MATHS

BOOKS - TARGET MATHS (HINGLISH)

TRIGONOMETRIC FUNCTIONS

Classical Thinking

1. The most general solution of θ satisfying the equations $\sin\theta = \sin\alpha$ and $\cos\theta = \cos\alpha$ is

A. $2n\pi + \alpha$

B. $2n\pi - \alpha$

C. $n\pi + \alpha$

D. $n\pi - \alpha$

Answer: A

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2. The general solution of the trigonometric equation $\tan\theta = \cot\alpha$ is

A. $\theta = n\pi + \frac{\pi}{2} - \alpha$

B. $\theta = n\pi - \frac{\pi}{2} + \alpha$

C. $\theta = n\pi + \frac{\pi}{2} + \alpha$

D. $\theta = n\pi - \frac{\pi}{2} - \alpha$

Answer: A

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

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

B. $x = \frac{n\pi}{3} + \frac{\pi}{12}$

C. $x = n\pi$

D. $x = n\pi \pm \frac{\pi}{4}$

Answer: B

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4. $\tan 3x$

A. $(2n+1)\frac{\pi}{8}$

B. $(2n+1)\frac{\pi}{6}$

C. $(2n+1)\frac{\pi}{4}$

D. $(2n+1)\frac{\pi}{2}$

Answer: A

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5. The general value of θ satisfying $\sin^2\theta + \sin\theta = 2$ is

A. $n\pi + (-1)^n \frac{\pi}{6}$

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

C. $n\pi + (-1)^n \frac{\pi}{2}$

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

Answer: C

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6. $\cot\theta - \tan\theta = 2$

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

B. $\theta = \frac{n\pi}{2} + \frac{\pi}{8}$

C. $\theta = \frac{n\pi}{2} \pm \frac{\pi}{8}$

D. $\theta = n\pi \pm \frac{\pi}{4}$

Answer: B

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7. If $\sin^2\theta = \frac{1}{4}$, then the value of θ is

A. $2n\pi \pm (-1)^n \frac{\pi}{6}$

B. $\frac{n\pi}{2} \pm (-1)^n \frac{\pi}{6}$

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

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

Answer: C

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8. The general solution of the equation $4\cos^2 x + 6\sin^2 x = 5$

A. $x = n\pi \pm \frac{\pi}{2}$

B. $x = n\pi \pm \frac{\pi}{4}$

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

D. $x = n\pi \pm \frac{3\pi}{4}$

Answer: B

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9. $3\left(\sec^2\theta + \tan^2\theta\right) = 5$

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

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

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

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

Answer: C

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10. $\tan\theta + \tan 2\theta + \sqrt{3}\tan\theta\tan 2\theta = \sqrt{3}$

A. $\theta = (6n+1)\frac{\pi}{18}, \forall n \in I$

B. $\theta = (6n+1)\frac{\pi}{9}, \forall n \in I$

C. $\theta = (3n+1)\frac{\pi}{9}, \forall n \in I$

D. $\theta = (3n+1)\frac{\pi}{18}, \forall n \in I$

Answer: C

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11. In a triangle ABC if a = 2, b = 3 and sin A = $\frac{2}{3}$, then what is angle B equal to?

A. 30°

B. 60°

C. 90°

D. 120°

Answer: C

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12. In $\triangle ABC$, $\frac{\sin B}{\sin(A+B)}$ =

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

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

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

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

Answer: B

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13. In ΔABC, if $a=16, b=24$ and $c=20$, then $\cos.\frac{B}{2}=$

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

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

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

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

Answer: A

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14. The sides of a triangle are 4 cm, 5 cm and 6 cm. The area of the triangle is equal to

A. $\frac{15}{4}$

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

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

D. $\frac{4}{15}$

Answer: B

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

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

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

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

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

Answer: B

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

A. $2, 3$

B. $3, 4$

C. $4, 3$

D. $6, 8$

Answer: B

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17. In triangle ABC, $AB = 6$, $AC = 3\sqrt{6}$, $\angle B = 60^\circ$ and $\angle C = 45^\circ$.

Find length of side BC.

A. 4

B. 2

C. 1

D. 3

Answer: B

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18. In a ΔABC, if the sides are a = 3, b = 5 and c = 4, then $\sin.\frac{B}{2}+\cos.\frac{B}{2}$ is equal to

A. $\sqrt{2}$

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

C. $\frac{\sqrt{3}-1}{2}$

D. 1

Answer: A

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19. In triangle ABC if a, b, c are in A.P., then the value of $\frac{\sin.\frac{A}{2}\sin.\frac{C}{2}}{\sin.\frac{B}{2}}$ =

A. 1

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

C. 2

D. -1

Answer: B

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20. If $\tan. \frac{B-C}{2} = x \cot. \frac{A}{2}$, then x =

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

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

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

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

Answer: C

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21. In ΔABC, $\cot. \frac{A+B}{2}. \tan. \frac{A-B}{2}$=

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

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

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

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

Answer: B

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22. The domain of $\sin^{-1} x$ is

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

B. $[-1, 1]$

C. $(0, 2\pi)$

D. $(-\infty, \infty)$

Answer: B

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23. Which of the following of the principal value branch of $\cos^{-1} x$?

A. $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

B. $(0, \pi)$

C. $[0, \pi]$

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

Answer: C

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24. Which of the following of the principal value branch of $\cos^{-1} x$?

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

B. $(0, \pi) - \left\{\frac{x}{2}\right\}$

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

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

Answer: D

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25. The principal values of $\sec^{-1} x$ lie in

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

B. $[0-\pi]-\left\{\frac{\pi}{2}\right\}$

C. $(0, \pi)$

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

Answer: B

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26. Find the principal values of $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$ (b) $\sin^{-1}\left(-\frac{1}{2}\right)$

A. 45°

B. 90°

C. 15°

D. 30°

Answer: D

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

A. $(\sqrt{3})$

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

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

D. $(-\sqrt{3})$

Answer: B

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28. Write the value of $\sin\left(2\frac{\sin^{-1}3}{5}\right)$.

A. $\frac{24}{27}$

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

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

D. $\frac{27}{24}$

Answer: B

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29. $\sin\left(3\sin^{-1}\left(\frac{2}{5}\right)\right)=$

A. $\frac{118}{125}$

B. $\frac{115}{127}$

C. $\frac{128}{135}$

D. $\frac{110}{118}$

Answer: A

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30. The value of $\cos^{-1}(\cos 12) - \sin^{-1}(s \in 14)$ is -2 b. $8\pi - 26$ c. $4\pi + 2$ none of these

A. -2

B. $8\pi - 26$

C. $4\pi + 2$

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

Answer: A

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31. $\tan^{-2}\tan\left(\frac{3\pi}{4}\right)$

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

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

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

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

Answer: B

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32. $\cot^{-1}\frac{x}{\sqrt{1-x^2}}$

A. $\cos ec^{-1}x$

B. $-\sec^{-1}x$

C. $-\cos ec^{-1}x$

D. $\sec^{-1}x$

Answer: D

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33. $\cot^{-1}(-\sqrt{3})$

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

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

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

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

Answer: B

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34. The general value of $\cos^{-1}(-1)$ is

A. 0

B. 1

C. π

D. $-\pi$

Answer: C

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35. $\sin\left(\frac{\pi}{3}-\sin^{-1}\left(-\frac{1}{2}\right)\right)$ is equal to(A) $\frac{1}{2}$ (B) $\frac{1}{3}$ (C) $\frac{1}{4}$ (D) 1

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

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

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

D. 1

Answer: D

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36. $\sin^{-1} x + \cos^{-1} x$ is equal to

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

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

C. -1

D. 1

Answer: B

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37. The value of $\cos^{-1}\left(\cos\frac{5\pi}{3}\right) + \sin^{-1}\left(\sin\frac{5\pi}{3}\right)$ is -

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

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

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

D. 0

Answer: A

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38. The value of $\cos\left[\cos^{-1}\left(-\frac{1}{7}\right)+\sin^{-1}\left(-\frac{1}{7}\right)\right]$ is -

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

B. 0

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

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

Answer: B

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39. If $\tan^{-1}x+\tan^{-1}y=\frac{4\pi}{5}$, find $\cot^{-1}x+\cot^{-1}y$.

A. π

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

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

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

Answer: B

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40. $\tan^{-1}\sqrt{3} - \cot^{-1}(-\sqrt{3})$ is equal to(A) π (B) $-\frac{\pi}{2}$ (C) 0 (D) $2\sqrt{3}$

A. π

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

C. 0

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

Answer: B

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41. सिद्ध कीजिए -

$\tan^{-1}.\frac{1}{2}+\tan^{-1}.\frac{2}{11}=\tan^{-1}.\frac{3}{4}$

A. $\tan^{-1}\left(\frac{1}{3}\right)$

B. $\tan^{-1}\left(\frac{4}{3}\right)$

C. $\tan^{-1}\left(\frac{3}{4}\right)$

D. $\tan^{-1}\left(\frac{1}{5}\right)$

Answer: C

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42. If $\tan^{-1}x-\tan^{-1}y=\tan^{-1}A,$ then A=

A. $x-y$

B. $x+y$

C. $\frac{x-y}{1+xy}$

D. $\frac{x+y}{1-xy}$

Answer: C

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43. Prove each of the following $\sin^{-1}\left(\frac{3}{5}\right)+\sin^{-1}\left(\frac{8}{17}\right)=\sin^{-1}\left(\frac{77}{85}\right)$

A. $\sin^{-1}\left(\frac{57}{85}\right)$

B. $\sin^{-1}\left(\frac{47}{87}\right)$

C. $\sin^{-1}\left(\frac{67}{85}\right)$

D. $\sin^{-1}\left(\frac{77}{85}\right)$

Answer: D

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44. If $\cos^{-1}\frac{3}{5}-\sin^{-1}\frac{4}{5}=\cos^{-1}x$ then x =

A. 0

B. 1

C. -1

D. 2

Answer: B

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Critical Thinking

1. The values of θ in between 0° and 360° and satisfying the equation $\tan\theta + \frac{1}{\sqrt{3}} = 0$ is equal to

A. $\theta = 150^\circ \text{ and } 300^\circ$

B. $\theta = 120^\circ \text{ and } 300^\circ$

C. $\theta = 60^\circ \text{ and } 240^\circ$

D. $\theta = 150^\circ$ and 330°

Answer: D

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2. If $\cos 40^\circ = x$ and $\cos\theta = 1 - 2x^2$, then the possible values of θ lying between 0° and 360° is

A. 100° and 260°

B. 80° and 280°

C. 280° and 110°

D. 110° and 260°

Answer: A

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3. If `sintheta=sqrt(3)costheta,-pi

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

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

C. $\frac{4\pi}{6}$

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

Answer: B

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4. If $\cot\theta + \tan\theta = 2\cos ec\theta$, the general value of θ is

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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5. General solution of $\tan\theta + \tan\left(\frac{\pi}{2} - \theta\right) = 2$ is

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

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

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

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

Answer: B

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6. Find the most general value of θ which satisfies the equation $\sin\theta = -\frac{1}{2}$ and $\tan\theta = \frac{1}{\sqrt{3}}$

A. $n\pi + (-1)^n \frac{\pi}{6}$

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

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

D. $2n\pi + \frac{7\pi}{6}$

Answer: D

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7. If n is any integer, then the general solution of the equation $\cos x - \sin x = \frac{1}{\sqrt{2}}$ is

