: C

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78. If H is the orthocentre of the $\Delta ABC,$ then find AH.

A. $c \cdot \cot A$

B. $b \cdot \cot A$

C. $a \cdot \cot B$

D. $a \cdot \cot A$

Answer: D

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79. If the side of a right-angled triangled are in A.P., then tangents of its acute angled are

A. $\sqrt{\sqrt{3}+\frac{1}{2}}, \sqrt{\sqrt{3}-\frac{1}{2}}$

B. $\sqrt{\sqrt{5}+\frac{1}{2}}, \sqrt{\sqrt{3}-\frac{1}{2}}$

C. $\sqrt{3}, 1/\sqrt{3}$

D. $3/4, 4/3$

Answer: D

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80. If, in ΔABC, $a = 13cm$, $b = 13cm$, $c = 5cm$, then cosC is

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81. In the $\Delta ABCA > B$. If the measures of A and B satisfy the equation $3\sin x - 4\sin^3 x - k = 0, 0 < k < 1$. Then the measure of C is

A. $5\pi/6$

B. $\pi/3$

C. $\pi/2$

D. $2\pi/3$

Answer: D

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82. In ΔABC , a= 6 ,b=3 and cos (A-B) = 4/5 .Then are of triangle is

A. 8 sq. u.

B. 9 sq. u.

C. 6 sq. u.

D. none of these

Answer: B

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83. If, in ΔABC, $\tan A + \tan B + \tan C > 0$, then the triangle is

A. acute angled

B. obtuse angled

C. right angled

D. nothing can be said

Answer: A

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84. In a ΔABC, $\tan A + \tan B + \tan C = 6$ and $\tan A \tan B = 2$, then the triangle ABC is

A. right angled

B. acute angled

C. obtuse angled

D. equilateral

Answer: B

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85. If, in ΔABC, $a^4 + b^4 + c^4 = 2a^2\left(b^2 + c^2\right)$ then : $m\angle A$ = ...

A. $45^\circ, 135^\circ$

B. $60^\circ, 120^\circ$

C. 45^(@)`

D. none of these

Answer: A

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86. If, ΔABC is right angled at C, then : $\tan A \tan B$ = ...

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87. In a right of a triangle, the hypotenuse is 2 times the perpendicular. Then one of the acute angles of the triangle is.....

A. 15°

B. 30°

C. 45°

D. none of these

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88. Two sides of a triangle are $\left(\sqrt{3}+1\right)$ and $\left(\sqrt{3}-1\right)$, and the angle between them is 60°. The difference of the remaining angles is

A. 30°

B. 45°

C. 60°

D. 90°

Answer: D

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89. If, in ΔABC, $3a = b + c$

then: $\cot\left(\frac{B}{2}\right) \cdot \cot\left(\frac{C}{2}\right) = \ldots\ldots$

A. 1

B. $\sqrt{3}$

C. 2

D. none of these

Answer: C

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90. If, in ΔABC, $\cos A = \cos B \cdot \cos C$,

then: $\cot B \cdot \cot C = \ldots .$

A. 2

B. 3

C. 4

D. $1/2$

Answer: D

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91. If the altitudes of a Δ are in A.P., then its sdies are in

A. A.P.

B. H.P.

C. G.P.

D. none of these

Answer: B

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92. If, in $\Delta ABC, a = 2x, b = 2y$ and $C = 120^\circ$ then the area of the triangle is

A. xy

B. $\sqrt{3} \cdot xy$

C. $3xy$

D. $2xy$

Answer: B

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93. If, in $\Delta ABC, a = 4, b = 5$ and $C = 6$ then $\angle C$=....

A. $\angle A$

B. $\angle(A/2)$

C. $2\angle A$

D. $3\angle A$

Answer: C

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94. If, in ΔABC, $a = 13, b = 14, c = 15,$ then : $\sin(A/2) = ...$

A. $1/\sqrt{5}$

B. $2/\sqrt{5}$

C. $3/\sqrt{5}$

D. $4/\sqrt{5}$

Answer: A

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95. If, in `Delta ABC, angle C is obstuse, then

A. $\tan A \cdot \tan B < 1$

B. $\tan A \cdot \tan B > 1$

C. $\tan A + \tan B = 1$

D. $\tan A + \tan B = 2$

Answer: A

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96. The perimeter of a triangle ABC is saix times the arithmetic mean of the sines of its angles. If the side $ais1$ then find angle A.

A. $\pi/6$

B. $\pi/3$

C. $\pi/2$

D. π

Answer: A

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97. If the area Δ of ΔABC is given by $\Delta = a^2 - (b-c)^2$, 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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98. Evaluate each of the following: $\sin^{-1}(\sin 3)$ (ii) $\sin^{-1}(\sin 4)$

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

B. $\frac{\pi}{2} - 3$

C. $\pi - 3$

D. $3 - \pi$

Answer: A

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99. If $\frac{3\pi}{2} \leq x \leq 2\pi \quad \text{then}: \sin^{-1}(\sin x) = \ldots$

A. $x - 2\pi$

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

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

D. none of these

Answer: A

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100. If $0 < x < \pi$ and $x \neq \frac{\pi}{2}$, then: $\tan^{-1}(\tan x) = \ldots$

A. $x - \pi$

B. $\pi + x$

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

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

Answer: D

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101. Principal value of $\sin^{-1}\left[\sin\left(\frac{5\pi}{6}\right)\right]$ is

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

B. $-\frac{5\pi}{6}$

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

D. $-\frac{\pi}{6}$

Answer: C

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102. Principal value of $\cos^{-1}\left[\cos\left(\frac{4\pi}{3}\right)\right]$ is

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

B. $-\frac{4\pi}{6}$

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

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

Answer: D

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103. Principal value of $\cos^{-1}\left[\cos\left(\frac{7\pi}{6}\right)\right]$ is

A. $\frac{7\pi}{6}$

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

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

D. $-\frac{\pi}{6}$

Answer: B

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104. Principal value of $\tan^{-1}\left[\tan\left(\frac{3\pi}{4}\right)\right]$ is

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

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

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

D. $-\frac{3\pi}{4}$

Answer: C

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105. Principal value of $\sin^{-1}.\left(-\frac{\sqrt{3}}{2}\right)$ is

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

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

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

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

Answer: B

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106. Find the smallest positive values of $x and y$ satisfying $x - y = \frac{\pi}{4} and \cot x + \cot y = 2$

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

B. $\frac{\pi}{3}, \frac{2\pi}{3}$

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

D. none of these

Answer: A

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107. If $\sin^{-1} x = \theta + \phi$ and $\sin^{-1} y = \theta - \phi$, then: $1 + xy$=

A. $\sin^2 \theta + \sin^2 \phi$

B. $\sin^2 \theta + \cos^2 \phi$

C. $\cos^2 \theta + \cos^2 \phi$

D. none of these

Answer: B

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108. $\sin^{-1}(\cos x) + \tan^{-1}(\cot x)$

A. $m = 0, M = \pi$

B. $m = 0, M = \pi/2$

C. $m = \pi/4, M = 3\dfrac{\pi}{4}$

D. none of these

Answer: A

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109. If $\left(\tan^{-1} x\right)^2 + \left(\cot^{-1} x\right)^2 = \dfrac{5\pi^2}{8}$, then find x.

A. -1

B. 1

C. 0

D. none of these

Answer: A

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110. If $\sin^{-1}\left(\frac{2a}{1+a^2}\right) - \cos^{-1}\left(\frac{1-b^2}{1+b^2}\right) = \tan^{-1}\left(\frac{2x}{1-x^2}\right)$, then : x =

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

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

C. $\frac{ab-1}{a+b}$

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

Answer: A

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111. If $x \geq 1, \quad \text{then} : 2\tan^{-1} x + \sin^{-1}\left(\frac{2x}{1+x^2}\right) = \ldots$

A. $4\tan^{-1}x$

B. 0

C. $\pi/2$

D. π

Answer: D

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112. Prove that $\tan\left(\frac{\text{pi}}{4}+\frac{1}{2}\cos^{-1}\backslash\ \backslash\ \frac{\text{a}}{\text{b}}\right)+\tan\backslash\ \left(\frac{\text{pi}}{4}+\frac{1}{2}\cos^{-1}\backslash\ \backslash\ \frac{\text{a}}{\text{b}}\right)=\frac{2\text{b}}{\text{a}}$.

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

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

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

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

Answer: B

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113. Show that: $\cos\left(2\frac{\tan^{-1}1}{7}\right) = \sin\left(4^{-1}\frac{1}{3}\right)$

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

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

C. 0

D. 1

Answer: C

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114. If $x = \sin\left(2\tan^{-1}2\right), y = \sin\left(\frac{1}{2}\tan^{-1}\left(\frac{4}{3}\right)\right)$, then -

A. $x > y$ and $y^2 = 1 - x$

B. $x < y$

C. $x > y$ and $y^2 = x$

D. $y^2 = 1 + x$

Answer: A

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115. $\cos^{-1}\left(\frac{1}{2}\right) + 2\sin^{-1}\left(\frac{1}{2}\right) = \ldots$

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

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

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

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

Answer: D

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116. Find the value of $\sin\left(\frac{1}{2}\cot^{-1}\left(-\frac{3}{4}\right)\right)$

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

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

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

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

Answer: C

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117. $\tan\left[\cos^{-1}\left(\frac{4}{5}\right)+\tan^{-1}\left(\frac{2}{3}\right)\right]=....$

A. $\frac{6}{17}$

B. $\frac{17}{6}$

C. $\frac{16}{7}$

D. none of these

Answer: B

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118. Evaluate: $\tan^{-1}\left(\frac{\tan(5\pi)}{6}\right)+\cos^{-1}\left\{\cos\left(\frac{13\pi}{6}\right)\right\}$

A. 3π

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

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

D. none of these

Answer: D

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119. Find the value of expression: $\sin\left(2\frac{\tan^{-1}1}{3}\right)+\cos\left(\tan^{-1}2\sqrt{2}\right)$

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

B. $\frac{14}{15}$

C. $\frac{4\sqrt{2}}{3}$

D. none of these

Answer: B

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120. If $a = \cos\left(2.\tan^{-1}.\frac{1}{7}\right)$ and $b = \sin\left(4.\tan^{-1}.\frac{1}{3}\right)$

A. $a < b$

B. $a > b$

C. $a = b$

D. $ab = 1$

Answer: C

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121. If: $\cos\left(\tan^{-1} x\right) = \sin\left(\cot^{-1}.\ \frac{3}{4}\right)$, then : x =

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

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

C. $\pm\frac{5}{6}$

D. none of these

Answer: B

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122. Find the value of $\sin^{-1}\left(\cos.\ \frac{33\pi}{5}\right)$.

A. $-\frac{61\pi}{10}$

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

C. $-\frac{\pi}{10}$

D. none of these

Answer: C

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123. If $\cos\left(\frac{\sin^{-1}2}{5}+\cos^{-1}x\right)=0$ find the value of x.

