MATHS

BOOKS - ZEN MATHS (KANNADA ENGLISH)

AN INTRODUCTION TO TRIGONOMETRY

Illustrative Example

1. Given $\tan A = \frac{5}{12}$, find the other trigonometric ratios of angle A.

A.

B.

C.

D.

Answer: $\cot A = \frac{12}{5}$

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2. If $\sin\theta = \frac{12}{13}(0^\circ < \theta < 90^\circ)$, find the value of $\frac{\sin^2\theta - \cos^2\theta}{2\sin\theta\cos\theta} \times \frac{1}{\tan^2\theta}$.

A.

B.

C.

D.

Answer: $\frac{595}{3456}$.

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3. If $5\cos A - 12\sin a = 0$, find the value of $\frac{\sin A - \cos A}{2\cos A - \sin A}$.

A.

B.

C.

D.

Answer: $\frac{17}{19}$

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4. If $\sin\theta = \frac{1}{2}$, show that $3\cos\theta - 4\cos^3\theta = 0$.

A.

B.

C.

D.

Answer:

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5. In ΔABC right-angled at B, $AB = 7cm$ and $AC - BC = 1cm$, Find the values of sin C and cos C.

A.

B.

C.

D.

Answer: $\frac{24}{25}$

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6. If $x = 4\cos\theta, y = r\sin\theta$ Prove that $x^2 + y^2 = r^2$

A.

B.

C.

D.

Answer: $a^2 = RHS$

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7. $x = a\sec\theta + b\tan\theta$ and $y = a\tan\theta + b\sec\theta.$ Prove that $x^2 - y^2 = a^2 - b^2.$

A.

B.

C.

D.

Answer:

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8. If $x = p\tan\theta + q\sec\theta$ and $y = p\sec\theta + q\tan\theta$ the prove that $x^2 - y^2 = q^2 - p^2$.

A.

B.

C.

D.

Answer:

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9. Prove that $\sin^4\alpha + \cos^4\alpha + 2\sin^2\alpha\cos^2\alpha = 1$.

A.

B.

C.

D.

Answer:

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10. Prove that

$$(1+\cot\theta+\tan\theta)(\sin\theta-\cos\theta)=\frac{\sec\theta}{\cos ec^2\theta}-\frac{\cos ec\theta}{\sec^2\theta}.$$

A.

B.

C.

D.

Answer:

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11. If $\tan A = n\tan B$ and $\sin A = m\sin B$, show that $\cos^2 A = \frac{m^2-1}{n^2-1}$

.

A.

B.

C.

D.

Answer:

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12. Solve $\cos(50^\circ + \theta) = \sin(30^\circ + \theta)$.

A.

B.

C.

D.

Answer: $\theta = 5^\circ$

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13. $2\left(\sin^6\theta+\cos^6\theta\right)-3\left(\sin^4\theta+\cos^4\theta\right)=$

A.

B.

C.

D.

Answer:

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14. Solve $\sin^2\theta-\cos\theta=\frac{1}{4}, 0\le\theta\le 2\pi.$

A.

B.

C.

D.

Answer: $\theta = 60^\circ$

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15. Find the value of : $\sin^2 30^\circ \cos^2 45^\circ + 4\tan^2 30^\circ + \frac{1}{2}\sin^2 90^\circ + \frac{1}{8}\cot^2 60^\circ.$

A.

B.

C.

D.

Answer: 2

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16. Show that $\frac{\tan 60^\circ - \tan 30^\circ}{1 + \tan 60^\circ \tan 30^\circ} = \tan 30^\circ$.

A.

B.

C.

D.

Answer:

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17. Taking $A = 60^\circ$ and $B = 30^\circ$ verify that $\sin(A - B) = \sin A \cos B - \cos A \sin B$.

A.

B.

C.

D.

Answer:

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18. If $\sin(A+B)=1$ and $\cos(A-B)=\frac{\sqrt{3}}{2}$, find A and B.

A.

B.

C.

D.

Answer: Hence $A=60^\circ$ **and** $B=30^\circ$**.**

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19. In a right ΔABC, $\lfloor B=90^\circ$, $AB=3cm$, and $AC=6cm$. Find $\lfloor C$ and $\lfloor A$.