A. $x = 2n\pi - \frac{\pi}{12}$ or $x = 2n\pi + \frac{7\pi}{12}$

B. $x = n\pi \pm \frac{\pi}{12}$

C. $x = 2n\pi + \frac{\pi}{12}$ or $x = 2n\pi - \frac{7\pi}{12}$

D. $x = n\pi + \frac{\pi}{12}$ or $x = n\pi - \frac{7\pi}{12}$

Answer: C

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8. $1 + \cot\theta = \text{cosec}\theta$

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

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

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

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

Answer: C

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9. The general solution of $\sin x - \cos x = \sqrt{2}$, for any integer n is

A. $x = n\pi$

B. $x = 2n\pi + \frac{3\pi}{4}$

C. $x = 2n\pi$

D. $x = (2n + 1)\pi$

Answer: B

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10. $\cot\theta + \cot\left(\frac{\pi}{4} + \theta\right) = 2$

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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11. If $\sin^2 x - 2\cos x + \frac{1}{4} = 0$, then x has value

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

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

C. $2n\pi + \frac{\pi}{6}$

D. $2n\pi + \frac{\pi}{12}$

Answer: B

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12. $\tan\theta + \sec\theta = \sqrt{3}$

A. 0

B. 1

C. 2

D. 3

Answer: C

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13. If r $\sin\theta = 3, r = 4(1 + \sin\theta), 0 \leq \theta \leq 2\pi$, then $\theta =$

A. $\frac{\pi}{6}, \frac{\pi}{3}$

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

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

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

Answer: B

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14. The general value of θ satisfying the equation $2\sin^2\theta - 3\sin\theta - 2 = 0$ is

A. $n\pi + (-1)^n \frac{\pi}{6}$

B. $n\pi + (-1)^n \frac{\pi}{2}$

C. $n\pi + (-1)^n \frac{5\pi}{6}$

D. $n\pi + (-1)^{n+1}\frac{\pi}{6}$

Answer: D

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15. If $2\cos^2 x + 3\sin x - 3 = 0, 0 \leq x \leq 180^\circ$, then x =

A. $30^\circ, 90^\circ, 150^\circ$

B. $60^\circ, 120^\circ, 180^\circ$

C. $0^\circ, 30^\circ, 150^\circ$

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

Answer: A

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16. If $4\sin^2\theta + 2\left(\sqrt{3}+1\right)\cos\theta = 4 + \sqrt{3}$ then the general value of θ is

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

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

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

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

Answer: A

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17. If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, then the smallest positive values of A and B are

A. $60^\circ, 30^\circ$

B. $75^\circ, 15^\circ$

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

D. $45^\circ, 45^\circ$

Answer: A

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18. If $\cos 7\theta = \cos\theta - \sin 4\theta$, then the general value of θ is

A. $\frac{n\pi}{4}, \frac{n\pi}{3} + \frac{\pi}{18}$

B. $\frac{n\pi}{3}, \frac{n\pi}{3} + (-1)^n \frac{\pi}{18}$

C. $\frac{n\pi}{4}, \frac{n\pi}{3} + (-1)^n \frac{\pi}{18}$

D. $\frac{n\pi}{6}, \frac{n\pi}{3} + (-1)^n \frac{\pi}{18}$

Answer: C

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19. If $\frac{1 - \tan^2\theta}{\sec^2\theta} = \frac{1}{2}$ then the general value of θ is

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

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

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

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

Answer: A

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20. $\sqrt{3}\tan 2\theta + \sqrt{3}\tan 3\theta + \tan 2\theta \tan 3\theta = 1$

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

B. $\left(n + \frac{1}{6}\right)\frac{\pi}{5}$

C. $\left(2n \pm \frac{1}{6}\right)\frac{\pi}{5}$

D. $\left(n + \frac{1}{3}\right)\frac{\pi}{5}$

Answer: B

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21. If $\tan\theta + \tan 2\theta + \tan 3\theta = \tan\theta \tan 2\theta \tan 3\theta$, then the general value of θ is

A. $n\pi$

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

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

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

Answer: B

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22. If $2\tan^2\theta = \sec^2\theta$, then the general solution of θ-

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

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

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

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

Answer: C

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23. General solution of the equation $\tan\theta\tan 2\theta = 1$ is given by

A. $(2n+1)\frac{\pi}{6}, n \in I$

B. $n\pi + \frac{\pi}{6}, n \in I$

C. $n\pi - \frac{\pi}{6}, n \in I$

D. $n\pi \pm \frac{\pi}{6}, n \in I$

Answer: D

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24. Solve: $\sin 3\alpha = 4\sin\alpha\sin(x+\alpha)\sin(x-\alpha), where \alpha \neq n\pi, n \in Z$

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

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

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

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

Answer: B

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25. If $\cos\theta + \cos 3\theta + \cos 5\theta + \cos 7\theta = 0$, then general value of θ is:

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

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

C. $\frac{n\pi}{8}$

D. none of these

Answer: C

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

A. isosceles

B. right angled

C. equilateral

D. scalene

Answer: C

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27. In a triangle ABC, if $a = 2, b = 3$ and $c = 4$, then $\cos A$ is equal to

A. $\frac{7}{8}$

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

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

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

Answer: A

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28. In $\triangle ABC$, If the anlges are in A.P., and $b:c=\sqrt{3}:\sqrt{2}$, then $\angle A, \angle B, \angle C$ are

A. 30°

B. 60°

C. 15°

D. 75°

Answer: D

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29. In a triangle ABC, if a = 2, $B=60^\circ$ and $C=75^\circ$, then b =

A. $\sqrt{3}$

B. $\sqrt{6}$

C. $\sqrt{9}$

D. $1+\sqrt{2}$

Answer: B

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

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

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

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

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

Answer: A

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31. Which of the following is true in a triangle ABC? (1)

$$(b+c)\sin\left(\frac{B_C}{2}\right) = 2a\cos\left(\frac{A}{2}\right) \quad (2)$$

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

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

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

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

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

Answer: C

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32. Prove that $\frac{1+\cos(A-B)\cos C}{1+\cos(A-C)\cos B} = \frac{a^2+b^2}{a^2+c^2}$

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

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

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

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

Answer: D

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33. In ΔABC, $\frac{\cos.\frac{1}{2}(B-C)}{\sin.\frac{1}{2}A}$=

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

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

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

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

Answer: B

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34. If the sides of a triangle are 6 cm, 10 cm and 14 cm, then what is the largest angle included by the sides ?

A. Obtuse angled

B. Acute angled

C. Right angled

D. Equilateral

Answer: A

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35. If the angles A, B, and C of a triangle ABC are in AP and the sides a, b and c opposite to these angles are in GP, then $a^2, b^2 \text{ and } c^2$ a are related as

A. A.P.

B. H.P.

C. G.P.

D. A.G.P.

Answer: A

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36. If the angles of a triangle ABC are in $A.\ P.$, then

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

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

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

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

Answer: B

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37. In ΔABC, $\frac{\cos A}{a} + \frac{\cos B}{b} + \frac{\cos C}{c} =$

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

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

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

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

Answer: B

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38. The ratio of the sides of a triangle ABC is $1 : \sqrt{3} : 2$. The ratio $A : B : C$ is

A. $3 : 5 : 2$

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

C. $3 : 2 : 1$

D. $1 : 2 : 3$

Answer: D

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39. In ΔABC, $(a-b)^2 \cos^2 . \frac{C}{2} + (a+b)^2 \sin^2 . \frac{C}{2}$=

A. a^2

B. b^2

C. c^2

D. bc

Answer: C

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

A. Equilateral

B. Isosceles

C. Right angled

D. Obtuse triangle

Answer: B

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41. 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. 60°

B. 90°

C. 120°

D. 150°

Answer: C

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42. In $\Delta ABC, 1 - \tan.\frac{A}{2}\tan.\frac{B}{2} =$

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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43. In ΔABC, if $2s = a+b+c$, then the value of $\frac{s(s-a)}{bc} - \frac{(s-b)(s-c)}{bc} =$

A. $\sin A$

B. $\cos A$

C. $\tan A$

D. $-\cos A$

Answer: B

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44. If in a triangle ABC, $a\cos^2\left(\frac{C}{2}\right)os^2\left(\frac{A}{2}\right) = \frac{3b}{2}$, then the sides $a, b, andc$ are in A.P. b. are in G.P. c. are in H.P. d. satisfy $a + b = \cdot$

A. A.P.

B. G.P.

C. H.P.

D. A.G.P.

Answer: A

Watch Video Solution

45. If in a triangle ABC, $(s-a)(s-b) = s(s-c)$, then angle C is equal to

A. 90°

B. 45°

C. 30°

D. 60°

Answer: A

Watch Video Solution

46. In any ΔABC, $\dfrac{\tan\frac{A}{2} - \tan\frac{B}{2}}{\tan\frac{A}{2} + \tan\frac{B}{2}}$ is equal to

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

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

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

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

Answer: B

Watch Video Solution

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

A. A.P.

B. G.P.

C. H.P.

D. A.G.P.

Answer: C

Watch Video Solution

48. If in a $\triangle ABC$, $a = 6, b = 3$ and $\cos(A - B) = \frac{4}{5}$ then find its area.

A. 7 square units

B. 8 square units

C. 9 square units

D. 10 square units

Answer: C

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49. if the sides of a triangle are in the ratio $2 : \sqrt{6} : \sqrt{3} + 1$, then the largest ange of the trangle will be (1) 60 (3) 90 (2) 75 (4) 120

A. 60°

B. 75°

C. 90°

D. 120°

Answer: B

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50. In triangle $ABC, a = 5, b = 4$ and $\cos(A + B) = \frac{31}{32}$ In this triangle,$c =$

A. 6

B. 7

C. 9

D. 8

Answer: A

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

A. 0

B. 3

C. -3

D. 9

Answer: A

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52. The value of $\cot\left(cosec^{-1}\frac{5}{3} + \tan^{-1}\left(\frac{2}{3}\right)\right)is$

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

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

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

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

Answer: B

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53. $\sin^2\left(2\tan^{-1}\sqrt{\frac{1+x}{1-x}}\right) =$ ____, where $-1 \leq x < 1$

A. $1 - x^2$

B. $1 + x^2$

C. $x^2 - 1$

D. $-x^2$

Answer: A

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54. The principle value of $\sin^{-1}\left(\sin\frac{2\pi}{3}\right)$ is

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

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

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

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

Answer: D

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55. $\cos\left(\sin^{-1}.\frac{5}{13}\right) =$

A. $\frac{12}{13}$

B. $-\frac{12}{13}$

C. $\frac{5}{12}$

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

Answer: A

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56. If $\theta = \sin^{-1}[\sin(-600^\circ)]$, then one of the possible values of θ is -

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

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

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

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

Answer: A

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57. सरलतम रूप में लिखे।

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

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

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

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

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

Answer: B

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58. If $\frac{a}{b}\tan x > -1$, then $\tan^{-1}\left[\frac{a\cos x - b\sin x}{b\cos x + a\sin x}\right]$ is