A. 0

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

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

D. 1

Answer: C

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124. If $\tan^{-1}x+\tan^{-1}y=\frac{4\pi}{5}$, then $\cot^{-1}x+\cot^{-1}y$ equal to

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

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

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

D. π

Answer: A

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125. If $\sin^{-1}\left(\frac{2a}{1+a^2}\right) - \cos^{-1}\left(\frac{1-b^2}{1+b^2}\right) = \tan^{-1}\left(\frac{2x}{1-x^2}\right)$, then : x =

A. 0

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

C. a

D. $\frac{2a}{1-a^2}$

Answer: D

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126. $\tan\left(\frac{1}{2}.\cos^{-1}.\frac{2}{\sqrt{5}}\right) =$

A. $5-\sqrt{2}$

B. $\sqrt{5}-2$

C. $5+\sqrt{2}$

D. none of these

Answer: B

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127. If :

$\cos^{-1}x+\cos^{-1}y+\cos^{-1}z=3\pi, \quad \text{then}: x(y+z)+y(z+x)+z(x+y)$

A. 0

B. 6

C. 1

D. 12

Answer: C

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128. If $y = 2\tan^{-1} x + \sin^{-1}\left(\frac{2x}{1+x^2}\right)$ then: $y \in$

A. $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

B. $(-\pi.\ \pi)$

C. $(-2\pi, 2\pi)$

D. none of these

Answer: C

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129. If $\tan^{-1}\left(\frac{a}{x}\right)+\tan^{-1}\left(\frac{b}{x}\right)=\frac{\pi}{2}$, then: x=

A. ab

B. 2ab

C. $\sqrt{ab}$

D. $\sqrt{2ab}$

Answer: C

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130. If

$y=\cot^{-1}\left(\sqrt{\tan\alpha}\right)-\tan^{-1}\left(\sqrt{\tan\alpha}\right),$ than: $\tan\left(\frac{\pi}{4}-\frac{y}{2}\right)=\ldots$

A. $\sqrt{\cot\alpha}$

B. $\sqrt{\tan\alpha}$

C. $\cot\alpha$

D. $\tan\alpha$

Answer: B

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131. $\sin\left\{\cot^{-1}\left[\cos\left(\tan^{-1}x\right)\right]\right\} = ...$

A. $\sqrt{\dfrac{x^2+2}{x^2+1}}$

B. $\sqrt{\dfrac{x^2+1}{x^2+2}}$

C. $\sqrt{x^2+1}$

D. none of these

Answer: B

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132. If $\cos^{-1}\sqrt{p} + \cos^{-1}\sqrt{1-p} + \cos^{-1}\sqrt{1-q} = \dfrac{3\pi}{4}\text{than}: q =$

A. 1

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

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

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

Answer: D

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133. If $\sin^{-1} x - \cos^{-1} x = \frac{\pi}{6}, \quad \text{then} : x =$

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

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

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

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

Answer: B

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134. $\tan^{-1}\left(\frac{x+1}{x-1}\right)+\tan^{-1}\left(\frac{x-1}{x}\right)=\tan^{-1}(-7)$

A. -2

B. 0

C. 2

D. 1

Answer: C

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135. $\sec^2\left(\tan^{-1}2\right)+\operatorname{cosec}^2\left(\cot^{-1}3\right)=$

A. 15

B. 10

C. 0

D. -1

Answer: A

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136. If $\sin^{-1} x + \cot^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{2}$, then : $x =$

A. 0

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

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

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

Answer: B

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137. $\sin\left\{\tan^{-1}\left[\frac{1-x^2}{2x}\right] + \cos^{-1}\left[\frac{1-x^2}{1+x^2}\right]\right\} =$

A. 0

B. 1

C. $\sqrt{2}$

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

Answer: B

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138. If $4\sin^{-1}x + \cos^{-1}x = \pi$, then x is equal to

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

B. 2

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

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

Answer: D

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139. If $\tan^{-1} 3 + \tan^{-1} x = \tan^{-1} 87$ then x =

A. 5

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

C. $\frac{5}{14}$

D. $\frac{14}{5}$

Answer: B

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140. Solve for x: $\tan^{-1}(x+1) + \tan^{-1}(x-1) = \tan^{-1}\left(\frac{8}{31}\right)$

A. 1

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

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

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

Answer: D

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141. If $\sin^{-1} x + \sin^{-1} y = \frac{2\pi}{3}$, then $\cos^{-1} x + \cos^{-1} y$

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

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

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

D. π

Answer: B

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142. A solution of the equation

$\tan^{-1}(1+x)+\tan^{-1}(1-x)=\frac{\pi}{2}$ is

A. $x=1$

B. $x=-1$

C. $x=0$

D. $x=\pi$

Answer: C

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143. If $\sin^{-1}x=\frac{\pi}{5}$ for some $x\in(-1,1)$, then : $\cos^{-1}x=....$

A. $\frac{3\pi}{10}$

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

C. $\frac{7\pi}{10}$

D. $\frac{9\pi}{10}$

Answer: A

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144. Simplify the following:

Evaluate $\tan^{-1}\left(\frac{x}{y}\right) - \tan^{-1}\left(\frac{x-y}{x+y}\right)$

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

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

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

D. $\frac{\pi}{4}$ or $\frac{3\pi}{4}$

Answer: C

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145. The domain of the function $f(x) = \frac{\sqrt{9-x^2}}{\sin^{-1}(3-x)}$ is

A. $(2, 3)$

B. $[2, 3)$

C. $(2, 3]$

D. none of these

Answer: B

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146. The domain of the function $f(x) = \sqrt{5 - x} + \cos^{-1}\left(\frac{3 - 2x}{7}\right)$ is

A. $[-1, 3]$

B. $(-1, 3]$

C. $[-1, 3)$

D. none of these

Answer: D

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147. The domain of the function

$f(x) = \cos^{-1}\left(\frac{2-x}{4}\right)$ is

A. $[-6, 3)$

B. $[-6, 2)$

C. $[-6, 3]$

D. none of these

Answer: A

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148. The domain of definition of the function

$f(x) = \sin^{-1}\left(\frac{x-3}{2}\right) - \log_{10}(4-x)$, is

A. $(1, 4)$

B. $[1, 4]$

C. $[1, 4)$

D. $(1, 4]$

Answer: C

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149. The domain of the function

$f(x) = \sqrt[3]{1 - 3x} + 3\cos^{-1}\left(\frac{2x - 1}{3}\right)$ is

A. $[1, 2]$

B. $(-1, 2)$

C. R

D. none of these

Answer: A

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150. The domain of the function $f(x) = \sqrt{\cos^{-1}\left(\frac{1-|x|}{2}\right)}$ is

A. $(-\infty, -3) \cup (3, \infty)$

B. $[-3, 3]$

C. $(-\infty, -3) \cup [3, \infty)$

D. $\{\}$

Answer: B

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151. The domain of the function

$f(x) = \sqrt{\sin^{-1}(\log_2 x)}$ is

A. $(1, 2)$

B. $[1, 2)$

C. $(1, 2]$

D. none

Answer: D

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152. The range of the function $\sin^{-1}\left(\frac{x^2}{1+x^2}\right)$ is

A. $\left(0, \frac{\pi}{2}\right)$

B. $\left[0, \frac{\pi}{2}\right)$

C. $\left[0, \frac{\pi}{2}\right]$

D. none of these

Answer: B

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MULTIPLE CHOICE QUESTIONS - PART - B : MASTERING THE BEST

1. If : $\cot\theta + \tan\theta = 2 \cdot \csc\theta =$

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

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

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

D. $2n\pi \pm \frac{\pi}{6}$

Answer: C

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2. If $\tan^2\theta - \left(1+\sqrt{3}\right)\tan\theta + \sqrt{3} = 0$, then the general value of theta is

A. $n\pi + \frac{\pi}{4}, n\pi + \frac{\pi}{3}$

B. $n\pi - \frac{\pi}{4}, n\pi + \frac{\pi}{3}$

C. $n\pi + \frac{\pi}{4}, n\pi - \frac{\pi}{3}$

D. $n\pi - \frac{\pi}{4}, n\pi - \frac{\pi}{3}$

Answer: A

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3. If : $\tan\theta - \sqrt{2}\cdot\sec\theta = \sqrt{3}$, then : θ =

A. $n\pi + (-1)^n \cdot \frac{\pi}{4} - \frac{\pi}{3}$

B. $n\pi + (-1)^n \cdot \frac{\pi}{3} - \frac{\pi}{4}$

C. $n\pi + (-1)^n \cdot \frac{\pi}{3} + \frac{\pi}{4}$

D. $n\pi + (-1)^n \cdot \frac{\pi}{4} + \frac{\pi}{3}$

Answer: D

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4. If: $\tan\theta + \tan\left(\frac{\pi}{2} - \theta\right) = 2$, then: $\theta =$

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

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

C. $2n\pi \pm \frac{\pi}{4}$

D. $n\pi + (-1)^n \cdot \frac{\pi}{4}$

Answer: B

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5. If : $\sin\left(\frac{\pi}{4} \cdot \cot\theta\right) = \cos\left(\frac{\pi}{4} \cdot \tan\theta\right)$, then : θ =

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

B. $2n\pi \pm \frac{\pi}{3}$

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

D. $2n\pi \pm \frac{\pi}{6}$

Answer: A

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6. If $\cos 2\theta = (\sqrt{2}+1)\left(\cos\theta - \frac{1}{\sqrt{2}}\right)$, then the value of θ is

A. $2n\pi + \frac{\pi}{4}$

B. $2n\pi \pm \frac{\pi}{3}$

C. $2n\pi - \frac{\pi}{4}$

D. none of these

Answer: B

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7. If $: \cos 2\theta = \sin\alpha$, then $:\theta$ is given by

A. $2\theta = (\pi/2) - \alpha$

B. $\theta = 2n\pi \pm \left(\frac{\pi}{2} - \alpha\right)$

C. $\theta = \frac{1}{2}\left[n\pi + (-1)^n \cdot \alpha\right]$

D. $\theta = n\pi \pm \left(\frac{\pi}{4} - \frac{\alpha}{2}\right)$

Answer: D

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8. Number of values of x in the interval $[0, 3\pi]$ satisfying the equation $2\sin^2 x + 5\sin x - 3 = 0$ is

A. 4

B. 6

C. 1

D. 2

Answer: A

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9. If $: 1 - \cos\theta = \sin\theta \cdot \sin\left(\frac{\theta}{2}\right)$, then $:\theta =$

A. $n\pi$

B. $2n\pi$

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

D. none of these

Answer: B

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10. If : $\frac{\tan 3\theta - 1}{\tan 3\theta + 1} = \sqrt{3}$, then : θ =

A. $n\frac{\pi}{3} + \frac{\pi}{12}$

B. $n\frac{\pi}{3} - \frac{5\pi}{36}$

C. $n\pi + \frac{7\pi}{12}$

D. $n\pi + \frac{\pi}{12}$

Answer: B

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11. If : $\sin 5x + \sin 3x + \sin x = 0$, where $0 < x \leq \frac{\pi}{2}$, then : $x =$