A.

B.

C.

D.

Answer: Hence $\lfloor A = 60^\circ$ **and** $\lfloor C = 30^\circ$**.**

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20. If $\tan 40^\circ = x$, find the value of

(i) $\sec^2 40^\circ$ $(ii) 1 + \cos ec^2 50^\circ$

A.

B.

C.

D.

Answer: (i) $1 + x^2$

(ii) $2 + x^2$.

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21. Evaluate $\cos 1^\circ \cos 2^\circ \cos 3^\circ \cos 4^\circ \ldots \cos 179^\circ \cos 188.$

A.

B.

C.

D.

Answer: 0

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22. If $f(x^\circ) = 3 - 2\cos^2 x$, find (60°).

A.

B.

C.

D.

Answer: $\frac{5}{2}$

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23. Find the value of $\sec^2 42^\circ - \cos ec^2 48^\circ$.

A.

B.

C.

D.

Answer: 0

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24. Evaluate: $\sin\theta \times \sec(90^\circ - \theta)$

A.

B.

C.

D.

Answer: 1

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25. Find the value of $\tan(65^\circ - \theta) - \cot(25^\circ + \theta)$.

A.

B.

C.

D.

Answer: 0

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26. Without using trigonometric tables, prove that $\sec 70^\circ \sin 20^\circ + \cos 20^\circ \cos ec 70^\circ = 2.$

A.

B.

C.

D.

Answer:

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27. Without using trigonometric tables, evaluate:

$$\frac{\tan 50^\circ + \sec 50^\circ}{\cot 40^\circ + \cos ec 40^\circ} + \cos 40^\circ \cos ec 50^\circ$$

A.

B.

C.

D.

Answer: 2

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28. If $\sin 3A = \cos(A - 10^\circ)$ where 3A is an acute angle, find the value of

A.

A.

B.

C.

D.

Answer: $A = 25^\circ$.

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29. Express $\cos A$ in terms of cot A.

A.

B.

C.

D.

Answer: $\cos A = \frac{\cot A}{\sqrt{1 + \cot^2 A}}$.

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30. Prove that $(\sec\theta + \tan\theta)^2 = \frac{\cos ec\theta + 1}{\cos ec\theta - 1}$.

A.

B.

C.

D.

Answer:

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31. Prove that $\frac{\tan A}{\sec A - 1} + \frac{\tan A}{\sec A + 1} = 2\cos ecA.$

A.

B.

C.

D.

Answer:

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32. Show that $\sqrt{\frac{1+\cos\alpha}{1-\cos\alpha}} = \cos ec\alpha + \cot\alpha$

A.

B.

C.

D.

Answer:

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33. Prove that $\left(\frac{1+\cos\theta}{1-\cos\theta}\right) = (\text{cosec}\theta + \cot\theta)^2$

A.

B.

C.

D.

Answer:

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34. Prove that: $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \frac{1}{\sec\theta - \tan\theta}$

A.

B.

C.

D.

Answer:

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35. Prove that $\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} + \frac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta} = \frac{2\sec^2\theta}{\tan^2\theta - 1}$.

A.

B.

C.

D.

Answer:

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36. Prove that $(1+\cot\theta-\cos ec\theta)(1+\tan\theta+\sec\theta)=2.$

A.

B.

C.

D.

Answer:

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37. Show that $(\tan A.\ \sin A) + \cos A = \sec A.$

A.

B.

C.

D.

Answer:

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38. Prove that $\frac{\cot^2(90^\circ - \theta)}{\tan^2\theta - 1} + \cos ec^2 \frac{\theta}{\sec^2\theta - \cos ec^2\theta} = \frac{1}{\sin^2\theta - \cos^2\theta}.$

A.

B.

C.

D.