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

B. $\cot^{-1}.\frac{a}{b}x$

C. $\tan^{-1}.\frac{a}{b} - x$

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

Answer: C

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59. $\frac{d}{dx}\left\{\tan^{-1}\left(\frac{\cos x}{1+\sin x}\right)\right\} =$

A. $\frac{\pi}{4} - \frac{x}{2}$

B. $\frac{\pi}{4} + \frac{x}{2}$

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

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

Answer: A

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60. $y = \frac{\tan^{-1}\left(3a^2x - x^3\right)}{a(a^2 - 3x^2)}$

A. $3\tan^{-1}.\frac{x}{a}$

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

C. $\tan^{-1}.\frac{x}{a}$

D. $\tan^{-1}.\frac{a}{x}$

Answer: A

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61. $3\sin^{-1}\frac{2x}{1+x^2} - 4\cos^{-1}\frac{1-x^2}{1+x^2} + 2\tan^{-1}\frac{2x}{1-x^2} = \frac{\pi}{3}$

A. $\sqrt{3}$

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

C. 1

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

Answer: B

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62. Solve $y = \tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$

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

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

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

D. $3\tan^{-1}x$

Answer: B

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63. $\sin^{-1}\left[x\sqrt{1-x}-\sqrt{x}\sqrt{1-x^2}\right]=$

A. $\sin^{-1}x+\sin^{-1}\sqrt{x}$

B. $\sin^{-1}x-\sin^{-1}\sqrt{x}$

C. $\sin^{-1}\sqrt{x}-\sin^{-1}x$

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

Answer: B

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64. If $\cos^{-1}.\left(\frac{1}{x}\right)=\theta$, then $\tan\theta$=

A. $\frac{1}{\sqrt{x^2-1}}$

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

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

D. $\sqrt{x^2-1}$

Answer: D

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65. If: $\sin\left(\frac{\sin^{-1}1}{5}+\cos^{-1}x\right)=1$, then: x=

A. 1

B. 0

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

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

Answer: D

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66. Find the value of $\sin^{-1} x + \frac{\sin^{-1} 1}{x} + \cos^{-1} x + \frac{\cos^{-1} 1}{x}$.

A. π

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

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

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

Answer: A

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67. If $\sin^{-1} x = \frac{\pi}{5}, f \text{ or } somex \in (-1, 1)$, then find the value of $\cos^{-1} x$.

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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68. If $x \geq 0$ and $\theta = \sin^{-1} x + \cos^{-1} x - \tan^{-1} x$, then

A. $\frac{\pi}{2} \leq \theta \leq \frac{3\pi}{4}$

B. $0 < \theta < \pi$

C. $-\frac{\pi}{4} \leq \theta \leq 0$

D. $\frac{\pi}{4} \leq \theta \leq \frac{\pi}{2}$

Answer: B

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69. If $\left(\tan^{-1} x\right)^2 + \left(\cot^{-1} x\right)^2 = \frac{5\pi^2}{8}$ then x equals :

A. -1

B. 1

C. 0

D. 4

Answer: A

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70. $\cos\left(\tan^{-1}\left(\frac{1}{3}\right) + \tan^{-1}\left(\frac{1}{2}\right)\right) =$

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

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

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

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

Answer: A

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71. $\cos^{-1}\left(\frac{4}{5}\right)+\tan^{-1}\left(\frac{3}{5}\right)=\tan^{-1}\left(\frac{27}{11}\right)$

A. $\tan^{-1}.\frac{27}{11}$

B. $\sin^{-1}.\frac{11}{27}$

C. $\cos^{-1}.\frac{11}{27}$

D. $\cot^{-1}.\frac{27}{11}$

Answer: A

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72. If $\tan^{-1}\frac{x-1}{x-2}+\tan^{-1}\frac{x+1}{x+2}=\frac{\pi}{4}$, find x

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

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

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

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

Answer: C

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73. $\cot^{-1}\left[(\cot)^{\frac{1}{2}}\right]+\tan^{-1}\left[(\cot\alpha)^{\frac{1}{2}}=x then\sin x=\right.$ (A) 1 (B) $\cot^2\left(\frac{\alpha}{2}\right)$ (C) $\tan\alpha$ (D) `cot(alpha/2)

A. $\tan^2\left(\frac{\alpha}{2}\right)$

B. $\cot^2\left(\frac{\alpha}{2}\right)$

C. $\tan\alpha$

D. $\cot\left(\frac{\alpha}{2}\right)$

Answer: A

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74. 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. $2\sqrt{3a}$

B. $\sqrt{3a}$

C. $2\sqrt{3}a^2$

D. $\sqrt{3}a^2$

Answer: C

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75. Q. the value of $\tan^{-1}\left(\frac{a}{b+c}\right)+\tan^{-1}\left(\frac{b}{c+a}\right)$, if $\angle=90^\circ$ in triangle ABC, is

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

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

C. π

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

Answer: B

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76. सिद्ध कीजिए -

$\tan^{-1}.\frac{3}{4}+\tan^{-1}.\frac{3}{5}-\tan^{-1}.\frac{8}{19}=\frac{\pi}{4}.$

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

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

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

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

Answer: A

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

Answer: B

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78. If $c_j > 0$ for $i = 1, 2, , n,$ prove that $\tan^{-1}\left(\frac{c_1 x - y}{c_1 y + x}\right) + \tan^{-1}\left(\frac{c_2 - c_1}{1 + c_2 c_1}\right) + \tan^{-1}\left(\frac{c_3 - c_2}{1 + c_3 c_2}\right) + + \frac{\tan^{-1}}{c_n}$

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

B. $\tan^{-1} yx$

C. $\tan^{-1}. \frac{x}{y}$

D. $\tan^{-1}(x-y)$

Answer: C

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79. If $a_1, a_2, a_3, , a_n$ is an A.P. with common difference d, then prove that $\tan\left[\tan^{-1}\left(\frac{d}{1+a_1a_2}\right)+\tan^{-1}\left(\frac{d}{1+a_2a_3}\right)+\tan^{-1}\left(\frac{d}{11+a_{n-1}a_n}\right)\right]=$

A. $\left(\frac{(n-1)d}{a_1+a_n}\right)$

B. $\left(\frac{(n-1)d}{1+a_1a_n}\right)$

C. $\left(\frac{nd}{1+a_1a_n}\right)$

D. $\left(\frac{a_n-a_1}{a_n+a_1}\right)$

Answer: B

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

A. $\frac{17}{7}$

B. $-\frac{17}{7}$

C. $\frac{7}{17}$

D. $-\frac{7}{17}$

Answer: D

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81. $\sin\left[3\sin^{-1}\left(\frac{1}{5}\right)\right]$ is equal to

A. $\frac{71}{125}$

B. $\frac{74}{125}$

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

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

Answer: A

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82. The value of $\cot\left[\cos^{-1}\left(\frac{7}{25}\right)\right]$ is

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

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

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

D. $\frac{7}{24}$

Answer: D

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83. If $\cos\left(2\sin^{-1}x\right) = \frac{1}{9}$, then find the values of x.

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

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

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

D. Neither $\frac{2}{3}$ nor $\frac{-2}{3}$

Answer: C

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

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

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

C. $\frac{12}{15}$

D. $\frac{11}{15}$

Answer: B

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85. 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

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86. If we consider only the principal values then the value inverse trigonometric functions then the value of $\left(\cos^{-1}\left(\frac{1}{5\sqrt{2}}\left(-\sin^{-1}\right)\frac{4}{\sqrt{17}}\right)\right.$ is (a) $\frac{\sqrt{29}}{3}$ (b) $\frac{29}{3}$ (c) $\frac{\sqrt{3}}{29}$ (d) $\frac{3}{29}$

A. $\sqrt{\frac{29}{3}}$

B. $\frac{29}{3}$

C. $\sqrt{\frac{3}{29}}$

D. $\frac{3}{29}$

Answer: D

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87. $\sin^{-1}\frac{1}{\sqrt{5}} + \cot^{-1} 3 = \frac{\pi}{4}$

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

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

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

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

Answer: B

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88. If $\begin{vmatrix} \cos(A+B) & -\sin(A+B) & \cos 2B \\ \sin A & \cos A & \sin B \\ -\cos A & \sin A & \cos B \end{vmatrix} = 0$ then the value of B is -

A. $(2n+1)\frac{\pi}{2}$

B. $n\pi$

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

D. $2n\pi$

Answer: A

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Competitive Thinking

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

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

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

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

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

Answer: C

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2. The equation $\sin x \cos x = 2$ has:

A. one solution

B. two solutions

C. infinite number of solutions

D. no solution

Answer: D

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3. The solution of $\tan\theta + \cot\theta = 2$ is:

A. $\theta = \frac{n\pi}{2} + (-1)^n \frac{\pi}{4}$

B. $\theta = n\pi + (-1)^n \frac{\pi}{8}$

C. $\theta = \frac{n\pi}{2} + (-1)^n \frac{\pi}{8}$

D. $\theta = \frac{n\pi}{2} + (-1)^n \frac{\pi}{6}$

Answer: A

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4. The number of principal solutions of $\tan 2\theta = 1$ is

A. One

B. Two

C. Three

D. Four

Answer: B

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5. The number of solutions of $\sec x \cos 5x + 1 = 0$ in the interval $[0, 2\pi]$ is

A. 5

B. 8

C. 10

D. 12

Answer: B

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6. If $\cos\theta = \frac{-1}{2}$ and $0^\circ < \theta < 360^\circ$, then the values of θ are

A. 120° and 300°

B. 60° and 120°

C. 120° and 240°

D. 60° and 240°

Answer: C

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7. The value of θ satisfying the given equation $\cos\theta + \sqrt{3}\sin\theta = 2$, is

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

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

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

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

Answer: A

View Text Solution

8. Values of $\theta(0 < \theta < 360^\circ)$ satisfying $\cos ec\theta + 2 = 0$ are

A. $210^\circ, 300^\circ$

B. $240^\circ, 300^\circ$

C. $210^\circ, 240^\circ$

D. $210^\circ, 330^\circ$

Answer: D

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9. The equation $\sin x + \sin y + \sin z = -3$ for $0 \leq x \leq 2\pi, 0 \leq y \leq 2\pi$ and $0 \leq z \leq 2\pi$ has

A. one solution

B. Two sets of solutions

C. Four sets of solutions

D. no solution

Answer: A

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10. The number of solutions of 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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11. If $\tan(\pi\cos\theta) = \cot(\pi\sin\theta)$, then the value(s) of $\cos\left(\theta - \frac{\pi}{4}\right)$, is (are)

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

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

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

D. $\frac{1}{4\sqrt{2}}$

Answer: A

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

A. $\left(-\frac{\pi}{4}, \frac{\pi}{4}\right)$

B. $\left(\frac{\pi}{4}, \frac{3\pi}{4}\right)$

C. $\left(\frac{3\pi}{4}, \frac{5\pi}{4}\right)$

D. $\left(\frac{5\pi}{4}, \frac{7\pi}{4}\right)$

Answer: D

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13. The number of values of θ in $[0, 2\pi]$ satisfying the equation $2\sin^2\theta = 4 + 3\cos\theta$ are

A. 0

B. 1

C. 2

D. 3

Answer: A

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14. The number of integral values of a for which the equation $\cos 2x + a\sin x = 2a - 7$ possesses a solution is