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

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

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

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

Answer: C

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12. If : $\cos 6\theta + \cos 4\theta + \cos 2\theta + 1 = 0$,

where, $0 < \theta < 180^\circ$, then : θ =

A. $30^\circ, 45^\circ$

B. $45^\circ, 90^\circ$

C. $135^\circ, 150^\circ$

D. $30^\circ, 45^\circ, 90^\circ, 135^\circ, 150^\circ$

Answer: D

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13. If $: 0 < \theta < \frac{\pi}{2}$ and $\sin 7\theta + \sin 4\theta + \sin \theta = 0$, then $: \theta =$

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

B. $\frac{\pi}{3}, \frac{\pi}{9}$

C. $\frac{\pi}{6}, \frac{\pi}{9}$

D. none of these

Answer: A

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14. Solve $5\cos 2\theta + 2\cos^2 \frac{\theta}{2} + 1 = 0, \ -\pi < \theta < \pi.$

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

B. $\frac{\pi}{3}, \frac{\cos^{-1}3}{5}$

C. $\cos^{-1}(3/5)$

D. $\frac{\pi}{3}, \pi - \frac{\cos^{-1}3}{5}$

Answer: D

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15. $\cot\theta = \sin 2\theta, \theta \neq n\pi, n \in Z$, if θ equals

A. $45^\circ, 60^\circ$

B. $45^\circ, 90^\circ$

C. 45° only

D. 90° only

Answer: B

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16. If : $\cot\theta + \cot\left(\frac{\pi}{4} + \theta\right) = 2$, then : θ =

A. $2n\pi \pm \frac{\pi}{6}$

B. $2n\pi \pm \frac{\pi}{3}$

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

D. $n\pi \pm \frac{\pi}{6}$

Answer: D

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17. If $\sin 3\alpha = 4\sin\alpha\sin(x+\alpha)\sin(x-\alpha)$, then

A. $n\pi \pm (\pi)/(6)$

B. $n\pi \pm (\pi)/(3)$

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

D. $n\pi \pm (\pi)/2$

Answer: B

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18. The number of values of x in the interval $[0, 5\pi]$ satisfying the equation $3\sin^2 x - 7\sin x + 2 = 0$ is

A. 0

B. 5

C. 6

D. 10

Answer: C

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19. If, in $\triangle ABC, (s-a)(s-b) = s(s-c)$, then: $\angle C$=

A. 90°

B. 45°

C. 30°

D. 60°

Answer: A

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20. If, in a $\Delta ABC, (s-b)(s-c) = x \cdot \sin^2\left(\frac{A}{2}\right)$, then : x =

A. bc

B. ca

C. ab

D. abc

Answer: A

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21. In a ΔABC, $\sin B : \sin(A+B) =$

A. $b : (a+b)$

B. $b : c$

C. $c : b$

D. none of these

Answer: B

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22. If, in a ΔABC, $c^2 + a^2 - b^2 = ac$, then $: \angle B =$

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

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

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

D. none of these

Answer: C

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23. In a ΔABC, if : $a = 16, b = 24$ and $c = 20$

then : $\cos\left(\frac{B}{2}\right)$ =

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

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

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

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

Answer: A

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24. In ΔABC, $\csc A(\sin B \cos C + \cos B \sin C) =$

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

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

C. 1

D. $\frac{c}{ab}$

Answer: C

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25. If sides a,b,c of ΔABC are in A.P., then : $\sin\left(\frac{A}{2}\right) \cdot \frac{\sin\left(\frac{C}{2}\right)}{\sin\left(\frac{B}{2}\right)} =$

A. 1

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

C. 2

D. -1

Answer: B

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26. If, in a ΔABC, $a = 6cm$, $b = 8cm$, $c = 10cm$,

then : $\sin 2A$ =

A. $\frac{6}{25}$

B. $\frac{8}{25}$

C. $\frac{10}{25}$

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

Answer: D

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27. In ΔABC if $\angle C = 90^\circ$ then $R + r =$

A. (10,10)

B. $\left(10, 10\sqrt{3}\right)$

C. $\left(5, 5\sqrt{3}\right)$

D. $\left(8, 8\sqrt{3}\right)$

Answer: B

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28. In ΔABC, $\dfrac{\cos\left(\frac{B-C}{2}\right)}{\cos\left(\frac{A}{2}\right)} =$

A. $\dfrac{b-c}{a}$

B. $\dfrac{b+c}{a}$

C. $\dfrac{a}{b-c}$

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

Answer: B

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29. In ΔABC, 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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30. If : $a = 9, b = 8$ and $c = x$ satisfies 3 cos C = 2, then : x =

A. 5

B. 6

C. 4

D. 7

Answer: D

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31. If in a $\Delta ABC, b = \sqrt{3}, c = 1$ and $B - C = 90^\circ$, then $\angle A$ is

A. 30°

B. 45°

C. 75°

D. 15°

Answer: A

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32. In ΔABC, if : a = 2 cm , b = 3cm and c = 4cm, then $\angle A$ =

A. $\cos^{-1}\left(\frac{1}{24}\right)$

B. $\cos^{-1}\left(\frac{11}{16}\right)$

C. $\cos^{-1}\left(\frac{7}{8}\right)$

D. $\cos^{-1}\left(-\frac{1}{4}\right)$

Answer: C

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33. If : $a = 2, b = 3, c = 5$ in ΔABC, then : $\angle C =$

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

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

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

D. none of these

Answer: D

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34. If one side of a triangle is double the other, and the angles on opposite sides differ by 60°, then the triangle is

A. isosceles

B. right angled

C. obtuse angled

D. acute angled

Answer: B

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

A. 1

B. 2

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

D. $\sqrt{3}$

Answer: D

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36. In a ABC, if $= 2, \angle B = 60^0 and \angle C = 75^0$, then $b =$ $\sqrt{3}$ (b) $\sqrt{6}$ (c) $\sqrt{9}$ (d) $1 + \sqrt{2}$

A. $\sqrt{3}$

B. $\sqrt{6}$

C. $\sqrt{9}$

D. $1 + \sqrt{2}$

Answer: B

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37. In $\triangle ABC$, If $A = 30^\circ, b = 8, a = 6$ where $B = \sin^{-1} x$, then: x=

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

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

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

D. 1

Answer: C

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38. In ΔABC, if : $\sin\left(\frac{A}{2}\right).\sin\left(\frac{C}{2}\right) = \sin\left(\frac{B}{2}\right)$ then : semiperimeter s =

A. 2b

B. b

C. 3b

D. 4b

Answer: A

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39. In ΔABC, if : $a = 2, b = 3$ and $\sin A = 2/3$, then : $\angle B =$

A. 30°

B. 60°

C. 90°

D. 120°

Answer: C

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40. In ΔABC, if : $a = 5, b = 4, A = \frac{\pi}{2} + B$, then : $\angle C =$

A. $\tan^{-1}\left(\frac{1}{9}\right)$

B. $\tan^{-1}\left(\frac{1}{40}\right)$

C. cannot be found

D. $2 \cdot \tan^{-1}\left(\frac{1}{9}\right)$

Answer: D

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41. In ΔABC, if : $A = 30^\circ, C = 60^\circ, a = \sqrt{2}$ then b and c

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42. If, in a ΔABC, angle C is 45°

then : $(1 + \cot A)(1 + \cot B) =$

A. -1

B. 2

C. 3

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

Answer: B

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43. If ΔABC is a right angled at C, then tan A + tan B is equal to

A. $a+b$

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

C. $\frac{b^2}{ca}$

D. $\frac{c^2}{ab}$

Answer: D

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44. If $a = 7, b = 4\sqrt{3}$ and $c = \sqrt{13}$, then the smallest angle of ΔABC has measure

A. 30°

B. 15°

C. 45°

D. none of these

Answer: A

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45. 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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46. In ΔABC, if: $b = \sqrt{3}, c = 1$ and $A = 30^\circ$, then the largest angle of the triangle is

A. 135°

B. 90°

C. 60°

D. 120°

Answer: D

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47. The lengths of the sides of a triangle are $\alpha - \beta, \alpha + \beta$ and $\sqrt{3\alpha^2 + \beta^2}, (\alpha > \beta > 0)$. Its largest angle is

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

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

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

D. $\frac{5\pi}{6}$

Answer: C

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48. In ΔABC, if : $2s = a + b + c$,

then: $\frac{s(s-a)}{bc} =$

A. sin A

B. cos A

C. tan A

D. none of these

Answer: B

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49. If ΔABC, if : $a = 2, b = 4, C = 60^\circ$, then : (A, B) =`

A. $(90^\circ, 30^\circ)$

B. $(60^\circ, 60^\circ)$

C. $(30^\circ, 90^\circ)$

D. $(60^\circ, 45^\circ)$

Answer: C

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50. In ΔABC, if : $A = 60^\circ, a = 5, b = 4\sqrt{3}$, then $B =$

A. 30°

B. 60°

C. 90°

D. none of these

Answer: D

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51. If, in a ΔABC right angled at B, it is given that $s - a = 3$ and $s - c = 2$, then : (a, c) =

A. (2,3)

B. (3,4)

C. (4,3)

D. (6,8)

Answer: B

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52. If, in a ΔABC, $b^2 + c^2 = 3a^2$,

then : $\cot B + \cot C - \cot A$ =

A. 1

B. $\frac{ab}{4\Delta}$

C. 0

D. $\frac{ac}{4\Delta}$

Answer: C

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53. $In\Delta ABC, 1 - \tan\left(\frac{A}{2}\right)\tan\left(\frac{B}{2}\right) =$

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

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

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

D. $\frac{4a}{a+b+c}$

Answer: A

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54. In a $\triangle ABC$, if A,B,C are in A.P.,

then: $\frac{a}{c}(\sin 2C) + \frac{c}{a}(\sin 2A) = ...$

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

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

C. 1

D. $\sqrt{3}$

Answer: D

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55. In ΔABC, if : a^2, b^2, c^2 are in A.P., then : $(\sin 3B) : (\sin B)$ =

A. $\frac{c^2 - a^2}{2ca}$

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

C. $\left(\frac{c^2 - a^2}{ca}\right)^2$

D. $\left(\frac{c^2 - a^2}{2ca}\right)^2$

Answer: D

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56. In ΔABC

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

then: $\angle A =$

A. 45°

B. 30°

C. 90°

D. 60°

Answer: C

Watch Video Solution

57. Area of the triangle is $10\sqrt{3}sq.\ cm$, $\angle C = 60^\circ$ and its perimeter is 20 cm, then side c will be

A. 5

B. 7

C. 8

D. 10

Answer: B

Watch Video Solution

58. In ΔABC, if : $a = 6, b = 3, \cos(A - B) = 4/5$, then : its area =

A. 7sq. units

B. 8sq. units

C. 9sq. units

D. none of these

Answer: C

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MULTIPLE CHOICE QUESTIONS - PART - A : BUILDING-UP THE BASE (B) Properties of triangles

1. If the lengths of the sides of a triangle are $3, 5, 7$, then its largest angle of the triangle is

A. 90°

B. 120°

C. 150°

D. none of these

Answer: B

Watch Video Solution

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

A. 75°

B. 90°

C. 120°

D. none of these

Answer: C

Watch Video Solution

3. If, in a ΔABC, $\tan A = 1$ and $\tan B = 2$, then : $\tan C = ...$

A. 1

B. 2

C. 3

D. 4

Answer: C

Watch Video Solution

4. If $\triangle ABC$ is a right angled at A, then: $\cos^2 B + \cos^2 C =$

A. -2

B. -1

C. 1

D. 0

Answer: C

Watch Video Solution

5. If $\sin A + \sin B + \sin C = \left(3\sqrt{3}\right)/2$ then ΔABC is

A. isosceles

B. right angled

C. equilateral

D. obtuse-angled

Answer: C

Watch Video Solution

6. If : $\cos^2 A + \cos^2 B + \cos^2 C = 1$, then: ΔABC is

A. isosceles

B. right angled

C. equilateral

D. obtuse-angled

Answer: B

Watch Video Solution

7. In ΔABC

$a \cdot \sin(B - C) + b \cdot \sin(C - A) + c \cdot \sin(A - B) =$

A. -2

B. -1

C. 0

D. none of these

Answer: C

Watch Video Solution

8. If $\cos A = \dfrac{\sin B}{2\sin C}$, then ΔABC is

A. isosceles

B. right angled

C. scelene

D. none of these

Answer: A

Watch Video Solution

9. If, in a $\triangle ABC$,

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

then: $\angle A = \ldots .$

A. isosceles

B. right angled

C. equilateral

D. obtuse-angled

Answer: B

Watch Video Solution

10. In ΔABC

$(b-c)\cdot \sin A+(c-a)\cdot \sin B+(a-b)\cdot \sin C=$ .....