Answer:

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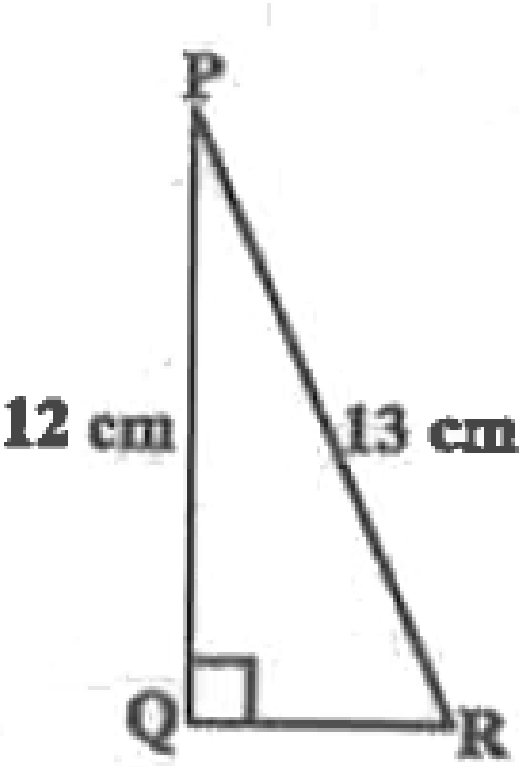
Exercise 11 1

1. In ΔABC, right - angled at B, $AB = 24cm$, $BC = 7cm$. Determine :

(i) $\sin A$, $\cos A$

(ii) $\sin C, \cos C$



A.

B.

C.

D.

Answer: (A) $\frac{24}{25}$

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

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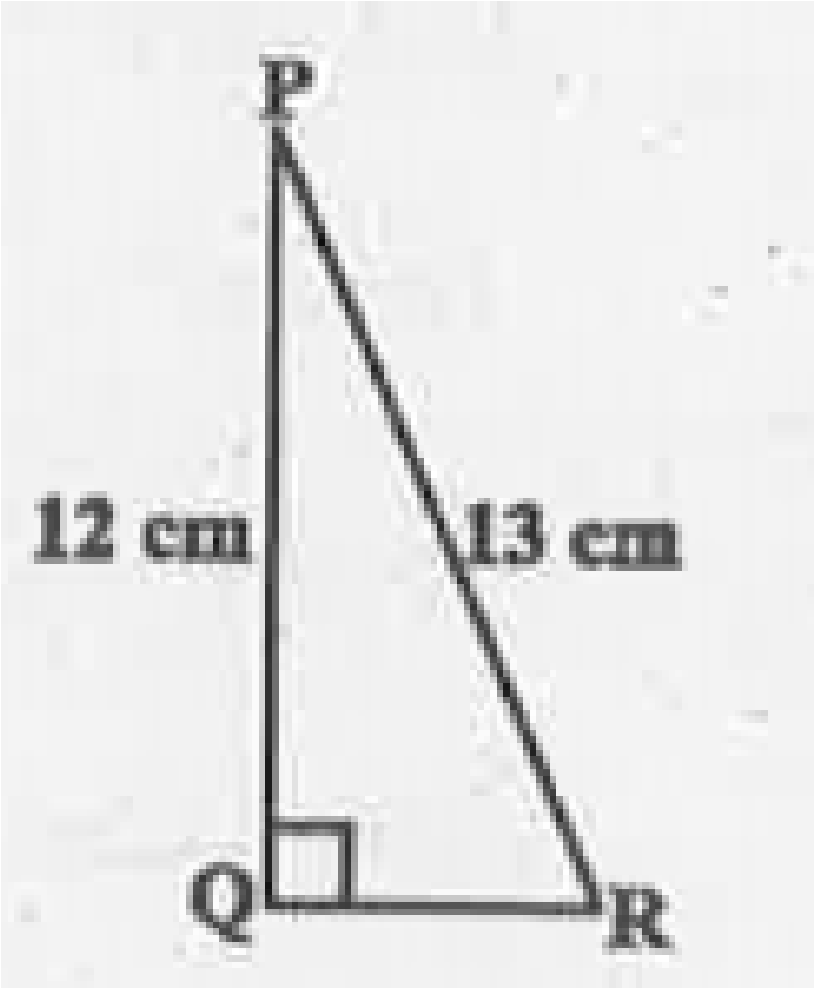
2. In fig. find $\tan P - \cot R$.



A.

B.

C.

D.

Answer: 0

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3. If $\sin A = \frac{3}{4}$ calculate $\cos A$ and $\tan A$

A.