A. $k < 3$

B. $k < 2$

C. $k > 3$

D. $2 < k < 6$

Answer: D

Watch Video Solution

15. If $(1 + \tan\theta)(1 + \tan\phi) = 2$ then $\theta + \phi =$

A. 30°

B. 45°

C. 60°

D. 75°

Answer: B

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16. If $(1+\tan\alpha)(1+\tan 4\alpha)=2, \alpha \in \left(0, \frac{\pi}{16}\right)$, then α is equal to

A. $\frac{\pi}{20}$

B. $\frac{\pi}{30}$

C. $\frac{\pi}{40}$

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

Answer: A

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17. The solution set of the system of equations $x+y=\frac{2\pi}{3}, \cos x+\cos y=\frac{3}{2}$, where x and y are real, is

A. a finite non-empty set

B. no solution

C. ∞

D. none of these

Answer: B

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18. if $0 \leq x \leq \pi$ and $81^{\sin^2 x} + 81^{\cos^2 x} = 30$ then $x =$

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

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

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

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

Answer: A

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19. If $4\sin^4 x + \cos^4 x = 1, then\xi sequa < o(n \in Z) \quad n\pi \quad$ (b) $n\pi \pm \sin^{-1}\sqrt{\frac{2}{5}}\ \frac{2n\pi}{3}$ (d) $2n\pi \pm \frac{\pi}{4}$

A. $n\pi$

B. $n\pi \pm \sin^{-1}\left(\frac{2}{5}\right)$

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

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

Answer: A

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20. The root of the equation $1 - \cos\theta = \sin\theta \cdot \sin\frac{\theta}{2}$ is

A. $k\pi, k \in I$

B. $2k\pi, k \in I$

C. $\frac{k\pi}{2}, k \in I$

D. none of these

Answer: B

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21. If the general solution of $\sin 5x = \cos 2x$ is of the form $a_n . \frac{\pi}{2}$ for $n = 0, \pm 1, \pm 2, \ldots$ then $a_n =$

A. $\frac{2n}{5 + 2(-1)^n}$

B. $\frac{2n + (-1)^n}{5 + 2(-1)^n}$

C. $\frac{2n + 1}{5 + 2(-1)^n}$

D. $\frac{2n - 1}{5 + 2(-1)^n}$

Answer: B

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22. General solution of $\tan\theta = \cot 2\theta$ is

A. $\theta = \frac{n\pi}{7} + \frac{\pi}{14}$

B. $\theta = \frac{n\pi}{7} + \frac{\pi}{5}$

C. $\theta = \frac{n\pi}{7} + \frac{\pi}{2}$

D. $\theta = \frac{n\pi}{7} + \frac{\pi}{3}$

Answer: A

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23. Find the most general value of θ satisfyingn the equation $\tan\theta = -1$ and $\cos\theta = \frac{1}{\sqrt{2}}$.

A. $n\pi + \frac{7\pi}{4}$

B. $n\pi + (-1)^n \frac{7\pi}{4}$

C. $2n\pi + \frac{7\pi}{4}$

D. none of these

Answer: C

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24. If $\tan\theta = -\frac{1}{\sqrt{3}}, \sin\theta = \frac{1}{2}$ and $\cos\theta = -\frac{\sqrt{3}}{2}$, then the principal value of θ will be

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

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

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

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

Answer: B

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25. If $\cos p\theta = \cos q\theta, p \neq q,$ then

A. $\theta = 2n\pi$

B. $\theta = \dfrac{2n\pi}{p \pm q}$

C. $\theta = \dfrac{n\pi}{p+q}$

D. none of these

Answer: B

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26. If $(2\cos x - 1)(3 + 2\cos x) = 0, 0 \leq x \leq 2\pi,$ then x=

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

B. $\dfrac{\pi}{3}, \dfrac{5\pi}{3}$

C. $\dfrac{\pi}{2}, \dfrac{5\pi}{3}, \cos^{-1}\left(-\dfrac{3}{2}\right)$

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

Answer: B

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27. If $\sin\left(\frac{\pi}{4}\cos\theta\right) = \cos\left(\frac{\pi}{4}\tan\theta\right)$, then θ is equal to

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

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

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

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

Answer: A

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

A. $\left(n + \frac{1}{2}\right)\frac{\pi}{3}$

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

C. $\left(2n\pm\frac{1}{2}\right)\frac{\pi}{3}$

D. none of these

Answer: A

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29. The general value θ obtained from the equation $\cos 3\theta = \sin\alpha$ is

A. $2\theta = \frac{\pi}{2} - \alpha$

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

C. $\theta = \frac{n\pi + (-1)^n\alpha}{2}$

D. $\theta = 2n\frac{\pi}{3} \pm \left(\frac{\pi}{6} - \frac{\alpha}{3}\right)$

Answer: D

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

Then the general value of θ is

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

B. $\frac{n\pi}{4}, n\pi \pm \frac{\pi}{6}$

C. $\frac{n\pi}{4}, 2n\pi \pm \frac{\pi}{3}$

D. $\frac{n\pi}{4}, 2n\pi \pm \frac{\pi}{6}$

Answer: A

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31. If $\sin 5x + \sin 3x + \sin x = 0$,then the value of x other than 0 lying between $0 \leq x \leq \frac{\pi}{2}$ is

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

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

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

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

Answer: C

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32. $\sin x + \sin 3x + \sin 5x = 0$

A. 2

B. 3

C. 4

D. 5

Answer: B

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33. The number of solutions of the equation $\sin x - \sin 2x + \sin 3x = 2\cos^2 x - \cos x$ in $(0, \pi)$ is

A. 1

B. 3

C. 2

D. 4

Answer: D

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34. The value of x in $\left(0, \frac{\pi}{2}\right)$ satisfying the equation sin x cos x $= \frac{1}{4}$ are .

. .

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

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

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

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

Answer: D

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35. If $\sin\theta = \cos\theta = 1$, then find the general value of θ.

A. $2n\pi$

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

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

D. $(2n-1) + \frac{\pi}{4}$

Answer: B

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36. $\sqrt{2}\sec\theta + \tan\theta = 1$

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

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

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

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

Answer: C

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37. $\sqrt{3}\cos\theta + \sin\theta = 2$

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

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

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

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

Answer: D

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38. $\sin 6\theta + \sin 4\theta + \sin 2\theta = 0$, then θ=

A. $\frac{n\pi}{4}$ or $n\pi \pm \frac{\pi}{3}$

B. $\frac{n\pi}{4}$ or $n\pi \pm \frac{\pi}{6}$

C. $\frac{n\pi}{4}$ or $2n\pi \pm \frac{\pi}{6}$

D. none of these

Answer: A

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39. $\sin\theta + \sin 7\theta = \sin 4\theta$

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

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

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

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

Answer: A

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40. Solve $\frac{\tan 3x - \tan 2x}{1 + \tan 3x \tan 2x'} = 1$

A. ϕ

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

C. $\left\{n\pi + \frac{\pi}{4} : n = 1, 2, 3, \ldots\right\}$

D. $\left\{2n\pi + \frac{\pi}{4} : n = 1, 2, 3, \ldots\right\}$

Answer: A

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41. $\frac{\tan 3\theta - 1}{\tan 3\theta + 1} = \sqrt{3}$, then the general value of θ is

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

B. $\frac{n\pi}{3} + \frac{7\pi}{36}$

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

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

Answer: B

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42. If $\sin 2\theta = \cos 3\theta and th\eta$ is an acute angle, then $\sin\theta$ equal $\frac{\sqrt{5}-1}{4}$ (b) $-\left(\frac{\sqrt{5}-1}{4}\right)$ $\frac{\sqrt{5}+1}{4}$ (d) $\frac{-\sqrt{5}-1}{4}$

A. $\frac{\sqrt{5}-1}{4}$

B. $\frac{-\sqrt{5}-1}{4}$

C. 0

D. none of these

Answer: A

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43. Find the gereral of the equation $\sin x - 3\sin 2x + \sin 3x = \cos x - 3\cos 2x + \cos 3x.$

A. $n\pi + \frac{\pi}{8}$

B. $\frac{n\pi}{2} + \frac{\pi}{8}$

C. $(-1)^n \frac{n\pi}{2} + \frac{\pi}{8}$

D. $2n\pi + \cos^{-1}\left(\frac{3}{2}\right)$

Answer: B

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44. If $\cot(\alpha + \beta) = 0$, then $\sin(\alpha + 2\beta)$ is equal to

A. $\sin\alpha$

B. $\cos\alpha$

C. $\sin\beta$

D. $\cos 2\beta$

Answer: A

Watch Video Solution

45. $\tan\theta + \tan 2\theta = \tan\theta\tan 2\theta = 1$

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

B. $\frac{n\pi}{2} + 6$

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

D. $\frac{n\pi}{2} + \frac{\pi}{12}$

Answer: C

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46. $\sec 4\theta - \sec 2\theta = 2$

A. $(2n+1)\frac{\pi}{4}$

B. $(2n+1)\frac{\pi}{10}$

C. $n\pi + \frac{\pi}{2}$ or $\frac{n\pi}{5} + \frac{\pi}{10}$

D. none of these

Answer: C

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47. If $\sin 2x + \sin 4x = 2\sin 3x$ then x=

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

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

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

D. none of these

Answer: A

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48. The equation $\alpha \sin x + b \cos x = c$ where $|c| > \sqrt{a^2 + b^2}$ has

A. 1

B. 2

C. Infinite

D. none of these

Answer: D

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49. If $\tan\left(\frac{p\pi}{4}\right) = \cot\left(\frac{q\pi}{4}\right)$, then prove that $p + q = 2(2n + 1), n \in Z.$

A. $p + q = 0$

B. $p + q = 2n + 1$

C. $p + q = 2n$

D. $p + q = 2(2n + 1)$

Answer: D

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50. $2\sin^2 x + \sin^2 2x = 2$

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

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

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

D. none of these

Answer: B

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51. If $\tan(\cot x) = \cot(\tan x)$, *then* $\sin 2x$ is equal to

A. $(2n+1)\frac{\pi}{4}$

B. $\frac{4}{(2n+1)\pi}$

C. $4\pi(2n+1)$

D. none of these

Answer: B

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52. Find the general solution of the equation $(\sqrt{3}-1)\sin\theta + (\sqrt{3}+1)\cos\theta = 2$

A. $2n\pi \pm \frac{\pi}{4} + \frac{\pi}{12}$

B. $n\pi + (-1)^n \frac{\pi}{4} + \frac{\pi}{12}$

C. $2n\pi \pm \frac{\pi}{4} - \frac{\pi}{12}$

D. $n\pi + (-1)^n \frac{\pi}{4} - \frac{\pi}{12}$

Answer: A

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53. The solution of the equation $\sec\theta - \cos ec\theta = \frac{4}{3}$ is

A. $\frac{1}{2}\left[n\pi + (-1)^n \sin^{-1}\left(\frac{3}{4}\right)\right]$

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

C. $\frac{n\pi}{2} + (-1)^n \sin^{-1}\left(\frac{3}{4}\right)$

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

Answer: A

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54. The general value of θ satisfying the equation $\tan^2\theta + \sec 2\theta = 1$ is_____

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

B. $m\pi, n\pi \pm \frac{\pi}{3}$

C. $m\pi, n\pi \pm \frac{\pi}{6}$

D. $\frac{m\pi}{2}, n\pi \pm \frac{\pi}{3}$

Answer: B

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55. The general value of θ in the equation $2\sqrt{3}\cos\theta = \tan\theta$ is

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

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

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

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

Answer: C

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56. 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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57. Principal solutions of the equation $\sin 2x + \cos 2x = 0$, where $\pi < x < 2\pi$

A. $\frac{7\pi}{8}, \frac{11\pi}{8}$

B. $\frac{9\pi}{8}, \frac{13\pi}{8}$

C. $\frac{11\pi}{8}, \frac{15\pi}{8}$

D. $\frac{15\pi}{8}, \frac{19\pi}{8}$

Answer: C

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58. If $2\sin^2\theta = 3\cos\theta$, where $0 \leq \theta \leq 2\pi$, then find the value of θ.