A. -2

B. -1

C. 0

D. none of these

Answer: C

Watch Video Solution

11. In any triangle ABC, prove that following:

$$\frac{\cos^2 B - \cos^2 C}{b+c} + \frac{\cos^2 C - \cos^2 A}{c+a} + \frac{\cos^2 A - \cos^2 B}{a+b} = 0$$

A. -1

B. 0

C. 1

D. 2

Answer: B

Watch Video Solution

12. If the sides of a triangle are x, y and $\sqrt{(x^2 + xy + y^2)}$, then then measure of its greatest angle is....

A. 75°

B. 90°

C. 120°

D. none of these

Answer: C

Watch Video Solution

13. In any ΔABC, prove that :

$$\frac{a^2 \sin(B-C)}{\sin B + \sin C} + \frac{b^2 \sin(C-A)}{\sin C + \sin A} + \frac{c^2 \sin(A-B)}{\sin A + \sin B} = 0$$

A. 0

B. 1

C. -1

D. 2

Answer: A

Watch Video Solution

14. In any ΔABC, prove that :

$(b+c)\cos A+(c+a)\cos B+(a+b)\cos C=a+b+c$

A. $a+b+c$

B. $a-b+c$

C. $a+b-c$

D. none of these

Answer: A

Watch Video Solution

15. If θ is real , then: $c\cdot\cos(A-\theta)+a\cdot\cos(C+\theta)=.....$

A. $a\cdot\cos\theta$

B. $b\cdot\cos\theta$

C. $c\cdot\cos\theta$

D. none of these

Answer: B

Watch Video Solution

16. In ΔABC, $\frac{\cot B + \cot C}{\cot C + \cot A}$ = ...

A. a^2 / b^2

B. b^2 / c^2

C. c^2 / a^2

D. none of these

Answer: A

Watch Video Solution

17. If : $2 \sin B \cdot \cos C = \sin A,$ then ΔABC is

A. isosceles

B. right angled

C. scelene

D. none of these

Answer: A

Watch Video Solution

18. If $A = 3B$ and $a = 2b$, then : $m\angle B = \ldots$

A. 15°

B. 30°

C. 45°

D. 90°

Answer: B

Watch Video Solution

19. If $m\angle A = 60^\circ$, then $(a+b+c)(-a+b+c) = ...$

A. 3ab

B. 3bc

C. 3ca

D. 3abc

Answer: B

Watch Video Solution

20. If a, c, b are in A.P., then : $a\cos B - b\cos A = ...$

A. $2(c-a)$

B. $2(b-c)$

C. $2(a-b)$

D. none of these

Answer: C

Watch Video Solution

21. In ΔABC, $\frac{\cos 2A}{a^2} - \frac{\cos 2B}{b^2} = ...$

A. $b^{-2} - c^{-2}$

B. $c^{-2} - a^{-2}$

C. $a^{-2} - b^{-2}$

D. none of these

Answer: C

Watch Video Solution

22. In ΔABC, $\frac{\tan B}{\tan C} = ...$

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

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

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

D. none of these

Answer: A

Watch Video Solution

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

A. $2ca \cdot \sin B$

B. $2ab \cdot \cos C$

C. $2bc \cdot \tan A$

D. none of these

Answer: A

Watch Video Solution

24. If ΔABC is right -angled at C,

then: $\frac{a^2+b^2}{a^2-b^2} \cdot \sin(A-B)$ =....

A. 1

B. 2

C. 3

D. none of these

Answer: A

Watch Video Solution

25. If the angles A,B,C of ΔABC are in A.P. And its sides a,b,c are in G.P., then a^2, b^2, c^2 are in

A. A.P.

B. G.P.

C. H.P.

D. none of these

Answer: A

Watch Video Solution

26. If p_1, p_2, p_3 are the lengths of the altitudes ofa tringle from the vertices A,B,C, then $\frac{1}{p_1^2} + \frac{1}{p_2^2} + \frac{1}{p_3^2} =$

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: C

Watch Video Solution

27. If a^2, b^2, c^2 are in A.P.,

then : $\frac{\cos A}{a}, \frac{\cos B}{b}, \frac{\cos C}{c}$ are in

A. A.P.

B. G.P.

C. H.P.

D. none of these

Answer: A

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MULTIPLE CHOICE QUESTIONS - PART-B: MASTERING THE BEST

1. $\sin\left(\cos^{-1} x\right) =$

A. $\sqrt{1+x^2}$

B. x

C. $\left(1+x^2\right)^{-3/2}$

D. $\left(1+x^2\right)^{-1/2}$

Answer: D

Watch Video Solution

2. $1+\cos^2\left(\sin^{-1}x\right)=$

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

B. x^2

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

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

Answer: C

Watch Video Solution

3. If: $\sin^{-1}\left(\frac{1}{2}\right) = \tan^{-1} x$, then x=

A. $\sqrt{3}$

B. $1/\sqrt{3}$

C. $1/\sqrt{2}$

D. none of these

Answer: B

Watch Video Solution

4. $\tan\left[\frac{\sqrt{1+x^2}-1}{x}\right]$ =

A. $\tan^{-1} x$

B. $\frac{1}{2}\tan^{-1} x$

C. $2.\ \tan^{-1} x$

D. none of these

Answer: B

Watch Video Solution

5. $\tan^{-1}\left[\frac{x}{\sqrt{a^2-x^2}}\right] =$

A. $\frac{1}{a}.\sin^{-1}\left(\frac{x}{a}\right)$

B. $a.\sin^{-1}\left(\frac{x}{a}\right)$

C. $\sin^{-1}\left(\frac{x}{a}\right)$

D. $\sin^{-1}\left(\frac{a}{x}\right)$

Answer: C

Watch Video Solution

6. If $\cos^{-1}(x) = \alpha, (0 < x < 1)$ and $\sin^{-1}\left(2x\sqrt{1-x^2}\right) + \sec^{-1}\left(\frac{1}{2x^2-1}\right)$, than $\tan^{-1}(2x)$ equals

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

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

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

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

Answer: C

Watch Video Solution

7. $\sin^{-1}\left[\sqrt{\frac{x}{a+x}}\right] =$

A. $\cos^{-1}\sqrt{\frac{x}{a}}$

B. $\cos^{-1}\sqrt{\frac{x}{a}}$

C. $\tan^{-1}\sqrt{\frac{x}{a}}$

D. none of these

Answer: C

Watch Video Solution

8. If: $\sin\left(\sin^{-1}\left(\frac{1}{5}\right)+\cos^{-1}x\right)=1$, then: x=

A. 1

B. 0

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

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

Answer: D

Watch Video Solution

9. $\tan\left(\cos^{-1}x\right)=$

A. $\frac{\sqrt{1-x^2}}{x}$

B. $\frac{x}{1+x^2}$

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

D. $\sqrt{1-x^2}$

Answer: A

Watch Video Solution

10. $\cot\left(\cos ec^{-1}\left(\frac{5}{3}\right)+\tan^{-1}\left(\frac{2}{3}\right)\right)=$

A. $\frac{3}{17}$

B. $\frac{4}{17}$

C. $\frac{5}{17}$

D. $\frac{6}{17}$

Answer: D

Watch Video Solution

11. $\cot^{-1}9+\cos ec^{-1}\left(\frac{\sqrt{41}}{4}\right)=$

A. 0

B. $\tan^{-1} 2$

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

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

Answer: C

Watch Video Solution

12. If: $\tan^{-1} x = \sin^{-1}\left(\frac{3}{\sqrt{10}}\right)$, then: x=

A. 3

B. -3

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

D. $-\frac{1}{3}$

Answer: A

Watch Video Solution

Watch Video Solution

13. If: $\cos\left(2.\tan^{-1}x\right)=\frac{1}{2}$, then: x=

A. $\sqrt{3}$

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

C. $1-\sqrt{3}$

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

Answer: B

Watch Video Solution

14. If $\tan^{-1}.\frac{a+x}{a}+\tan^{-1}\left(\frac{a-x}{a}\right)=\frac{\pi}{6}$ then prove that $x^2=2\sqrt{3}a^2$

A. $2a\sqrt{3}$

B. $a\sqrt{3}$

C. $2a^2\sqrt{3}$

D. none of these

Answer: C

Watch Video Solution

15. If: $\tan^{-1}\left(\frac{1}{3}\right)+\tan^{-1}\left(\frac{3}{4}\right)-\tan^{-1}\left(\frac{x}{3}\right)=0$, then: x=