B.

C.

D.

Answer: $\frac{3}{\sqrt{7}}$.

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4. Given $15\cot A = 8$, find $\sin A$ and $\sec A$.

A.

B.

C.

D.

Answer: $\frac{17}{8}$

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5. Given $\sec\theta = \frac{13}{12}$, calculate all other trigonometric ratios.

A.

B.

C.

D.

Answer: $\frac{12}{5}$

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6. If $\angle A$ and $\angle B$ are acute angles such that $\cos A = \cos B$, then show that $\angle A = \angle B$.

A.

B.

C.

D.

Answer:

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7. If $\cot\theta = \frac{7}{8}$, evaluate:

(i) $\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$

A.

B.

C.

D.

Answer: $\frac{49}{64}$

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8. If $\cot\theta = \frac{7}{8}$, evaluate:

(ii) $\cot^2\theta$

A.

B.

C.

D.

Answer: $\frac{49}{64}$

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9. If $3\cot A = 4$, check whether $\frac{1-\tan^2 A}{1+\tan^2 A} = \cos^2 A - \sin^2 A$ or not

A.

B.

C.

D.

Answer: Yes, $\frac{1-\tan^2 A}{1+\tan^2 A} = \cos^2 A - \sin^2 A.$

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10. In ΔABC right angled at B if $\tan A = \frac{1}{\sqrt{3}}$ then find the value of :

(i) $\sin A \cos C + \cos A \sin C$

(ii) $\cos A \cos C - \sin A \sin C$

A.

B.

C.

D.

Answer: 0

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11. In ΔPQR , right - angled at Q, $PR + QR = 25cm$ and $PQ = 5cm$.

Determine the values of $\sin P$, $\cos P$ and $\tan P$

A.

B.

C.

D.

Answer: $\frac{12}{5}$

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12. State whether the following are true or false. Justify your answer.

(i) The value of tan A is always less than 1.

A.

B.

C.

D.

Answer: False.

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13. State whether the following are true or false. Justify your answer.

(ii) $\sec A = \frac{12}{5}$ for some value of angle A

A.

B.

C.

D.

Answer: True.

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14. State whether the following are true or false. Justify your answer.

(iii) cos A is the abbreviation used for the cosecant of angle A.

A.

B.

C.

D.

Answer: False.

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15. State whether the following are true or false. Justify your answer.

(iv) cot A is the product of cot and A.

A.

B.

C.

D.

Answer: False.

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16. State whether the following are true or false. Justify your answer.

(v) $\sin\theta = \frac{4}{3}$ for some angle θ.

A.

B.

C.

D.

Answer: False.

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Exercise 11 2

1. $\sin 60^\circ \cos 30^\circ + \sin 30^\circ \cos 60^\circ = ?$

A.

B.

C.

D.

Answer: 1

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2. Evaluate the following:

(ii) $2\tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ$

A.

B.

C.

D.

Answer: 2

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3. $\dfrac{\cos 45^\circ}{\sec 30^\circ + \cos ec30^\circ} = ?$

A.

B.

C.

D.

Answer: $\frac{3\sqrt{2}-\sqrt{6}}{8}$.

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4. $\frac{\sin 30^\circ + \tan 45^\circ - \cos ec60^\circ}{\sec 30^\circ + \cos 60^\circ + \cot 45^\circ}$

A.

B.

C.

D.

Answer: $\frac{43-24\sqrt{3}}{11}$.

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5. Evaluate the following:

(v) $\dfrac{5\cos^2 60^\circ + 4\sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$

A.

B.

C.

D.

Answer: $\dfrac{67}{12}$

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6. $\dfrac{2\tan 30^\circ}{1 + \tan^2 30^\circ}$

A. $\sin 60^\circ$

B. $\cos 60^\circ$

C. $\tan 60^\circ$

D. $\sin 30^\circ$

Answer: A

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7. Choose the correct option and justify your choice.

(ii) $\frac{1-\tan^2 45^\circ}{1+\tan^2 45^\circ}$

A. $\tan 60^\circ$

B. 1

C. $\sin 45^\circ$

D. 0

Answer: D

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8. Choose the correct option and justify your choice.