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

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

C. $\frac{\pi}{3}, \frac{7\pi}{3}$

D. $\frac{-2\pi}{3}, \frac{-7\pi}{3}$

Answer: B

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59. If $5\cos 2\theta + 2\cos^2\frac{\theta}{2} + 1 = 0$, when $(0 < \theta < \pi)$, then the values of θ are

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

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

C. $\cos^{-1}.\frac{3}{5}$

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

Answer: D

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60. The smallest positive angle which satisfies the equation $2\sin^2\theta + \sqrt{3}\cos\theta + 1 = 0$, is

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

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

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

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

Answer: A

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61. The equation $3\sin^2 x + 10\cos x - 6 = 0$ is satisfied, if

A. $x = n\pi \pm \cos^{-1}\left(\frac{1}{3}\right)$

B. $x = 2n\pi \pm \cos^{-1}\left(\frac{1}{3}\right)$

C. $x = n\pi \pm \cos^{-1}\left(\frac{1}{6}\right)$

D. $x = 2n\pi \pm \cos^{-1}\left(\frac{1}{6}\right)$

Answer: B

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62. The solution of the equation

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

A. $\pi = \cot^{-1}\left(\frac{1}{2}\right)$

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

C. $\pi + \tan^{-1}\left(-\frac{1}{2}\right)$

D. none of these

Answer: C

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63. $\cos 2\theta = (\sqrt{2}+1)\left(\cos\theta - \frac{1}{\sqrt{2}}\right)$

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

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

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

D. none of these

Answer: B

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64. If $32\tan^8\theta = 2\cos^2\alpha - 3\cos\alpha$ and $3\cos 2\theta = 1$, then the general value of α is

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

B. $2n\pi \pm \cos^{-1}(2)$

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

D. none of these

Answer: C

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65. In $(0, 2\pi)$, the number of solutions of $\cos 2\theta = \sin\theta$ are

A. 1

B. 2

C. 3

D. 4

Answer: C

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66. The number of values of θ in the interval $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ such that $\theta \neq \frac{n\pi}{5}$ for $n = 0, \pm 1, \pm 2$ and $\tan\theta = \cot 5\theta$ as well as $\sin 2\theta = \cos 4\theta$, is

A. 4

B. 5

C. 7

D. 3

Answer: D

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67. The number of solutions of the equation $\cos^2\left(x+\frac{\pi}{6}\right)+\cos^2 x-2\cos\left(x+\frac{\pi}{6}\right)\frac{\cos\pi}{6}=\frac{\sin^2\pi}{6}$ in interval $\left(\frac{-\pi}{2},\frac{\pi}{2}\right)$ is_____

A. 0

B. 1

C. 2

D. 3

Answer: C

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68. If the sum of all the solutions of the equation $8\cos x.\left(\cos\left(\frac{\pi}{6}+x\right)\cos\left(\frac{\pi}{6}-x\right)-\frac{1}{2}\right)=1$ in $[0,\pi]$ is $k\pi$ then k is equal to

A. $\frac{13}{9}$

B. $\frac{8}{9}$

C. $\frac{20}{9}$

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

Answer: A

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69. If $\sec^2\theta=\frac{4}{3}$, then the general value of θ is

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: B

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

A. 45° and 60°

B. 45° and 90°

C. 45° only

D. 90° only

Answer: B

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

A. $x = \frac{\pi}{6}, y = \frac{5\pi}{2}$

B. $x = \frac{5\pi}{12}, y = \frac{\pi}{6}$

C. $x = \frac{\pi}{3}, y = \frac{7\pi}{12}$

D. none of these

Answer: B

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72. If $0 \leq x < 2\pi$, then the number of real values of x, which satisfy the equation $\cos x + \cos 2x + \cos 3x + \cos 4x = 0$;

A. 5

B. 7

C. 9

D. 3

Answer: B

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

A. $1:2:3$

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

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

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

Answer: B

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74. In a ABC, $A:B:C=3:5:4$. Then $a+b+c\sqrt{2}$ is equal to $2b$ b. $2c$ c. $3b$ d. $3a$

A. 2b

B. 2c

C. 3b

D. 3a

Answer: C

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75. If the angles of a triangle are in the ratio $4:1:1$, then the ratio of the longest side to the perimeter is $\sqrt{3}:\left(2+\sqrt{3}\right)$ (b) $1:6$ $1:2+\sqrt{3}$ (d) $2:3$

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

A. 1

B. 2

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

D. $\sqrt{3}$

Answer: D

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77. In ΔABC, if $\sin^2 A + \sin^2 B = \sin^2 C$ and $l(AB) = 10$, then the maximum value of the area of ΔABC is

A. 50

B. $10\sqrt{2}$

C. 25

D. $25\sqrt{2}$

Answer: C

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

A. Equilateral

B. Isosceles

C. Right angled

D. Obtuse angled

Answer: C

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79. The perimeter of a triangle ABC is 6 times the arithmatic mean of the sines of its angles. if the side a is 1, then the angle A is

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

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

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

D. π

Answer: A

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80. If angles $A, B, \text{ and } C$ are in $A.P.$, then $\frac{a+c}{b}$ is equal to

A. $2\sin.\ \frac{A-C}{2}$

B. $2\cos.\ \frac{A-C}{2}$

C. $\cos.\ \frac{A-C}{2}$

D. $\sin.\ \frac{A-C}{2}$

Answer: B

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81. 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.

A. isosceles

B. right angled

C. Obtuse angled

D. Acute angled

Answer: B

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82. In $\triangle ABC$, $\frac{\cos 2A}{a^2} - \frac{\cos 2B}{b^2} =$

A. $a^2 - b^2$

B. $\frac{1}{a^2 - b^2}$

C. $\frac{1}{a^2} - \frac{1}{b^2}$

D. $a^2 + b^2$

Answer: C

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83. If the sides of a triangle are 3, 5, 7, then

A. All its angles are acute

B. One angle is obtuse

C. Triangle is right angled

D. none of these

Answer: B

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84. If in a triangle ABC, $2\cos A = \sin B\cos ecC$, then

A. $a = b$

B. $b = c$

C. $c = a$

D. $2a = bc$

Answer: C

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85. In $\triangle ABC$, if $a^2 + c^2 - b^2 = ac$, 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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86. In $ABC, \ = \$ if $(a+b+c)(a-b+c) = 3ac,$ then find $\angle B$.

A. $\angle B = 60^\circ$

B. $\angle B = 30^\circ$

C. $\angle C = 60^\circ$

D. $\angle A + \angle C = 90^\circ$

Answer: A

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87. 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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88. If : $a = 9, b = 8$ and $c = x$ satisfies 3 cos C = 2, then : x =

A. $x = 5$

B. $x = 6$

C. $x = 4$

D. $x = 7$

Answer: D

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89. In $\Delta ABC, a = 2cm, b = 3cm$ and $c = 4cm$, then angle A is

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

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

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

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

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

Answer: C

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91. The smallest angle of the ΔABC, when $a = 7, b = 4\sqrt{3}$ and $c = \sqrt{13}$ is

A. 30°

B. 15°

C. 45°

D. none of these

Answer: A

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92. In any ΔABC, prove that

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

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

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

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

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

Answer: A

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

A. 30°

B. 60°

C. 90°

D. 120°

Answer: B

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94. In a $\Delta ABC, \angle C=\frac{\pi}{3}$, then $\frac{3}{a+b+c}-\frac{1}{a+c}=$

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

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

C. $\frac{1}{2a+b}$

D. $\frac{1}{b+2c}$

Answer: B

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95. In triangle ABC, if $A + C = 2B$, then $\frac{a + c}{\sqrt{a^2 - ac + c^2}}$ is equal to

A. $2\cos.\frac{A - C}{2}$

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

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

D. $\sin.\frac{2A + C}{2}$

Answer: A

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96. In

$\triangle ABC, a\left(b^2 + c^2\right)\cos A + b\left(c^2 + a^2\right)\cos B + c\left(a^2 + b^2\right)\cos C =$

A. $3abc^2$

B. $3a^2bc$

C. $3abc$

D. $3ab^2c$

Answer: C

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97. In a triangle ABC, if $\frac{b+c}{11} = \frac{c+a}{12} = \frac{a+b}{13}$ then $\frac{\cos A}{l} = \frac{\cos B}{m} = \frac{\cos C}{n}$ where l, m, n are least positive integer. Find the value of $(l+m+n)$.

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

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

C. $\frac{17}{16}$

D. $\frac{16}{17}$

Answer: B

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98. In any ΔABC under usual notation, $a(b\cos C - c\cos B)$=

A. $b^2 - c^2$

B. $c^2 - b^2$

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

D. $\frac{c^2 - b^2}{2}$

Answer: A

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99. If in a ΔABC, $a^2\cos^2 A - b^2 - c^2 = 0$, then

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

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

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

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

Answer: B

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

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

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

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

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

Answer: A

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

A. 135°

B. 90°

C. 60°

D. 120°

Answer: D

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103. If a, b, c are the sides of the triangle ABC such that $a^4 + b^4 + c^4 = 2x^2(a^2 + b^2)$, then the angle opposite to the side c is-

A. 45° or 135°

B. 30° or 100°

C. 50° or 100°

D. 60° or 120°

Answer: A

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

A. Scalene

B. Equilateral

C. Isosceles

D. Right angled

Answer: B

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105. If in a ΔABC,

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

A. A.P.

B. G.P.

C. H.P.

D. none of these

Answer: A

Watch Video Solution

106. In a triangle ABC If $\frac{2\cos A}{a} + \frac{\cos B}{b} + \frac{2\cos C}{c} = \frac{a}{bc} + \frac{b}{ca}$, find the angle A.