A. $\frac{7}{3}$

B. 3

C. $\frac{11}{3}$

D. $\frac{13}{3}$

Answer: D

Watch Video Solution

16. If: $\cot^{-1}\alpha + \cot^{-1}\beta = \cot^{-1}x$, then: x=

A. $\alpha + \beta$

B. $\alpha - \beta$

C. $\dfrac{1+\alpha\beta}{\alpha+\beta}$

D. $\dfrac{\alpha\beta - 1}{\alpha+\beta}$

Answer: D

Watch Video Solution

17. If: $\tan^{-1}x + 2\cot^{-1}x = \dfrac{2\pi}{3}$, then: x=

A. $\sqrt{2}$

B. 3

C. $\sqrt{3}$

D. $\dfrac{\sqrt{3}-1}{\sqrt{3}+1}$

Answer: C

Watch Video Solution

18. If $\sin^{-1} x + \cot^{-1}(1/2) = \pi/2$, then what is the value of x ?

A. 0

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

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

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

Answer: B

Watch Video Solution

19. If: $A = \tan^{-1} x$, then: sin 2A=

A. $\frac{2x}{\sqrt{1-x^2}}$

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

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

D. none of these

Answer: C

Watch Video Solution

20. $\tan\left[2.\tan^{-1}\left(\frac{1}{5}\right)-\frac{\pi}{4}\right]=$

A. $\frac{17}{7}$

B. $-\frac{17}{7}$

C. $\frac{7}{17}$

D. $-\frac{7}{17}$

Answer: D

Watch Video Solution

21. If: $2.\tan^{-1}(\cos x) = \tan^{-1}(\cos ec^2 x)$, then: x=

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

B. π

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

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

Answer: D

Watch Video Solution

22. If $\theta = \tan^{-1} a, \phi = \tan^{-1} b$ and $ab = -1$, then $\theta - \phi$ is

A. 0

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

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

D. none of these

Answer: C

Watch Video Solution

23. $\sin^{-1}\left[\sqrt{x^2-x^3}-\sqrt{x-x^3}\right]=$

A. $\sin^{-1}x+\sin^{-1}\sqrt{x}$

B. $\sin^{-1}s-\sin^{-1}\sqrt{x}$

C. $\sin^{-1}\sqrt{x}-\sin^{-1}x$

D. none of these

Answer: B

Watch Video Solution

24. $\sin\left\{\cot^{-1}\left[\tan\left(\cos^{-1}x\right)\right]\right.=$

A. x

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

C. 1

D. none of these

Answer: A

Watch Video Solution

25. If: $\sin^{-1} x = 2\tan^{-1} x$, then: x=

A. {1,2}

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

C. $\{-1, 1, 0\}$

D. $\{1, 1/2, 0\}$

Answer: C

Watch Video Solution

26. In $\triangle ABC$, if $\angle A = 90^\circ$, then $\tan^{-1}\left(\frac{c}{a+b}\right) + \tan^{-1}\left(\frac{b}{a+c}\right) =$

A. 0

B. 1

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

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

Answer: C

Watch Video Solution

27. If: $\tan^{-1}\left(\frac{x-1}{x+1}\right) + \tan^{-1}\left(\frac{2x-1}{2x+1}\right) = \tan^{-1}\left(\frac{23}{36}\right)$. Then: x=

A. $\frac{3}{4}, -\frac{3}{8}$

B. $\frac{3}{4}, \frac{3}{8}$

C. $\frac{4}{3}, \frac{3}{8}$

D. none of these

Answer: D

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MASTERING THE BEST - ALL TOPICS

1. If the measure of the central angle of a sector of a circle is 1^c, then the length of its arc is equal to the _____ of the circle.

A. diameter

B. circumference

C. chord

D. radius

Answer: D

Watch Video Solution

2. The measures of coterminal angles differ by an integral multiple of

A. 90°

B. $2\pi^c$

C. 180°

D. 360°

Answer: D

Watch Video Solution

3. 1^c is approximately equal to

A. π^0

B. 180°

C. 57°

D. none of these

Answer: C

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4. 1° is approximately equal to

A. 0.01745^c

B. $\left(\frac{270}{\pi}\right)^c$

C. 175^c

D. none of these

Answer: A

Watch Video Solution

5. If $x^\circ = \left(\frac{13\pi}{6}\right)^c$, then: x=

A. 390

B. 930

C. 309

D. 390°

Answer: D

Watch Video Solution

6. If $y^c = 27^\circ$, then: y=

A. $\left(\frac{20\pi}{3}\right)^c$

B. $\frac{20\pi}{3}$

C. $\frac{3\pi}{20}$

D. $\frac{\pi}{20}$

Answer: C

Watch Video Solution

7. In a right-angled triangle, If one angle ahs measures 75°, then the another angle has measure.

A. 105°

B. $\left(\frac{\pi}{12}\right)^c$

C. 30°

D. $\left(\frac{\pi}{10}\right)^c$

Answer: B

Watch Video Solution

8. The radian measure of the angle, subtends at the centre of a circle by an arc whose length is twice the diameter of the circle, is

A. 2

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

C. π

D. 4

Answer: D

Watch Video Solution

9. If the perimeter of a sector of a circle is twice the diameter of the circle, then the radian measure of the angle of the sector is

A. 2

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

C. π

D. 4

Answer: A

Watch Video Solution

10. A wire in the form of a rectangle of sides 4 cm and 6 cm is reshaped into a sector of a circleof radius 8 cm.Then the angle of the sector in degree is

A. $\frac{\pi^\circ}{45}$

B. $\frac{180^\circ}{\pi}$

C. $\frac{360^\circ}{\pi}$

D. $\frac{90^\circ}{\pi}$

Answer: D

Watch Video Solution

11. The value of $\cot 5^\circ . \cot 10^\circ . \cot 15^\circ ..... \cot 85^\circ$ is

A. 1

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

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

D. 0

Answer: A

Watch Video Solution

12. The value of $\left(\sin^2 5^\circ + \sin^2 10^\circ + \sin^2 15^\circ + \ldots + \sin^2 90^\circ\right)$ is-

A. $7\left(\frac{1}{2}\right)$

B. $8\left(\frac{1}{2}\right)$

C. $9\left(\frac{1}{2}\right)$

D. 8

Answer: C

Watch Video Solution

13. If $\tan\alpha = \frac{1}{3}$ and $\tan\beta = \frac{1}{2}$, then: $\tan(\alpha+\beta)$=

A. 1

B. -1

C. 2

D. 3

Answer: A

Watch Video Solution

14. If $\cos ec\theta + \cot\theta = \frac{11}{2}$, then $tan\theta =$ $\frac{21}{22}$ (b) $\frac{15}{16}$ (c) $\frac{44}{117}$ (d) $\frac{117}{44}$

A. $\frac{21}{22}$

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

C. $\frac{44}{117}$

D. $\frac{22}{21}$

Answer: C

Watch Video Solution

15. If $\tan\theta = -\frac{1}{\sqrt{5}}$ and θ lies in the fourth quadrant, then: $\cos\theta$=

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

B. $\frac{2}{\sqrt{6}}$

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

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

Answer: A

Watch Video Solution

16. If $\sin x + \sin^2 = 1$, then $\cos^8 x + 2\cos^6 x + \cos^4 x =$

A. 0

B. -1

C. 2

D. 1

Answer: D

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17. The value of $\cos 1^\circ \cos 2^\circ \cos 3^\circ \ldots \cos 179^\circ$ is

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

B. 0

C. 1

D. none of these

Answer: B

Watch Video Solution

18. The value of $\frac{\cot 54^\circ}{\tan 36^\circ} + \frac{\tan 20^\circ}{\cot 70^\circ}$ is

A. 3

B. 1

C. 0

D. 2

Answer: D

Watch Video Solution

19. If $\tan A = \frac{1}{2}$ and $\tan B = \frac{1}{3}$, then: A+B=

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

B. 0

C. π

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

Answer: A

Watch Video Solution

20. The greatest value of A= sin x.cos x is

A. -1

B. 2

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

D. 1

Answer: C

Watch Video Solution

21. The $\sin\theta + \text{cosec}\theta = 2$, then: $\sin^2\theta + \text{cosec}^2\theta$=

A. 1

B. 4

C. 2

D. 8

Answer: C

Watch Video Solution

22. $\tan 20^\circ + \tan 40^\circ + \sqrt{3}.\tan 20^\circ.\tan 40^\circ =$

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

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

C. $\sqrt{3}$

D. 1

Answer: C

Watch Video Solution

23. The value of $\sin 200^\circ + \cos 200^\circ$ is

A. positive

B. negative

C. zero

D. non-negative

Answer: B

Watch Video Solution

24. $8.\sin\left(\frac{x}{8}\right).\cos\left(\frac{x}{2}\right).\cos\left(\frac{x}{4}\right).\cos\left(\frac{x}{8}\right)=$

A. 8.cos x

B. cos.x

C. 8 sin x

D. sin x

Answer: D

Watch Video Solution

25. $\tan\theta + \sec\theta = \sqrt{3}$

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

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

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

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

Answer: C

Watch Video Solution

26. If sinA + sin B + sin C=3, then: cos A + cos B + cos C=

A. 0

B. 1

C. 2

D. 3

Answer: A

Watch Video Solution

27. $\sec 2x - \tan 2x =$

A. $\tan\left(x - \frac{\pi}{4}\right)$

B. $\tan\left(\frac{\pi}{4} - x\right)$

C. $\tan\left(x + \frac{\pi}{4}\right)$

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

Answer: B

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28. If, in a $\triangle ABC$, tanA =1 and tanB=2, then: tanC=

A. 1

B. 2

C. 3

D. 4

Answer: C

Watch Video Solution

29. If tan A - tan B =x and cot B - cot A=y, then: cot(A-B)=

A. $\frac{1}{x} - \frac{1}{y}$

B. $\frac{1}{x} + \frac{1}{y}$

C. $\frac{1}{y} - \frac{1}{x}$

D. $x - y$

Answer: B

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30. If $\cot^{-1} x + \cot^{-1} y = \tan^{-1} c,$ then: x+y=

A. c(1+xy)

B. c(1-xy)

C. c(xy-1)

D. $-c(1+xy)$

Answer: C

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31. $\sin^2 75^\circ - \sin^2 15^\circ =$

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

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

C. 1

D. 0

Answer: B

Watch Video Solution

32. If $\triangle ABC$ is a right angled at A, then: $\cos^2 B + \cos^2 C =$

A. -2

B. -1

C. 1

D. 0

Answer: C

Watch Video Solution

33. $\sin^6 A + \cos^6 A + 3\sin^2 A.\cos^2 A =$

A. 0

B. 1

C. 2

D. 3

Answer: B

Watch Video Solution

34. If $\cos(A-B)=\frac{3}{5}$ and tanA.tanB=2, then

A. cosA.cosB $=\frac{1}{5}$

B. $\cos A.\cos B=-\frac{1}{5}$

C. $\sin A.\sin B=-\frac{6}{5}$

D. $\sin A.\sin B=-\frac{1}{5}$

Answer: C

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35. If ABCD is a cyclic quadrilateral, then the value of cosA-cosB+cosC-cosD is equal to

A. 4

B. -2

C. 1

D. 0

Answer: D

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36. If $\frac{\sin\alpha}{2}+\frac{\cos\alpha}{2}=1.4$, then: $\sin\alpha\cos\alpha$=

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37. If $\tan\alpha + \cot\alpha = m$, then: $\tan^4\alpha + \cot^4\alpha =$

A. $m^4 - 4m^2 + 2$

B. $m^4 + 4m^2 - 2$

C. $m^4 - 4m^2 - 2$

D. $m^4 + 4m^2 + 2$

Answer: A

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38. If $\cos\theta + \cos\phi = a$ and $\sin\theta - \sin\phi = b$, then: $2\cos(\theta + \phi)$=

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

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

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

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

Answer: D

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39. If $\sin x + \operatorname{cosec} x = 2$, then, for all $n \in N$, the value of: $\sin^n x + \operatorname{cosec}^n x =$