(iii) $\sin 2A = 2\sin A$ is true when $A =$

A. 0°

B. 30°

C. 45°

D. 60°

Answer: A

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9. $\frac{2\tan 30^\circ}{1-\tan^2 30^\circ}$

A. $\cos 60^\circ$

B. $\sin 60^\circ$

C. $\tan 60^\circ$

D. $\sin 30^\circ$

Answer: C

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10. If $\tan(A+B)=\sqrt{3}$ and $\tan(A-B)=\frac{1}{\sqrt{3}}, 0^\circ < A+B \leq 90^\circ, A > B$, find A and B.

A.

B.

C.

D.

Answer: $A=45^\circ$ **and** $B=15^\circ$.

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11. State whether the following are true or false. Justify your answer.

(i) $\sin(A+B)=\sin A+\sin B$

A.

B.

C.

D.

Answer: False.

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12. State whether the following are true or false. Justify your answer.

(ii) The value of $\sin\theta$ increases as θ increases.

A.

B.

C.

D.

Answer: True.

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13. State whether the following are true or false. Justify your answer.

The value of $\cos\theta$ increases as θ increases.

A.

B.

C.

D.

Answer: False.

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14. State whether the following are true or false. Justify your answer.

(iv) $\sin\theta = \cos\theta$ for all values.

A.

B.

C.

D.

Answer: False.

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15. State whether the following are true or false. Justify your answer.

(v) $\cot A$ is not defined for $A = 0^\circ$.

A.

B.

C.

D.

Answer: True.

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Exercise 11 3

1. Evaluate:

(i) $\frac{\sin 18^\circ}{\cos 72^\circ}$

A.

B.

C.

D.

Answer: 1

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2. Evaluate:

(ii) $\frac{\tan 26^\circ}{\cot 64^\circ}$

A.

B.

C.

D.

Answer: 1

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3. Evaluate:

(iii) $\cos 48^\circ - \sin 42^\circ$

A.

B.

C.

D.

Answer: 0

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4. Evaluate:

(iv) $\cos ec31^\circ - \sec 59^\circ$

A.

B.

C.

D.

Answer: 0

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5. Show that :

$\tan 48^\circ \tan 23^\circ \tan 42^\circ \tan 67^\circ = 1$

A.

B.

C.

D.

Answer:

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6. Show that :

$\cos 38^\circ \cos 52^\circ - \sin 38^\circ \sin 52^\circ = 0$

A.

B.

C.

D.

Answer:

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7. If $\tan 2A = \cot(A - 18^\circ)$ where $2A$ is an acute angle, find the value of

A.

A.

B.

C.

D.

Answer: $A = 36^\circ$

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8. If $\tan A = \cot B$, prove that $A + B = 90^\circ$

A.

B.

C.

D.

Answer:

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9. If $\sec 4A = \cos ec(A - 20^\circ)$, where 4 A is an acute angle, find the value of A.

A.

B.

C.

D.

Answer: $A = 22^\circ$

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10. If A, B and C are interior angled of a triangle ABC, then show that $\sin\left(\frac{B+C}{2}\right) = \cos\frac{A}{2}$

A.

B.

C.

D.

Answer:

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11. Express $\sin 67^\circ + \cos 75^\circ$ in terms of trigonometric ratios of angles between 0° and 45°

A.

B.

C.

D.

Answer: $\cos 23^\circ + \sin 15^\circ$.

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Exercise 11 4

1. Express the trigonometric ratios sin A, sec A, and tan A in terms of cot A.

A.

A.

B.

C.

D.

Answer: (a) $\sin A = \frac{1}{\sqrt{1 + \cot^2 A}}$.

(b) $\sec A = \frac{\sqrt{1 + \cot^2 A}}{\cot A}$.

(c) $\tan A = \frac{1}{\cot A}$.

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2. Write all the other trigonometric ratios of $\angle A$ in terms of $\sec A$.

A.

B.

C.

D.

Answer: $\sqrt{1+\frac{1}{\sec^2 A-1}}$

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3. $\frac{\sin^2 63^\circ+\sin^2 27^\circ}{\cos^2 17^\circ+\cos^2 73^\circ}=?$

A.

B.

C.