A. 45°

B. 30°

C. 90°

D. 60°

Answer: C

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107. If $4\sin A = 4\sin B = 3\sin C$ in a ΔABC, then cos C =

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

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

C. $\frac{1}{27}$

D. $\frac{1}{18}$

Answer: B

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108. Let D be the middle point of the side BC of a triangle ABC. If the triangle ADC is equilateral, then $a^2 : b^2 : c^2$ is equal to

A. $1:4:3$

B. $4:1:3$

C. $4:3:1$

D. $3:4:1$

Answer: B

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109. The angles of a triangle ABC are in an arithmetic progression. The larger sides a, b satisfy the relation $\frac{\sqrt{3}}{2} < \frac{b}{a} < 1$, then the possible values of the smallest side are

A. $\frac{a \pm \sqrt{4b^2 - 3a^2}}{2a}$

B. $\frac{a \pm \sqrt{4b^2 - 3a^2}}{2b}$

C. $\frac{a \pm \sqrt{4b^2 - 3a^2}}{2c}$

D. $\frac{a \pm \sqrt{4b^2 - 3a^2}}{2}$

Answer: D

View Text Solution

110. In ΔABC, if $\cot A, \cot B, \cot C$ be in A.P. then a^2, b^2, c^2 are in

A. H.P.

B. G.P.

C. A.P.

D. A.G.P.

Answer: C

Watch Video Solution

111. If in ΔABC, $2b^2 = a^2 + c^2$, then $\frac{\sin 3B}{\sin B}$=

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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112. In a $\triangle ABC$, if $b^2 + c^2 = 3a^2$, then $\cot B + \cot C - \cot A$ is equal to

A. 1

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

C. 0

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

Answer: C

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113. If the sides of the triangle ABC are p,q and $\sqrt{p^2 + pq + q^2}$, then the greatest angle of the triangle is-

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

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

C. $\frac{5\pi}{4}$

D. $\frac{7\pi}{4}$

Answer: B

Watch Video Solution

114. If the line segment joining the points A(a,b) and B(c,d) subtends an angle θ at the origin, then $\cos\theta$ is equal to

A. $\frac{ab+cd}{\sqrt{(a^2+b^2)(c^2+d^2)}}$

B. $\frac{ac+bd}{\sqrt{(a^2+b^2)(c^2+d^2)}}$

C. $\frac{ac-bd}{\sqrt{(a^2+b^2)(c^2+d^2)}}$

D. $\frac{ad+bc}{\sqrt{(a^2+c^2)(b^2+d^2)}}$

Answer: B

Watch Video Solution

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

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

B. $1 + \sqrt{3}$

C. $2 + \sqrt{3}$

D. $4\sqrt{3}$

Answer: B

Watch Video Solution

116. If two adjacent sides of a cyclic quadrilateral aré 2 and 5 and the angle between them is 60º. If the third side is 3, then the remaining fourth side is (a) 2 (b) 3 (c) 4 (d) 5

A. 2

B. 3

C. 4

D. 5

Answer: A

Watch Video Solution

117. In triangle ABC, if A = 2B, and the sides opposite to the angles A, B, C are $\alpha + 1, \alpha - 1$ and α respectively, then α =

A. 3

B. 4

C. 5

D. 6

Answer: C

Watch Video Solution

118. In $\triangle ABC, (b+c)\cos A + (c+a)\cos B + (a+b)\cos C =$

A. 0

B. 1

C. $a+b+c$

D. $2(a+b+c)$

Answer: C

Watch Video Solution

119. In $\Delta ABC, \cos ecA(\sin B\cos C + \cos B\sin C) =$

A. c/a

B. a/c

C. 1

D. c/ab

Answer: C

Watch Video Solution

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

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

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

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

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

Answer: B

Watch Video Solution

121. In ΔABC, with usual notations, if a,b,c are in AP then $a\cos^2\left(\frac{C}{2}\right) + \cos^2\left(\frac{A}{2}\right) =$

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

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

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

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

Answer: C

Watch Video Solution

122. In a ΔABC, if $2s = a + b + c$ and $(s - b)(s - c) = x \sin^2 . \frac{A}{2}$, then x =

A. bc

B. ca

C. ab

D. abc

Answer: A

Watch Video Solution

123. In $\triangle ABC, \sin\left(\frac{A}{2}\right)\sin\left(\frac{C}{2}\right) = \sin\left(\frac{B}{2}\right)$ and '2s' is the perimeter of the triangle. Then the value of x is

A. 2b

B. b

C. 3b

D. 4b

Answer: A

Watch Video Solution

124. In $\triangle ABC$, if $a = 18, b = 24, c = 30$, then $\cos\left(\frac{A}{2}\right) =$

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

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

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

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

Answer: A

Watch Video Solution

125. In ΔABC, $(a-b)^2 \cos^2 . \frac{C}{2} + (a+b)^2 \sin^2 . \frac{C}{2}$=

A. b^2

B. c^2

C. a^2

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

Answer: B

Watch Video Solution

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

A. $2\cot(A/2)$

B. $2\cot(B/2)$

C. $2\cot(C/2)$

D. $2\cot A$

Answer: B

Watch Video Solution

127. In ΔABC, $\tan.\frac{A}{2}+\tan.\frac{B}{2}=$

A. $\frac{c\cot.\frac{C}{2}}{4s}$

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

C. $\frac{2c\tan.\frac{C}{2}}{s}$

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

Answer: B

Watch Video Solution

128. In ΔABC, $\left(\cot.\frac{A}{2}+\cot.\frac{B}{2}\right)\left(a\sin^2.\frac{B}{2}+b\sin^2.\frac{A}{2}\right)=$

A. $\cot C$

B. $c\cot C$

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

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

Answer: D

View Text Solution

129. If the sides of a triangle are in A.P., then the cotangent of its half the angles will be in

A. H.P.

B. G.P.

C. A.P.

D. No particular order

Answer: C

Watch Video Solution

130. If $c^2 = a^2 + b^2$, then $4s(s-a)(s-b)(s-c)$ is equal to

A. s^4

B. b^2c^2

C. c^2a^2

D. a^2b^2

Answer: D

Watch Video Solution

131. The area of an isosceles triangle is $9cm^2$. If the equal sides are 6 cm in length, the angle between them is

A. 60°

B. 30°

C. 90°

D. 45°

Answer: B

Watch Video Solution

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

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

B. $\sqrt{3}$

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

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

Answer: C

Watch Video Solution

133. In ΔABC, if $a = 1, b = 2, \angle C = 60^\circ$, then $4\Delta^2 + c^2$=

A. 6

B. 3

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

D. 9

Answer: A

Watch Video Solution

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

A. Δ

B. 2Δ

C. 3Δ

D. 4Δ

Answer: D

Watch Video Solution

135. If the area of a triangle ABC is given by $\Delta = a^2 - (b-c)^2$, then $\tan. \frac{A}{2}$ is equal to

A. -1

B. 0

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

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

Answer: C

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136. Let PQR be a triangle of area Δ with $a = 2, b = \frac{7}{2}$ and $c = \frac{5}{2}$, where a, b and c are the lengths of the sides of the triangle opposite to the angles at P, Q and R respectively. Then $\frac{2\sin P - \sin 2P}{2\sin P + \sin 2P}$ equals

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

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

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

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

Answer: C

Watch Video Solution

137. If in a triangle ABC, $b = \sqrt{3}$, c=1 and $B - C - 90^0$, then angle A is

A. 30°

B. 45°

C. 75°

D. 15°

Answer: A

Watch Video Solution

138. The range of $\tan^{-1} x$ is

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

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

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

D. $(0, \pi)$

Answer: B

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139. The domain of $\sin^{-1}\left(\frac{2x+1}{3}\right)$ is

A. $(-2, 1)$

B. $[-2, 1]$

C. R

D. $[-1, 1]$

Answer: B

Watch Video Solution

140. The trigonometric equation $\sin^{-1} x = 2\sin^{-1} a$ has a solution for all real values (b) $|a| < \frac{1}{a}$ $|a| \leq \frac{1}{\sqrt{2}}$ (d) $\frac{1}{2} < |a| < \frac{1}{\sqrt{2}}$

A. $|a| > \frac{1}{\sqrt{2}}$

B. $\frac{1}{2\sqrt{2}} < |a| < \frac{1}{\sqrt{2}}$

C. $|a| > \frac{1}{2\sqrt{2}}$

D. $|a| \leq \frac{1}{2\sqrt{2}}$

Answer: D

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141. If $\tan\left(\cos^{-1} x\right) = \sin\left(\cot^{-1}.\ \frac{1}{2}\right)$, then find the value of x

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

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

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

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

Answer: D

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

A. 5

B. 13

C. 15

D. 6

Answer: C

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143. If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \frac{\pi}{2}$, then the value of $x^2 + y^2 + z^2 + 2xyz$ is equal to

A. 0

B. 1

C. 2

D. 3

Answer: B

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144. If $\sin^{-1} a + \sin^{-1} b + \sin^{-1} c = \pi$, then the value of $a\sqrt{(1-a^2)} + b\sqrt{(1-b^2)} + \sqrt{(1-c^2)}$ will be $2abc$ (b) abc (c) $\frac{1}{2}abc$ (d) $\frac{1}{3}abc$

A. $2abc$

B. abc

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

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

Answer: A

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145. If $\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = 3\pi$, then $xy + yz + zx$ is equal to

A. 0

B. 1

C. 3

D. -3

Answer: C

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146. If $\cos^{-1}\sqrt{p} + \cos^{-1}\sqrt{1-p} + \cos^{-1}\sqrt{1-q} = \frac{3\pi}{4}$, then the value of q is -

A. 1

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

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

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

Answer: D

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147. The number of real solutions of $\tan^{-1}\sqrt{x(x+1)}+\sin^{-1}\sqrt{x^2+x+1}=\frac{\pi}{2}$ is z ero b. one c. two d. infinite

A. Zero

B. One

C. Two

D. Infinite

Answer: C

Watch Video Solution

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

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

B. x

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

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

Answer: D

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

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

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

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

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

Answer: D

Watch Video Solution

150. Let $\cos\left(2\tan^{-1}x\right) = \frac{1}{2}$ then the value of x is

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

B. $\pm\sqrt{3}$

C. $\sqrt{3} - 1$

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

Answer: D

Watch Video Solution

151. If $\cos\left(\cot^{-1}\left(\frac{1}{2}\right)\right) = \cot\left(\cos^{-1}x\right)$, then a value of x is

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

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

C. $\frac{2}{\sqrt{6}}$

D. $\frac{-2}{\sqrt{6}}$

Answer: A

Watch Video Solution

152. If $x > 0$, then the value of $\sin\left[\cot^{-1}\cos\left(\tan^{-1}x\right)\right]$ is equal to -

A. x

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

C. 1

D. π

Answer: A

Watch Video Solution

153. For the equation $\cos^{-1}x + \cos^{-1}2x + \pi = 0$, the number of real solution is 1 (b) 2 (c) 0 (d) ∞

A. 1

B. 2

C. 0

D. ∞

Answer: C

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154. $\cos^{-1}\left(\cos\frac{7\pi}{6}\right)$

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

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

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

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

Answer: B

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155. The value of $\sin^{-1}\left(\cos.\ \frac{53\pi}{5}\right)$ is

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

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

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

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

Answer: B

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156. $\tan^{-1}(\cot x) + \cot^{-1}(\tan x) = \pi - 2x$

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

B. $2x$

C. $\pi - 2x$

D. $\pi - x$

Answer: C

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

A. $2 - \sqrt{5}$

B. $\sqrt{5} - 2$

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

D. $5 - \sqrt{2}$

Answer: B

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158. 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 what os the value of x ?