A. 2

B. 2^n

C. 2^{n-1}

D. 2^{n-2}

Answer: A

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40. If $\sin^{-1} x = \theta + \phi$ and $\sin^{-1} y = \theta - \phi$, then: $1 + xy$=

A. $\sin^2\theta + \sin^2\phi$

B. $\sin^2\theta + \cos^2\phi$

C. $\cos^2\theta + \cos^2\phi$

D. $\sin^2\theta + \sin^2\phi$

Answer: B

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41. If $\tan^{-1}\left(\frac{a}{x}\right) + \tan^{-1}\left(\frac{b}{x}\right) = \frac{\pi}{2}$, then: x=

A. ab

B. 2ab

C. $\sqrt{ab}$

D. $\sqrt{2ab}$

Answer: C

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42. If two angles of a triangle are $\cot^{-1} 2$ and $\cot^{-1} 3$, then the third angle is

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

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

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

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

Answer: B

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43. $\sec^2\left(\tan^{-1} 2\right) + \operatorname{cosec}^2\left(\cot^{-1} 3\right) =$

A. 13

B. 14

C. 15

D. 16

Answer: C

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44. If $\sin^{-1} x + \sin^{-1} y = \frac{2\pi}{3}$, then: $\cos^{-1} x + \cos^{-1} y =$

A. $\sqrt{3}$

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

C. 1

D. 0

Answer: C

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45. Find the value of $\sin^{-1}\left(\cos\left(\sin^{-1} x\right)\right) + \cos^{-1}\left(\sin\left(\cos^{-1} x\right)\right)$

A. 0

B. 1

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

D. π

Answer: C

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46. If $\sin A + \sin B + \sin C = \frac{3\sqrt{3}}{2}$, then: $\triangle ABC$, is

A. isosceles

B. right-angled

C. equilateral

D. obtuse-angled

Answer: C

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47. If $\cos^2 A + \cos^2 B + \cos^2 C = 1$, then $\triangle ABC$ is

A. isosceles

B. right-angled

C. equilateral

D. obtuse-angled

Answer: B

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48. If $\tan x = \frac{b}{a}$, then the value of $(a\cos 2x + b\sin 2x)$ is equal to-

A. a

B. a-b

C. a+b

D. b

Answer: A

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49. $\frac{\sin^2 3A}{\sin^2 A} - \frac{\cos^2 3A}{\cos^2 A} =$

A. cos 2A

B. 8 cos 2A

C. $\frac{1}{8}\cos 2A$

D. $\frac{1}{4}\cos 2A$

Answer: B

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50. If $4\sin^{-1} x + \cos^{-1} x = \pi$, then: x=

A. 2

B. 1

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

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

Answer: D

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51. If $\tan\theta_1 . \tan\theta_2 = k$, then: $\left(\frac{\cos(\theta_1 - \theta_2)}{\cos(\theta_1 + \theta_2)}\right. =$

A. $\frac{1+k}{1-k}$

B. $\frac{1-k}{1+k}$

C. $\frac{k+1}{k-1}$

D. $\frac{k-1}{k+1}$

Answer: A

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52. If $\tan^{-1} 3 + \tan^{-1} x = \tan^{-1} 8$, then: $x =$

A. 5

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

C. $\frac{5}{14}$

D. $\frac{14}{5}$

Answer: B

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53. Prove that:

$$\cot^{-1}\left(\frac{ab+1}{a-b}\right) + \cot^{-1}\left(\frac{bc+1}{b-c}\right) + \cot^{-1}\left(\frac{ca+1}{c-a}\right) = 0.$$

A. 0

B. 1

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

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

Answer: A

Watch Video Solution

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

A. right-angled

B. obtuse anlged

C. equilateral

D. isosceles

Answer: C

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55. $\tan 5x.\ \tan 3x.\ \tan 2x$=

A. tan 5x- tan 3x - tan 2x

B. $\frac{\sin 5x - \sin 3x - \sin 2x}{\cos 5x - \cos 3x - \cos 2x}$

C. $\tan 5x + \tan 3x + \tan 2x$

D. 0

Answer: A

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56. If $\tan^{-1} a + \tan^{-1} b + \tan^{-1} c = \sin^{-1} 1$, then

A. a+b+c=1

B. a+b+c=abc

C. abc=1

D. ab + bc + ca=1

Answer: D

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57. $x = a\tan\theta, y = b\sec\theta$

A. 4

B. 8

C. 10

D. 16

Answer: C

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58. If $\cos 25^\circ + \sin 25^\circ = p$, then: $\cos 50^\circ =$

A. $\sqrt{2 - p^2}$

B. $p\sqrt{2-p^2}$

C. $p\sqrt{2-p^2}$

D. $-\sqrt{2-p^2}$

Answer: C

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59. If $\tan(x+y)=33$, and $x=\tan^{-1}3$, then: y=

A. 0.3

B. $\tan^{-1}(1.3)$

C. $\tan^{-1}(0.3)$

D. $\tan^{-1}\left(\frac{1}{18}\right)$

Answer: C

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60. $\tan^{-1}\left(\frac{\sqrt{2}+1}{\sqrt{2}-1}\right)-\tan^{-1}\left(\frac{\sqrt{2}}{2}\right)=$

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

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

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

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

Answer: C

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61. Solve $\sin x+\sqrt{3}\cos x=\sqrt{2}$

A. $2n\pi\pm\frac{\pi}{4}$

B. $2n\pi\pm\frac{\pi}{6}$

C. $2n\pi+\frac{\pi}{6}\pm\frac{\pi}{4}$

D. none of these

Answer: C

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62. If: $\cos^{-1}(\sin\theta) = \sin^{-1}(\cos\theta)$, then: θ=

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

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

C. $n\pi \pm \frac{\pi}{3}, n\pi \pm \frac{\pi}{6}$

D. none of these

Answer: D

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63. If: $\tan\theta + \tan 2\theta = \tan 3\theta$, then: θ=

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

B. $n\pi \pm n\pi$

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

D. none of these

Answer: A

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64. Solve:

$3\tan(\theta - 15^\circ) = \tan(\theta + 15^\circ)$

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

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

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

D. $n\pi \pm \frac{\pi}{12}$

Answer: A

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65. If: $\frac{\tan x}{\tan 2x} + \frac{\tan 2x}{\tan x} + 2 = 0$, then: x=

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

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

C. $2n\pi \pm \frac{\pi}{6}$

D. $n\pi \pm \frac{\pi}{6}$

Answer: B

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66. If: $\cos^{16} x - \sin^{64} x = 1$, then: x=

A. $n\pi$

B. $(2n+1)\frac{\pi}{2}$

C. $2n\pi$

D. $(2n-1)\frac{\pi}{2}$

Answer: A

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67. If: $\frac{1-\cos 2x}{1+\cos 2x}=3$, then: x =

A. $2n\pi \pm \frac{\pi}{6}$

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

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

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

Answer: D

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68. If: $\cot x+\cot\left(\frac{\pi}{4}+x\right)=2$, then: x=

A. $2n\pi \pm \frac{\pi}{6}$

B. $2n\pi \pm \frac{\pi}{3}$

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

D. $n\pi \pm \frac{\pi}{6}$

Answer: D

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69. If: $\tan\theta + \tan 2\theta + \tan 3\theta = \tan\theta.\tan 2\theta.\tan 3\theta$, then: θ=

A. $n\pi$

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

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

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

Answer: B

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70. If: $\sin^2 x \sec x + \sqrt{3}.\ \tan x = 0$, then: x=

A. $n\pi, n\pi + (-1)^{n+1}, \frac{\pi}{3}$

B. $n\pi$

C. $n\pi + (-1)^{n+1}, \frac{\pi}{3}$

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

Answer: B

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71. $\begin{vmatrix} \cos(x+y) & -\sin(x+y) & \cos 2y \\ \sin x & \cos x & \sin y \\ -\cos x & \sin x & -\cos y \end{vmatrix} =$

A. $(2n+1)\frac{\pi}{2}$

B. $n\pi$

C. $(2n+1)\pi$

D. $2n\pi$

Answer: A

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72. The value of θ , lying between $\theta = 0$ and $\theta = \frac{\pi}{2}$ and satisfying the equation . $\begin{vmatrix} 1+\cos^2\theta & \sin^2\theta & 4\sin 4\theta \\ \cos^2\theta & 1+\sin^2\theta & 4\sin 4\theta \\ \cos^2\theta & \sin^2\theta & 1+4\sin 4\theta \end{vmatrix} = 0, is$

A. $\frac{7\pi}{24}, \frac{11\pi}{24}$

B. $\frac{5\pi}{24}$

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

D. none of these

Answer: A

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73. The equation E= cos x.sin x attains its maximum value at x=

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

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

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

D. none of these

Answer: A

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74. Equation k.cosx-3.sinx=k+1 is solvable in R if k is in the internal

A. $[4, \infty)$

B. $(-\infty, 4]$

C. $[-4, 4]$

D. none of these

Answer: B

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75. If α, β are the different values of x satisfying $a\cos x + b\sin x = c$ then $\tan\left(\frac{\alpha+\beta}{2}\right)$ is

A. $a + b$

B. $a - b$

C. $\frac{b}{a}$

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

Answer: C

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76. The general solution of $e^{-\frac{1}{\sqrt{2}}}\left(e^{\sin x} + e^{\cos x}\right) = 2$ is

A. $n\pi$

B. $(4n\pi + 1)\frac{\pi}{4}$

C. $(4n\pi + 1)\frac{\pi}{2}$

D. none of these

Answer: B

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77. If $\tan 2x = \tan\left(\frac{x}{2}\right)$, then the value of x is

A. $\frac{n\pi \pm \sqrt{n^2\pi^2 + 16}}{4}$

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

C. $\frac{n\pi \pm \sqrt{n^2\pi^2 - 16}}{4}$

D. none of these

Answer: A

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78. Let n be a positive integer such that $si, \frac{\pi}{2n} + \cos, \frac{\pi}{2n} = \frac{\sqrt{n}}{2}$ then

(A) $n = 6$ (B) $n = 1, 2, 3, \ldots .8$ (C) $n = 5$ (D) none of these

A. 1,2,3,.....8

B. 5

C. 6

D. none of these

Answer: C

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79. If $x \in [0, 2\pi]$ and $|\sec x + \tan x| = |\sec x| + |\tan x|$, then x lies in the interval

A. $[0, \pi]$

B. $\left[0, \frac{\pi}{2}\right) \cup \left(\frac{\pi}{2}, \pi\right]$

C. $\left[0, p\frac{3\pi}{2}\right) \cup \left(\frac{3\pi}{2}, 2\pi\right]$

D. $(\pi, 2\pi)$

Answer: B

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80. If $1 + \sin\theta + \sin^2\theta + \sin^3\theta + .. \to \infty = 4 + 2\sqrt{3}$ $0<\theta<\pi$, $\theta \neq \frac{\pi}{2}$ then

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

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

C. $\frac{\pi}{3}$ or $\frac{\pi}{6}$

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

Answer: D

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81. If: $(\log_{\cos x} \sin x) + (\log_{\sin x} \cos x) = 2$, then, in general, x=

A. $2n\pi + \frac{\pi}{4}$

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

C. $n\pi + \frac{\pi}{8}$

D. none of these

Answer: A

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82. If

$$\sin^{-1}\left(x - \frac{x^2}{2} + \frac{x^3}{4} - \ldots.\right) + \cos^{-1}\left(x^2 - \frac{x^4}{2} + \frac{x^6}{4} - \ldots.\right) = \frac{\pi}{2}$$

for $0 < |x| < \sqrt{2}$ then $x =$

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

B. 1

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

D. -1

Answer: B

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83. If: $\tan^2\theta + \sec 2\theta = 1$, then the general value of θ is

A. $n\pi$

B. $n\pi, n\pi \pm \frac{\pi}{3}$

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

D. none of these

Answer: B

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84. The domain of the function $f(x) = \sin^{-1}\log_3\left(\frac{x}{3}\right)$ is

A. [1,9]

B. $[-1, 9]$

C. $[-9, 1]$

D. $[-9, -1]$

Answer: A

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85. Find the domain and range of the function $f(x) = \sin^{-1}\left((1+e^x)^{-1}\right)$.