D.

Answer: 1

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4. $\sin 25^\circ \cos 65^\circ + \cos 25^\circ \sin 65^\circ = ?$

A.

B.

C.

D.

Answer: 1

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5. $9\sec^2 A - 9\tan^2 A = ?$

A. 1

B. 9

C. 8

D. 0

Answer: B

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6. $(1+\tan\theta+\sec\theta)(1+\cot\theta-\cos ec\theta)=$

A. 0

B. 1

C. 2

D. -1

Answer: C

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7. $(\sec A + \tan A)(1 - \sin A) = ?$

A. $\sec A$

B. $\sin A$

C. $\cos ecA$

D. $\cos A$

Answer: D

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8. Choose the correct option. Justify your choice.

(iv) $\frac{1 + \tan^2 A}{1 + \cot^2 A}$

A. $\sec^2 A$

B. -1

C. $\cot^2 A$

D. $\tan^2 A$

Answer: D

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9. Prove the following identities, $0^\circ \leq \theta \leq 90^\circ$.

(i) $(\cos ec0 - \cot \theta)^2 = \dfrac{1 - \cos \theta}{1 + \cos \theta}$

A.

B.

C.

D.

Answer:

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10. Prove the following identities, $0^\circ \leq \theta \leq 90^\circ$.

(ii) $\dfrac{\cos A}{1 + \sin A} + \dfrac{1 + \sin A}{\cos A} = 2 \sec A$

A.

B.

C.

D.

Answer:

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11. Prove that: $\frac{\tan\theta}{1-\cot\theta}+\frac{\cot\theta}{1-\tan\theta}=1+\sec\theta\cos ec\theta$

A.

B.

C.

D.

Answer:

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12. $\frac{1+\sec A}{\sec A} = \frac{\sin^2 A}{1-\cos A}$.

A.

B.

C.

D.

Answer:

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13. Prove the following identities, $0^\circ \leq \theta \leq 90^\circ$.

(v) $\frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \cos ecA + \cot A$

A.

B.

C.

D.

Answer:

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14. Prove: $\sqrt{\frac{1+\sin A}{1-\sin A}} = \sec A + \tan A$

A.

B.

C.

D.

Answer:

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15. Prove that

$$\frac{\sin\theta}{1-\cos\theta} = \cos ec\theta + \cot\theta$$

OR

Prove that $\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$

A.

B.

C.

D.

Answer:

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16. Prove that

$$(\sin A + \cos ecA)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$$

A.

B.

C.

D.

Answer:

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17. $(\cos ecA - \sin A)(\sec A - \cos A) = \dfrac{1}{\tan A + \cot A}$

A.

B.

C.

D.

Answer:

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18. Prove the following identities, $0^\circ \leq \theta \leq 90^\circ$.

(x) $\dfrac{1+\tan^2 A}{1+\cot^2 A} = \left(\dfrac{1-\tan A}{1-\cot A}\right)^2 = \tan^2 A$

A.

B.

C.

D.

Answer:

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Zen Additional Questions Multiple Choice Questions

1. $\dfrac{\tan 30^\circ}{\cot 60^\circ} =$ _____

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

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

C. $\sqrt{3}$

D. 1

Answer: A::D

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2. $\sin 40^\circ - \cos 50^\circ =$ _____

A. $\sin 10^\circ$

B. $\cos 10^\circ$

C. 1

D. 0

Answer: D

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3. If A and B are acute angles such that $\sin A = \cos B$, then $A + B =$

_____

A. 45°

B. 60°

C. 90°

D. 180°

Answer: C

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4. If A and B are complementary angles

A. $\sin A = \sin B$

B. $\cos A = \cos B$

C. $\tan A = \tan B$

D. $\sec A = \cos ecB$

Answer: A::C::D

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5. If $\tan\theta = \frac{3}{4}$, $\cos^2\theta - \sin^2\theta =$ _____

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

B. 1

C. $\frac{-7}{25}$

D. $\frac{4}{25}$

Answer: A::B

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6. If $\cos(\alpha+\beta) = 0$, then $\sin(\alpha-\beta) =$ _____