A. a

B. b

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

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

Answer: D

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159. If $0 \leq x \leq 1$ then

$\sin\left\{\frac{\tan^{-1}(1-x^2)}{2x} + \frac{\cos^{-1}(1-x^2)}{1+x^{-2}}\right\}$ is equal to

A. 0

B. 1

C. $\sqrt{2}$

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

Answer: B

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160. The value of $\cot^{-1}\left\{\frac{\sqrt{1-\sin x}+\sqrt{1+\sin x}}{\sqrt{1-\sin x}-\sqrt{1+\sin x}}\right\}$, where $\frac{\pi}{2} < x < \pi$, is

A. $\pi - x$

B. $2\pi - x$

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

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

Answer: D

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161. $\cot^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)=$

A. $\frac{\pi}{2}-\frac{1}{2}\cot^{-1}x$

B. $\cot^{-1}x$

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

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

Answer: D

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162. $\tan^{-1}\frac{1-x}{1+x}=\frac{1}{2}\tan^{-1}x,(x>0)$

A. -1

B. $\sqrt{3}$

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

D. 1

Answer: C

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163. Given , $0 \leq x \leq \frac{1}{2}$, then the value of $\tan\left[\sin^{-1}\left\{\frac{x}{\sqrt{2}} + \frac{\sqrt{1-x^2}}{\sqrt{2}}\right\} - \sin^{-1} x\right]$ is

A. 1

B. $\sqrt{3}$

C. -1

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

Answer: A

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164. $\sec^{-1}[\sec(-30^\circ)]$=

A. -60°

B. -30°

C. 30°

D. 150°

Answer: C

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165. The value of $\cos^{-1}\left[\cot\left(\frac{\pi}{2}\right)\right] + \cos^{-1}\left[\sin\left(\frac{2\pi}{3}\right)\right]$ is

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

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

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

D. π

Answer: A

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166. $\frac{\tan^{-1}\left(\sqrt{3}\right) - \sec^{-1}(-2)}{\cos ec^{-1}\left(-\sqrt{2}\right) + \cos^{-1}\left(-\frac{1}{2}\right)} =$

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

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

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

D. 0

Answer: B

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167. If $\sec^{-1} x = \cos ec^{-1} y$,then $\cos^{-1}\left(\frac{1}{x}\right) = \cos^{-1}\left(\frac{1}{y}\right) =$

A. π

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

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

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

Answer: D

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168. If α and β are roots of the equation $x^2 + 5|x| - 6 = 0$, then the value of $\left|\tan^{-1}\alpha - \tan^{-1}\beta\right|$ is

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

B. 0

C. π

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

Answer: A

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

A. 0

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

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

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

Answer: B

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170. $\cos\left[2\cos^{-1}.\frac{1}{5} + \sin^{-1}.\frac{1}{5}\right] =$

A. $\frac{2\sqrt{6}}{5}$

B. $-\frac{2\sqrt{6}}{5}$

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

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

Answer: B

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

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

B. 0

C. 1

D. -1

Answer: D

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172. 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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173. If $\tan^{-1} x + 2\cot^{-1} x = \frac{2\pi}{3}$ then x =

A. $\sqrt{2}$

B. 3

C. $\sqrt{3}$

D. $\frac{\sqrt{3}-1}{\sqrt{3}+1}$

Answer: C

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174. $3\tan^{-1}x + \cot^{-1}x = \pi$

A. 1

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

C. 0

D. -1

Answer: A

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175. If $\tan^{-1}x + \tan^{-1}y = \frac{4\pi}{5}$, find $\cot^{-1}x + \cot^{-1}y$.

A. π

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

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

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

Answer: B

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176. If $\sin^{-1}\left(\frac{x}{13}\right) + \text{cosec}^{-1}\left(\frac{13}{12}\right) = \frac{\pi}{2}$ then the values of x is -

A. 5

B. 4

C. 12

D. 11

Answer: A

Watch Video Solution

177. if $\cot^{-1}\alpha + \cot^{-1}\beta = \cot^{-1}x$ then x

A. $\alpha + \beta$

B. $\alpha - \beta$

C. $\frac{1 + \alpha\beta}{\alpha + \beta}$

D. $\frac{\alpha\beta - 1}{\alpha + \beta}$

Answer: D

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178. Solve $\tan^{-1} 2x + \tan^{-1} 3x = \frac{\pi}{4}$.

A. -1

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

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

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

Answer: C

Watch Video Solution

179. $\tan^{-1}\frac{x-1}{x-2}+\tan^{-1}\frac{x+1}{x+2}=\frac{\pi}{4}$

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

B. $\pm\sqrt{2}$

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

D. ± 2

Answer: A

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180. $\tan^{-1}\frac{x}{y}-\tan^{-1}\frac{x-y}{x+y}$

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

B. π

C. 0

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

Answer: A

Watch Video Solution

181. For ΔABC if $A = \tan^{-1} 2, B = \tan^{-1} 3$, then C = _____.

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

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

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

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

Answer: B

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182. 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

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183. सिद्ध कीजिए कि

$$\cot^{-1}\left(\frac{ab+1}{a-b}\right) + \cot^{-1}\left(\frac{bc+1}{b-c}\right) + \cot^{-1}\left(\frac{ca+1}{c-a}\right) = 0$$

A. 0

B. 1

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

D. none of these

Answer: A

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184. If $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \frac{\pi}{2}$, then

A. $x + y + z - xyz = 0$

B. $x + y + z + xyz = 0$

C. $xy + yz + zx + 1 = 0$

D. $xy + yz + zx - 1 = 0$

Answer: D

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185. $4\tan^{-1}\frac{1}{5} - \tan^{-1}\frac{1}{239} =$

A. π

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

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

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

Answer: D

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186. $2\tan^{-1}(\cos x) = \tan^{-1}(2\cos ecx)$

A. $2\sqrt{2}$

B. $\sqrt{2}$

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

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

Answer: B

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187. If a, b, c be positive real numbers and the value of $\theta = \tan^{-1}\sqrt{\frac{a(a+b+c)}{bc}} + \tan^{-1}\sqrt{\frac{b(a+b+c)}{ca}} + \tan^{-1}\sqrt{\frac{c(a+b+}{(ab)}}$ then $\tan\theta$ is equal to

A. 0

B. 1

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

D. $\frac{ab+bc+ca}{a+b+c}$

Answer: A

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188. Find the value of $4\frac{\tan^{-1}1}{5} - \frac{\tan^{-1}1}{70} + \frac{\tan^{-1}1}{99}$

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

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

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

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

Answer: C

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189. सिद्ध कीजिए कि

$$2\tan^{-1}\frac{1}{5}+\sec^{-1}\frac{5\sqrt{2}}{7}+2\tan^{-1}\frac{1}{8}=\frac{\pi}{4}$$

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

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

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

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

Answer: B

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190. Which one of the following is true?

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

B. $\sec\left(\tan^{-1} x\right) = \tan\left(\sec^{-1} x\right)$

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

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

Answer: A

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191. 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. $-\frac{\pi}{2}$

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

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

D. 0

Answer: C

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192. If $\sin^{-1}\frac{1}{3}+\sin^{-1}\frac{2}{3}=\sin^{-1}x$, then the value of x is

A. 0

B. $\frac{\sqrt{5}-4\sqrt{2}}{9}$

C. $\frac{\sqrt{5}+4\sqrt{2}}{9}$

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

Answer: C

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193. If $\sin^{-1}x+\cos^{-1}y=\frac{2\pi}{5}$, then $\cos^{-1}x+\sin^{-1}y$=

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

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

C. $\frac{4\pi}{5}$

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

Answer: B

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194. 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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195. The value of $\sin^{-1}\left(\frac{2\sqrt{2}}{3}\right) + \sin^{-1}\left(\frac{1}{3}\right)$ is

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

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

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

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

Answer: D

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196. $\left[\sin\left(\tan^{-1}.\frac{3}{4}\right)\right]^2 =$

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

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

C. $\frac{9}{25}$

D. $\frac{25}{9}$

Answer: C

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197. $If \sin\{\cot^{-1}(x+1)\} = \cos(\tan^{-1} x)$, then find x.

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

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

C. 0

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

Answer: A

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198. $\cos(\tan^{-1} x) =$

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

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

C. $1+x^2$

D. $\frac{1}{1+x^2}$

Answer: B

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199. $\tan\left(\cos^{-1}x\right)$ is equal to

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

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200. $\cos\left(\tan^{-1}\left(\frac{3}{4}\right)\right) =$

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

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

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

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

Answer: A

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201. Find the value of $\cos^{-1}\left(\frac{x}{2} + \frac{\sqrt{3-3x^2}}{2}\right)$

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

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

C. π

D. zero

Answer: B

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202. Let $\tan^{-1} y = \tan^{-1} x + \tan^{-1}\left(\frac{2x}{1-x^2}\right)$, where $|x| < \frac{1}{\sqrt{3}}$.

Then a value of y is : (1) $\frac{3x - x^3}{1 - 3x^2}$ (2) $\frac{3x + x^3}{1 - 3x^2}$ (3) $\frac{3x - x^3}{1 + 3x^2}$ (4) $\frac{3x + x^3}{1 + 3x^2}$

A. $\frac{3x - x^3}{1 - 3x^2}$

B. $\frac{3x + x^3}{1 - 3x^2}$

C. $\frac{3x - x^3}{1 + 3x^2}$

D. $\frac{3x + x^3}{1 + 3x^2}$

Answer: A

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203. The value of $2\left(\cot^{-1}\right)\frac{1}{2} - \left(\cot^{-1}\right)\frac{4}{3}$ is

A. $-\frac{\pi}{8}$

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

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

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

Answer: D

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204. Find the value of $\tan^{-1}\left(\frac{1}{2}\tan 2A\right) + \tan^{-1}(\cot A) + \tan^{-1}\left(\cot^3 A\right)$

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

B. π

C. 0

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

Answer: B

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205. $\cos^{-1}\left(\frac{15}{17}\right) + 2\tan^{-1}\left(\frac{1}{5}\right) =$

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

B. $\cos^{-1}\left(\frac{171}{221}\right)$

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

D. $\cos^{-1}\left(\frac{140}{221}\right)$

Answer: D

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206. सिद्ध कीजिए कि $\tan\left[\cos^{-1}\left(\frac{4}{5}\right) + \tan^{-1}\left(\frac{2}{3}\right)\right] = \frac{17}{6}$

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

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

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

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

Answer: B

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207. If $\cot\left(\cos^{-1} x\right) = \sec\left\{\frac{\tan^{-1}(a)}{\sqrt{b^2 - a^{-2}}}\right\}$ then x equals

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

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

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

D. $\frac{\sqrt{b^2 - a^2}}{ab}$

Answer: A

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208. Value of $\tan^{-1}\left\{\sin\left(\cos^{-1}\sqrt{\frac{2}{3}}\right)\right\}$ is

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

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

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

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

Answer: D

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209. The number of solutions of the equation $2\cos(e^x) = 5^x + 5^{-x}$, are

A. No solution

B. One solution

C. Two solutions

D. Infinitely many solutions

Answer: A

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210. The value of θ lying between $\theta = 0$ and $\theta = \frac{\pi}{2}$ and satisfying the equation $\begin{vmatrix} 1+\sin^2\theta & \cos^2\theta & 4\sin 4\theta \\ \sin^2\theta & 1+\cos^2\theta & 4\sin 4\theta \\ \sin^2\theta & \cos^2\theta & 1+4\sin 4\theta \end{vmatrix} = 0$ are