A. $\left(\frac{1}{4}, \frac{1}{3}\right)$

B. $[-1, 0]$

C. $[0, 1]$

D. $(-\infty, \infty)$

Answer: D

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86. Domain of the function

$f(x) = \sqrt{3-x} + \frac{\cos^{-1}((3-2x))}{5}$ is

A. $[-1, 3]$

B. $(-1, 3)$

C. $[-1, 3)$

D. none of these

Answer: A

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87. The range of the function $f(x) = \frac{1}{2 - \sin 3x}$ is

A. [1,3]

B. $\left[\frac{1}{3}, 1\right]$

C. (1,3)

D. $\left(\frac{1}{3}, 1\right)$

Answer: B

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88. Domain of $f(x) = \frac{\sin^{-1}(x-3)}{\sqrt{9-x^2}}$, is

A. [1,2]

B. [2,3]

C. [1,2]

D. [2,3]

Answer: B

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89. Quadratic equation $8\sec^2\theta - 6\sec\theta + 1 = 0$ has

A. exactly 2 roots

B. exactly 4 roots

C. infinitely many roots

D. no roots

Answer: D

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90. In a right angled triangle the hypotenuse is $2\sqrt{2}$ times the length of perpendicular drawn from the opposite vertex, on the hypertenuse, then the other two angles, are

A. $\frac{\pi}{8}, \frac{3\pi}{4}$

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

C. $\frac{\pi}{12}, \frac{5\pi}{12}$

D. none of these

Answer: A

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91. If: $\sin\left(x+\frac{\pi}{6}\right)=\frac{\sqrt{3}}{2}$, where $0 \leq x \leq 2\pi$, then: x=

A. 30°

B. 60°

C. 90°

D. 180°

Answer: C

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92. Two sides of a triangle are $\left(\sqrt{3}+1\right)$ and $\left(\sqrt{3}-1\right)$, and the angle between them is 60°. The difference of the remaining angles is

A. 30°

B. 45°

C. 60°

D. 90°

Answer: D

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

A. right angled

B. isosceles but not equilateral

C. obtuse angled

D. equilateral

Answer: D

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94. If $B = 60^\circ$, in $\triangle ABC$, then

A. $(a-b)^2 + ab = c^2$

B. $(b-c)^2 + bc = a^2$

C. $(c-a)^2 + ca = b^2$

D. $a^2 + b^2 + c^2 = 2b^2 + ca$

Answer: C

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95. In a ΔABC, If $A = 30^\circ, b = 2, c = \sqrt{3} + 1$, then $\frac{C-B}{2}$ is

A. 15°

B. 30°

C. 45°

D. 60°

Answer: B

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96. If $\triangle ABC$ is right angled at A, then: $\tan B \tan C$=

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97. If $(\sin\theta)$ and $(\cos\theta)$ are the roots of the equation $ax^2 + bx + c = 0$, where a,b,c are the sides of $\triangle ABC$, then:=

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98. If $\triangle ABC$ is a right angled at C, then tanA + tan B equals

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99. If: $\cos\left(\frac{A}{2}\right) = \sqrt{\frac{b+c}{2c}}$, then $c^2 =$

A. $a^2 - b^2$

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

C. $a^2 + b^2$

D. 0

Answer: C

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100. If the area of $\triangle ABC$ is $\triangle = a^2 - (b-c)^2$, then: tanA =

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

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

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

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

Answer: B

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101. If the cotangents of half the angles of a triangle are in A.P., then prove that the sides are in A.P.

A. A.P.

B. G.P.

C. H.P.

D. None of these

Answer: A

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102. In ΔABC, if $b^2 + c^2 = 2a^2$, then value of $\frac{\cot A}{\cot B + \cot C}$ is

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

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

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

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

Answer: A

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103. In triangle ABC if $a^4 + b^4 + c^4 = 2a^2b^2 + 2b^2c^2$ then the values of B will be-

A. 45°

B. 115°

C. 120°

D. 60°

Answer: A

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104. If, in $\triangle ABC, \angle B = \angle C = 45^\circ$, then

A. triangle is equilateral

B. triangle is obtuse angled

C. triangle is right angled

D. $B = \cos^{-1}(7/8)$

Answer: D

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105. If, in $\triangle ABC$, tanA : tan B : tan C= 2:3:4, then: $\sec^2 C$=

A. $(1 - \cot A)(1 - \cot C) = 2$

B. $(1+\cot A)(1+\cot C)=2$

C. cotA + cot B + cot C = cot A + cot B + cot C

D. cotA + cot B + cot C $=\sqrt{3}$

Answer: B

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106. If, in $\triangle ABC$, tanC=4, then: $\sec^2 C$=

A. 17

B. 7

C. 11

D. 19

Answer: B

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107. If, in $\triangle ABC$, $B = 3C$, then: $\dfrac{b-c}{2c} =$

A. sinA

B. $\cos\left(\dfrac{A}{2}\right)$

C. $\sin\left(\dfrac{A}{2}\right)$

D. cos A

Answer: C

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

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: B

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109. In a ΔABC, if $A = 45^\circ$ and $B = 75^\circ$, then $a + \sqrt{2}c =$

A. b

B. 2b

C. 3b

D. 2ac

Answer: B

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110. If, in a $\triangle ABC$, $(a+b+c)(b+c-a) = kbc$, then k lies in the interval

A. (0,1)

B. (0,2)

C. (0,3)

D. (0,4)

Answer: D

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111. If, in a $\triangle ABC$, $A = 60^\circ$, then:

$$\left(1 + \frac{a}{c} + \frac{b}{c}\right)\left(1 + \frac{c}{b} - \frac{a}{b}\right) =$$

A. 1

B. 2

C. 3

D. 4

Answer: C

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112. If, in a $\triangle ABC$,

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

then: $\angle A = \ldots .$

A. 30°

B. 60°

C. 90°

D. 120°

Answer: C

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113. If, in a $\triangle PQR$, sin P, sin Q, sin R are in the A.P, then its altitudes are in

A. A.P.

B. G.P.

C. H.P.

D. None of these

Answer: C

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114. The value of $\lim_{|x| \to \infty} \cos\left(\tan^{-1}\left(\sin\left(\tan^{-1} x\right)\right)\right)$ is equal to

A. -1

B. $\sqrt{3}$

C. $-\frac{1}{\sqrt{2}}$

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

Answer: D

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115. $\tan^{-1} 3 + \tan^{-1} 4 =$

A. $\tan^{-1}\left(-\frac{7}{11}\right)$

B. $\pi - \tan^{-1}\left(\frac{7}{11}\right)$

C. $\tan^{-1}\left(\frac{7}{11}\right)$

D. none of these

Answer: A

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116. If:

$$3\sin^{-1}\left(\frac{2x}{1+x^2}\right) - 4\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right) + 2\tan^{-1}\left(\frac{2x}{1-x^2}\right) = \frac{\pi}{3},$$

where $|x| < 1$, then: x=

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

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

C. $\sqrt{3}$

D. $-\frac{\sqrt{3}}{4}$

Answer: A

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117. If $\tan^{-1}\left(\frac{1}{2+\sqrt{3}}\right) - \frac{\tan^{-1}1}{x} = \frac{\tan^{-1}1}{3}$, then x is equal to 1 (b) 2 (c) 3 (d) $\sqrt{2}$

A. 1

B. 2

C. 3

D. $\sqrt{2}$

Answer: B

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118. If: $\sin^{-1} x = \alpha + \beta$ and $\sin^{-1} y = \alpha - \beta$, then: $1 + xy$=

A. $\sin^2 \alpha + \sin^2 \beta$

B. $\sin^2 \alpha + \cos^2 \beta$

C. $\cos^2 \alpha + \cos^2 \beta$

D. $\cos^2 \alpha + \sin^2 \beta$

Answer: B

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119. If $x^2 + y^2 + z^2 = r^2$ and $x, y, z > 0$, then $\tan^{-1}\left(\frac{xy}{zr}\right) + \tan^{-1}\left(\frac{yz}{xz}\right) + \tan^{-1}\left(\frac{zx}{yr}\right)$ is equal to

A. π

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

C. 0

D. none of these

Answer: B

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120. if $\cos^{-1}\frac{x}{a}+\cos^{-1}\frac{y}{b}=\alpha$ prove that ,

$$\frac{x^2}{a^2}-\frac{2xy}{ab}\cos\alpha+\frac{y^2}{b^2}=\sin^2\alpha$$

A. $\sin^2\alpha$

B. $\cos^2\alpha$

C. $\tan^2\alpha$

D. $\cot^2\alpha$

Answer: A

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121. If $u = \cot^{-1}\sqrt{\tan\alpha} - \tan^{-1}\sqrt{\tan\alpha}$, then $\tan\left(\frac{\pi}{4} - \frac{u}{2}\right)$ is equal to (a) $\sqrt{\tan\alpha}$ (b) $\sqrt{\cos\alpha}$ (c) $\tan\alpha$ (d) $\cot\alpha$

A. $\sqrt{\tan\alpha}$

B. $\sqrt{\cot\alpha}$

C. $\tan\alpha$

D. $\cot\alpha$

Answer: A

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122. The sum of the infinite terms of the series $\tan^{-1}\left(\frac{1}{3}\right) + \tan^{-1}\left(\frac{2}{9}\right) + \tan^{-1}\left(\frac{4}{33}\right) + \ldots.$ is equal to $\frac{\pi}{n}$ The value of n is:

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

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

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

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

Answer: C

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123. If $\sin^{-1}\sqrt{x^2+2x+1}+\sec^{-1}\sqrt{x^2+2x+1}=\frac{\pi}{2}; x\neq 0,$ then the value of $2\sec^{-1}\left(\frac{x}{2}\right)+\sin^{-1}\left(\frac{x}{2}\right)$ is equal to

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

B. $-\frac{3\pi}{2}, \frac{\pi}{2}$

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

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

Answer: C

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124. If, in a $\triangle ABC$, $\tan\left(\frac{A}{2}\right) = \frac{5}{6}$ and $\tan\left(\frac{C}{2}\right) = \frac{2}{5}$, then:

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

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

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

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

Answer: B

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125. If $y = \sin^2\theta + \cos ec^2\theta, \theta \neq 0$, then

A. y=0

B. $y \leq 2$

C. $y \geq -2$

D. $y \geq 2$

Answer: D

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126. If $\tan\theta = -\frac{4}{3}$, then $\sin\theta$ is

A. $-\frac{4}{5}$ but not $\frac{4}{5}$

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

C. $\frac{4}{5}$ but not $-\frac{4}{5}$

D. none of these

Answer: B

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127. If $f: R \to S$, defined by $f(x) = \sin x - \sqrt{3}\cos x + 1$, is onto then the interval of S, is

A. [0,3]

B. [-1,1]

C. [0,1]

D. [-1,3]

Answer: D

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128. Let $\cos(\alpha+\beta)=\frac{4}{5}$ and let $\sin(\alpha-\beta)=\frac{5}{13}$ where $0\leq\alpha,\beta\leq\frac{\pi}{4}$ then $\tan 2\alpha$

A. $\frac{25}{16}$

B. $\frac{56}{53}$

C. $\frac{19}{12}$

D. $\frac{20}{7}$

Answer: B

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TEST YOUR GRASP: CHAPTER 3-3.1

1. If $\sec\theta + \tan\theta = \sqrt{3}$, then the principal value of $\left(\theta + \frac{\pi}{6}\right)$ is

A. $\pi/4$

B. $\pi/3$

C. $2\pi/3$

D. $3\pi/4$

Answer: A::B::C::D

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2. If $\sin\left(\frac{\pi}{4}\cot\theta\right) = \cos\left(\frac{\pi}{4}\tan\theta\right)$, then the general value of θ is-

A. $n\pi + (\pi/2)$

B. $n\pi + (\pi/3)$

C. $n\pi + (\pi/4)$

D. none of these

Answer: A::B::C::D

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3. If cosec x =1+ cotx, then x=

A. $n\pi + (\pi/2)$

B. $n\pi - (\pi/2)$

C. $2n\pi + (\pi/2)$

D. $2n\pi - \pi/2$

Answer: A::B::C::D

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4. If $\cot\theta - \tan\theta = \sec\theta$, then $\theta =$

A. $n\pi + (-1)^n.(\pi/6)$

B. $n\pi + (\pi/2)$

C. $2n\pi + (3\pi/2)$

D. none of these

Answer: A::B::C::D

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5. Solution set of the equation $\tan(\pi.\tan x) = \cot(\pi.\cot x)$ is

A. ϕ

B. {0}

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

D. none of these

Answer: A::B::C::D

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6. If $\sqrt{3}.\sin x + \cos x = \sqrt{3}$, then the general solution is x=

A. $n\pi \pm (\pi/3)$

B. $n\pi \pm (\pi/6)$

C. $n\pi + (-1)^n.(\pi/3) - (\pi/6)$

D. $n\pi + (-1)^n.(\pi/4) + (\pi/3)$

Answer: A::B::C::D

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7. if $0 \leq x \leq \pi$ and $81^{\sin^2 x} + 81^{\cos^2 x} = 30$ then $x =$

A. $\pi/3$ or $\pi/6$

B. $2\pi/3$ or $5\pi/6$

C. $\pi/6$ or $5\pi/6$

D. none of these

Answer: A::B::C::D

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8. If $\tan 2\theta \cdot \tan\theta = 1$, then general value of θ is

A. $\pi/3$ or $\pi/6$

B. $(6n \pm 1)\pi/6$

C. $(4n \pm 1)\pi/6$

D. $2n\pi \pm (\pi/6)$

Answer: A::B::C::D

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9. If $2\sin^2\theta - 3\sin\theta - 2 = 0$, then general value of θ is

A. $n\pi + (-1)^n.(\pi/6)$

B. $n\pi + (-1)^n.(\pi/2)$

C. $n\pi + (-1)^n.(5\pi/6)$

D. $n\pi + (-1)^n.(7\pi/6)$

Answer: A::B::C::D

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10. If: $\tan\theta + \tan\left(\frac{\pi}{2} - \theta\right) = 2$, then: $\theta =$

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

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

C. $2n\pi \pm \frac{\pi}{4}$

D. $n\pi + (-1)^n.\frac{\pi}{4}$

Answer: A::B::C::D

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TEST YOUR GRASP: CHAPTER 3-3.2

1. If, in $\triangle ABC$, a=18, b=24, c=30, then: sin A=.....

A. $1/5$

B. $3/5$

C. $2/5$

D. none of these

Answer: A::B::C::D

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2. If, in $\triangle ABC$, $a=\sqrt{2}, b=\sqrt{3}, c=\sqrt{5}$, then the area of $\triangle ABC$ is

A. $\frac{1}{2}\sqrt{6}$

B. $\frac{1}{2}\sqrt{9}$

C. $\frac{1}{2}\sqrt{7}$

D. none of these

Answer: A::B::C::D

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3. If, in $\triangle ABC$, $\frac{\cos A}{a} = \frac{\cos B}{b} = \frac{\cos C}{c}$ and side a=2, then the area of the triangle is

A. 1

B. 2

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

D. $\sqrt{3}$

Answer: A::B::C::D

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4. If, in ΔABC, angle A,B,C are in A.P. And $b:c=\sqrt{3}:\sqrt{2}$, then : $\angle A=....$

A. 75°

B. 45°

C. 60°

D. none of these

Answer: A::B::C::D

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5. If ΔABC, is right angled at C, then:

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

A. a^2b^2

B. b^2c^2

C. c^2a^2

D. s^4

Answer: A::B::C::D

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6. In a $\Delta ABC, \tan A + \tan B + \tan C = 6$ and $\tan A \tan B = 2$, then the triangle ABC is

A. right angled

B. acute angled

C. obtuse angled

D. equilateral

Answer: A::B::C::D

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7. If, in $\triangle ABC, a = 4, b = 5, c = 6$, then $\angle C =$

A. $\angle A$

B. $\angle(A/2)$

C. $2\angle A$

D. $3\angle A$

Answer: A::B::C::D

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8. The perimeter of atriangle ABC is 6 times the arihmetic mean of the sines of its angles .If the side a is 1. the $\angle A$ is

A. $\pi/6$

B. $\pi/3$

C. $\pi/2$

D. π

Answer: A::B::C::D

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

A. $2ca.\ \sin B$

B. $2ab.\ \cos C$

C. $2bc.\ \tan A$

D. none of these

Answer: A::B::C::D

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10. If $m\angle A = 60^\circ$, then $(a+b+c)(-a+b+c) =$ ....

A. 3ab

B. 3bc

C. 3ca

D. 3abc

Answer: A::B::C::D

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11. If, in $\triangle ABC$, $(s-a)(s-b)=s(s-c)$, then: $\angle C$=

A. 90°

B. 45°

C. 30°

D. 60°

Answer: A::B::C::D

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

A. equilateral

B. isosceles

C. right angled

D. obtuse angled

Answer: A::B::C::D

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13. In $\triangle ABC$, If $A = 30^\circ, b = 8, a = 6$ where $B = \sin^{-1} x$, then: x=

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

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

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

D. 1

Answer: A::B::C::D

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14. If in a triangle $ABC,$ right angle at $B, s-a=3 and s-c=2,$ then $a=2, c=3$ b. $a=3, c=4$ c. $a=4, c=3$ d. $a=6, c=8$

A. (2,3)

B. (3,4)

C. (4,3)

D. (6,8)

Answer: A::B::C::D

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15. If, in $\triangle ABC$, angle C is 45° then: $(1+\cot A)(1+\cot B)$=

A. -1

B. 2

C. 3

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

Answer: A::B::C::D

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16. If α, β are the different values of x satisfying $a\cos x + b\sin x = c$ then $\tan\left(\frac{\alpha+\beta}{2}\right)$ is

A. a+b

B. a-b

C. $\frac{b}{a}$

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

Answer: A::B::C::D

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17. In a right angled triangle the hypotenuse is $2\sqrt{2}$ times the length of perpendicular drawn from the opposite vertex, on the hypertenuse, then the other two angles, are

A. $\frac{\pi}{8}, \frac{3\pi}{8}$

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

C. $\frac{\pi}{12}, \frac{5\pi}{12}$

D. none of these

Answer: A::B::C::D

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TEST YOUR GRASP: CHAPTER 3-3.3

1. Principal value of $\tan^{-1}\left[\tan\left(\frac{3\pi}{4}\right)\right]$ is

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

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

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

D. $-\frac{3\pi}{4}$

Answer: A::B::C::D

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2. Show that: $\cos\left(2\frac{\tan^{-1}1}{7}\right) = \sin\left(4^{-1}\frac{1}{3}\right)$

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

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

C. 0

D. 1

Answer: A::B::C::D

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3. If $\tan^{-1}\left(\frac{a}{x}\right)+\tan^{-1}\left(\frac{b}{x}\right)=\frac{\pi}{2}$, then: x=.....

A. ab

B. 2ab

C. $\sqrt{ab}$

D. $\sqrt{2ab}$

Answer: A::B::C::D

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4. If $\sin^{-1}x-\cos^{-1}x=\frac{\pi}{6}$, then: x=.....

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

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

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

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

Answer: A::B::C::D

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5. if $4\sin^{-1}x + \cos^{-1}x = \pi$, then: x=.....

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

B. 2

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

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

Answer: A::B::C::D

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6. If $\sin^{-1} x + \sin^{-1} y = \frac{2\pi}{3}$, then: $\cos^{-1} x + \cos^{-1} y =$

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

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

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

D. π

Answer: A::B::C::D

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7. The domain of the function $f(x) = \sqrt{\sin^{-1}(\log_{10} x)}$ is

A. (1,2)

B. [1,]

C. (1,2)

D. [1,2)

Answer: A::B::C::D

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8. If $\sin\left(\frac{\sin^{-1}1}{5}+\cos^{-1}x\right)$ =1 then x is equal to

A. 1

B. 0

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

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

Answer: A::B::C::D

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9. If: $\cos\left(2.\tan^{-1}x\right)=\frac{1}{2}$, then: x=

A. $\sqrt{3}$

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

C. $1-\sqrt{3}$

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

Answer: A::B::C::D

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10. In $\triangle ABC$, if $\angle A=90^\circ$, then $\tan^{-1}\left(\frac{c}{a+b}\right)+\tan^{-1}\left(\frac{b}{a+c}\right)=$

A. 0

B. 1

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

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

Answer: A::B::C::D

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11. $\sec^2\left(\tan^{-1}2\right)+\operatorname{cosec}^2\left(\cot^{-1}3\right)=$

A. 13

B. 14

C. 15

D. 16

Answer: A::B::C::D

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12. $\tan^{-1}\left(\sqrt{3}\right)+\sec^{-1}(-2)=$

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

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

C. π

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

Answer: A::B::C::D

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13. If: $\frac{1-\cos 2x}{1+\cos 2x} = 3,$ then: x=

A. $2n\pi \pm \frac{\pi}{6}$

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

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

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

Answer: A::B::C::D

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