A. $\cos\beta$

B. $\cos 2\beta$

C. $\sin \alpha$

D. $\sin 2\alpha$

Answer: A::B::C

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7. $\sin\theta\cos(90^\circ - \theta) + \cos\theta\sin(90^\circ - 0) =$ _____

A. 0

B. 1

C. 2

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

Answer: A::B

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8. If $\sin\theta + \cos\theta = a$ and $\sin^3\theta + \cos^3\theta = b$, $(3a - 2b) =$

A. a^3

B. b^3

C. 0

D. 1

Answer: A::C

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9. $\sqrt{\dfrac{1+\sin A}{1-\sin A}} =$ ----------

A. $\sec A + \tan A$

B. $\sec A - \tan A$

C. $\sec A \tan A$

D. $\dfrac{\sec A}{\tan A}$

Answer: A::C

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10. $\frac{\sin\theta}{1+\cos\theta}+\frac{\sin\theta}{1-\cos\theta}=$ -------

A. $2\sin\theta$

B. $2\cos\theta$

C. $2\sec q$

D. $2\cos ec\theta$

Answer: A::B::C::D

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11. $\cos 48^\circ - \sin 42^\circ$ = ...

A. 0

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

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

D. 1

Answer: A

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12. The value of $\sin 30^\circ + \cos 60^\circ$ is

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

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

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

D. 1

Answer: A::D

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13. if 13 $\sin\theta$ = 12, then the value of $\cos ec\theta$ is

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

B. $\frac{13}{5}$

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

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

Answer: A::B::C::D

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Zen Additional Questions Very Short Answer Vsa Questions

1. If $(1+\cos)(1-\cos A)=\frac{3}{4}$, find the value of sec A.

A.

B.

C.

D.

Answer: $\pm 2 = \sec A$.

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2. If $\cos ec\theta + \cot\theta = x$, find the value of $\cos ec\theta - \cot\theta$.

A.

B.

C.

D.

Answer: $\frac{1}{x}$

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3. If $3x = \cos ec\theta$ and $\frac{3}{x} = \cot\theta$, find the value of $3\left(x^2 - \frac{1}{x^2}\right)$.

A.

B.

C.

D.

Answer: $\frac{1}{3}$

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4. If $\sin\theta = \frac{1}{3}$, then find the value of $\left(2\cot^2\theta + 2\right)$

A.

B.

C.

D.

Answer: 18

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5. If $\sec^2\theta(1+\sin\theta)(1-\sin\theta) = k$, find the value of k.

A.

B.

C.

D.

Answer: $1 = k$

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6. If $\sec A = \frac{15}{7}$ and $A + B = 90^\circ$, find the value of cosec B.

A.

B.

C.

D.

Answer: $\cos ecB = \frac{15}{7}$

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7. Find the value of $\left(\cos ec^2\theta - 1\right)\tan^2\theta$.

A.

B.

C.

D.

Answer: 1

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8. Evaluate $3\cot^2 60^\circ + \sec^2 45^\circ$.

A.

B.

C.

D.

Answer: $\frac{3}{3} + \frac{1}{\frac{1}{2}}$

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9. Find $x : \sin 2x = \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$.

A.

B.

C.

D.

Answer: $x = 15^\circ$

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10. Evaluate: $\sin\theta \sec(90^\circ - \theta)$.

A.

B.

C.

D.

Answer: 3

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11. Find the value of $\sin 38^\circ - \cos 52^\circ$.

A.

B.

C.

D.

Answer: 0

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12. Evaluate: $\sec 50^\circ \sin 40^\circ + \cos 40^\circ \cos ec 50^\circ$.

A.

B.

C.

D.