A. $\frac{7\pi}{24}$ or $\frac{11\pi}{24}$

B. $\frac{5\pi}{24}$

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

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

Answer: A

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211. If $\frac{(x+1)^2}{x^3+x} = \frac{A}{x} + \frac{Bx+C}{x^2+1}$, then $\cos ec^{-1}\left(\frac{1}{A}\right) + \cot^{-1}.\frac{1}{B} + \sec^{-1} C =$ _____

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

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

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

D. 0

Answer: B

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212. The number of points of intersection of $2y = 1$ and $y = \sin x$, in $-2\pi \leq x \leq 2\pi$ is

A. 1

B. 2

C. 3

D. 4

Answer: D

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213. If in a triangle ABC, $a = 5, b = 4$ and $A = \frac{\pi}{2} + B$, then the value of $\tan\frac{C}{2}$ is-

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

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

C. Cannot be evaluated

D. $2\tan^{-1}(1/9)$

Answer: D

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214. If $x = \sin^{-1} K, y = \cos^{-1} K, -1 \leq K \leq 1$, then the correct relationship is

A. $x + y = 2$

B. $x - y = 2$

C. $x + y = \frac{\pi}{2}$

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

Answer: C

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215. If $A = \frac{1}{\pi}\left[\sin^{-1}(\pi x)\tan^{-1}\left(\frac{x}{\pi}\right)\sin^{-1}\left(\frac{x}{\pi}\right)\cot^{-1}(\pi x)\right]$ and $B = \frac{1}{\pi}\left[-\cot^{-1}(\pi x)\tan^{-1}\left(\frac{x}{\pi}\right)\sin^{-1}\left(\frac{x}{\pi}\right) - \tan^{-1}(\pi x)\right]$, then $A - B$ is equal to I (b) 0 (c) $2I$ (d) $\frac{1}{2}I$

A. I

B. 0

C. $2I$

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

Answer: D

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216. If $\frac{1}{6}\sin\theta, \cos\theta$ and $\tan\theta$ are in geometric progression, then the solution set of θ is

A. $2n\pi \pm \left(\frac{\pi}{6}\right)$

B. $2n\pi \pm \left(\frac{\pi}{3}\right)$

C. $n\pi + (-1)^n\left(\frac{\pi}{6}\right)$

D. $n\pi + \left(\frac{\pi}{3}\right)$

Answer: B

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217. 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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218. The value of $\cot\left[\sum_{n=1}^{100} \cot^{-1}\left(1 + \sum_{k=1}^{n} 2k\right)\right]$ is

A. $\frac{51}{50}$

B. $\frac{50}{51}$

C. $\frac{100}{101}$

D. $\frac{101}{100}$

Answer: A

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Evaluation Test

1. If the equation $\cos 3x \cos^3 x + \sin 3x \sin^3 x = 0$, then x is equal to

A. $(2n+1)\frac{\pi}{4}$

B. $(2n-1)\frac{\pi}{4}$

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

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

Answer: A

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2. The values of x between 0 and 2π which satisfy the equation $\sin x\sqrt{8\cos^2 x} = 1$ are in A.P. with common difference is

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

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

C. $\frac{3\pi}{8}$

D. $\frac{5\pi}{8}$

Answer: A

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3. Total number of solutions of $16^{\sin^2 x} + 16^{\cos^2 x} = 10 \text{ in } [0, 2\pi]$ are

A. 4

B. 8

C. 12

D. 16

Answer: B

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4. Solve the equation $(\sin x + \cos x)^{1+\sin 2x} = 2$, when $0 \leq x \leq \pi$

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

B. π

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

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

Answer: C

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5. Find the total number of solution of $\sin^4 x + \cos^4 x = \sin x \cos x$ in $[0, 2\pi]$ is equal to

A. 2

B. 4

C. 6

D. 8

Answer: A

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6. The equation $\tan^4 x - 2\sec^2 x + a = 0$ will have at least one solution if `1

A. $|a| \leq 4$

B. $|a| \leq \sqrt{2}$

C. $|a| \leq \sqrt{3}$

D. $|a| \leq 2$

Answer: C

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7. If $\tan\alpha = \frac{1}{2}$ and $3\cos x + 4\sin x = 5$, then x is equal to

A. $n\pi + \alpha$

B. $2n\pi + 2\alpha$

C. $n\pi + 2\alpha$

D. $2n\pi + \alpha$

Answer: B

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8. If $\tan\theta + \tan\left(\theta + \frac{\pi}{3}\right) + \tan\left(\theta + \frac{2\pi}{3}\right) = 3$, then which of the following is equal to 1 ?

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

B. $(4n+1)\frac{\pi}{4}$

C. $(4n+1)\frac{\pi}{6}$

D. $(4n+1)\frac{\pi}{12}$

Answer: D

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9. In a ΔABC, if $\tan.\frac{A}{2}=\frac{5}{6}, \tan.\frac{B}{2}=\frac{20}{37}$, then which of the following is/are correct ?

A. $2a=b+c$

B. $a>b>c$

C. $2c=a+b$

D. $a<b<c$

Answer: B

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10. In a ABC, $A = \frac{2\pi}{3}$, $b - c = 3\sqrt{3}cm$ and area $(ABC) = \frac{9\sqrt{3}}{2}cm^2$. then $'a'$ is $6cm$ b. $9cm$ c.$18cm$ d. none of these

A. $6\sqrt{3}cm$

B. 9 cm

C. 18 cm

D. 6 cm

Answer: B

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11. If the angles of a triangle are $30^0 and 45^0$ and the included side is $\left(\sqrt{3}+1\right)cm$ then the area of the triangle is_____.

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

B. $\frac{\sqrt{3}+1}{4}$

C. $\frac{\sqrt{3}-1}{2}$

D. $\frac{\sqrt{3}-1}{4}$

Answer: A

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12. In $\triangle ABC$, If $\frac{b+c}{11}=\frac{c+a}{12}=\frac{a+b}{13}$, then $\cos C=$

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

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

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

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

Answer: D

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13. The sides of a triangle are three consecutive natural numbers and its largest angle is twice the smallest one. Determine the sides of the triangle.

A. $3, 4, 5$

B. $4, 5, 6$

C. $5, 6, 7$

D. $6, 7, 8$

Answer: B

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

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

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

C. $\frac{2\pi}{5}\cos ec.\ \frac{\pi}{10}$

D. $\frac{\pi}{5}\sin.\ \frac{\pi}{10}$

Answer: B

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15. In a triangle ABC, if $a:b:c=4:5:6$, then ratio between its circumradius and inradius is

A. $8:7$

B. $3:2$

C. $7:3$

D. $16:7$

Answer: D

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16. Given $b = 2, c = \sqrt{3}, \angle A = 30^\circ$, then inradius of ΔABC is

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

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

C. $\frac{\sqrt{3}-1}{4}$

D. $\frac{\sqrt{3}+1}{4}$

Answer: A

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

A. 30°

B. 45°

C. 60°

D. 90°

Answer: B

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

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

B. $2a$

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

D. $2b$

Answer: A

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19. If $\tan.\frac{A}{2}$ and $\tan.\frac{B}{2}$ are the roots of the quadratic equation $6x^2 - 5x + 1 = 0$, then ΔABC is

A. a right angled triangle

B. an acute angled triangle

C. an obtuse angled triangle

D. none of these

Answer: A

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

A. $2(c+a-b)$

B. $c+a-2b$

C. $c+a-b$

D. $c+b-a$

Answer: C

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21. In a triangle $\angle A = 55^\circ, \angle B = 15^\circ, \angle C = 110^\circ$. Then $c^2 - a^2$ is equal to

A. ab

B. $2ab$

C. $-ab$

D. a^2b

Answer: A

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22. If the angle $A, BandC$ of a triangle are in an arithmetic propression and if $a, bandc$ denote the lengths of the sides opposite to $A, BandC$ respectively, then the value of the expression $\frac{a}{c}\sin 2C + \frac{c}{a}\sin 2A$ is $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$ (c) 1 (d) $\sqrt{3}$

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

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

C. 1

D. $\sqrt{3}$

Answer: D

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23. The value of $\frac{\cot^{\pi}}{4} - 2\cot^{-13}$ is

A. 1

B. 7

C. 4

D. 3

Answer: B

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24. Prove the following:

$$\tan\left[\frac{\pi}{4}+\frac{1}{2}\cos^{-1}\left(\frac{a}{b}\right)\right]+\tan\left[\frac{\pi}{4}-\frac{1}{2}\cos^{-1}\left(\frac{a}{b}\right)\right]=\frac{2b}{a}$$

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

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

C. $\frac{a}{b}$

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

Answer: B

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25. If $\cot^{-1}x-\cos^{-1}\frac{y}{2}=\alpha$, then $4x^2-4xy\cos\alpha+y^2$ is equal to :

A. $-4\sin^2\alpha$

B. $4\sin^2\alpha$

C. 4

D. $2\sin^2\alpha$

Answer: B

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26. $\sin^{-1}x + \sin^{-1}2x = \frac{\pi}{3}$

A. $\sqrt{\frac{3}{7}}$

B. $\frac{1}{2}\sqrt{\frac{3}{7}}$

C. $-\sqrt{\frac{3}{7}}$

D. $-\frac{1}{2}\sqrt{\frac{3}{7}}$

Answer: B

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27. If $\sin^{-1}\left(\sin.\ \frac{33\pi}{7}\right)+\cos^{-1}\left(\cos.\ \frac{46\pi}{7}\right)$ $+\tan^{-1}\left(-\tan.\ \frac{13\pi}{8}\right)+\cot^{-1}\left(-\cot.\ \frac{19\pi}{8}\right)=\frac{a\pi}{b}$, where a and b are constant, then $(a+b)$ is equal to

A. 17

B. 20

C. 23

D. 26

Answer: B

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28. Prove that: $\sin^{-1}\left(\frac{4}{5}\right)+\sin^{-1}\left(\frac{5}{13}\right)+\sin^{-1}\left(\frac{16}{65}\right)=\frac{\pi}{2}$

A. 0

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

C. π

D. $\sin^{-1}.\frac{63}{65}$

Answer: B

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29. If $A = 9\tan^{-1}\left(\sqrt{2}-1\right)$ and $B = 3\sin^{-1}\left(\frac{1}{3}\right) + \sin^{-1}\left(\frac{3}{5}\right)$ then

A. $A = B$

B. $A < B$

C. $A > B$

D. None of these

Answer: C

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30. If $\cot^{-1} x + \cot^{-1} y + \cot^{-1} z = \frac{\pi}{2}$, then $x + y + z =$

A. $\frac{1}{x} + \frac{1}{y} + \frac{1}{z}$

B. xyz

C. $xy + yz + zx$

D. $x^2 + y^2 + z^2$

Answer: B

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31. The value of $\cos^{-1}\left\{\frac{1}{\sqrt{2}}\left(\cos\left(\frac{9\pi}{10}\right) - \sin\left(\frac{9\pi}{10}\right)\right)\right\}$

A. $\frac{3\pi}{20}$

B. $\frac{17\pi}{20}$

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

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

Answer: B

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32. $\tan^{-1}1+\tan^{-1}2+\tan^{-1}3=$

A. π

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

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

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

Answer: A

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

A. 0

B. 3

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

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

Answer: B

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34. Solve for $x : \cot^{-1} \sin^{-1}, \frac{1}{\sqrt{5}} = \frac{\pi}{4}$

A. 3

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

C. 0

D. 4

Answer: A

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