Answer: 2

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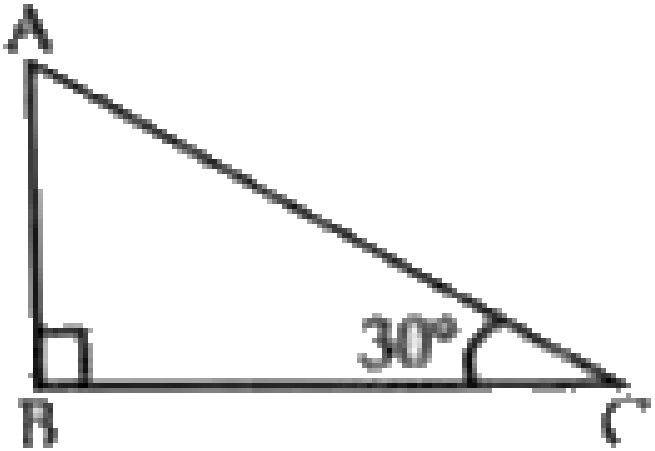
13. In a ΔABC, $\lfloor ABC = 90^\circ$ and $\lfloor ACB = 30^\circ$, then find $AB : AC$



A.

B.

C.

D.

Answer: $1 : 2$

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14. Find the value of tan 45°+ cot 45°

A.

B.

C.

D.

Answer: 2

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Zen Additional Questions Short Answer Sa Type 1 Questions

1. Write the values of $\sec 0^\circ$, $\sec 30^\circ$, $\sec 45^\circ$, $\sec 60^\circ$ and $\sec 90^\circ$. What happens to $\sec x$ when x increases from 0° to 90° ?

A.

B.

C.

D.

Answer: The value of $\sec x$ increases and reaches a not-defined value as x increases from 0° to 90°.

Watch Video Solution

2. Prove that: $\frac{\sin^3\theta + \cos^3\theta}{\sin\theta + \cos\theta} = 1 - \sin\theta\cos\theta$

A.

B.

C.

D.

Answer:

Watch Video Solution

3. Solve the equation for θ:

$$\frac{\cos^2\theta}{\cot^2\theta - \cos^2\theta} = 3.$$

A.

B.

C.

D.

Answer: $\therefore \theta = 120^\circ \quad \therefore \theta = 300^\circ$

Watch Video Solution

4. If $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$, show that $\cos\theta - \sin\theta = \sqrt{2}\sin\theta$.

A.

B.

C.

D.

Answer:

Watch Video Solution

5. If $\sqrt{3}\sin\theta - \cos\theta = 0$ and $0^\circ < \theta < 90^\circ$, find the value of θ.

A.

B.

C.

D.

Answer: $\theta = 30^\circ$

Watch Video Solution

6. If $\sin A = \frac{\sqrt{3}}{2}$ find the value of $2\cot^2 A - 1$.

A.

B.

C.

D.

Answer: $\frac{-1}{3}$.

Watch Video Solution

7. Simplify: $\frac{\sin^3\theta + \cos^3\theta}{\sin\theta + \cos\theta} + \sin\theta\cos\theta$

A.

B.

C.

D.

Answer: 1

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8. Prove that $\cos ec^2\theta + \sec^2\theta = \cos ec^2\theta\sec^2\theta$.

A.

B.

C.

D.

Answer:

Watch Video Solution

9. Prove that $\frac{\cos A}{1-\tan A}+\frac{\sin A}{1-\cot A}=\cos+\sin A.$

A.

B.

C.

D.

Answer:

Watch Video Solution

10. Prove that:

$(1 - \sin\theta + \cos\theta)^2 = 2(1 + \cos\theta)(1 - \sin\theta).$

A.

B.

C.

D.

Answer:

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11. If $\sin\theta = \frac{12}{13}$, find the values of $\cos\theta$ and $\tan\theta$.

OR

If $\cos ec\theta = \frac{13}{12}$, then find the value of $\cos\theta$.

A.

B.

C.

D.

Answer: $\frac{12}{5}$

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12. If $\sqrt{3}\tan\theta = 1$ and θ is acute, find the value of $\sin 3\theta + \cos 2\theta$.

A.

B.

C.

D.

Answer: $\frac{3}{2}$

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Zen Additional Questions Short Answer Sa Type 2 Questions

1. Prove that:

$$\frac{1}{\sec A - \tan A} - \frac{1}{\cos A} = \frac{1}{\cos A} - \frac{1}{\sec A + \tan A}$$

A.

B.

C.

D.

Answer:

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2. If $7\sin^2 A + 3\cos^2 A = 4$, show that $\tan A = \frac{1}{\sqrt{3}}$.

A.

B.

C.

D.

Answer:

Watch Video Solution

3. For any acute angle θ, prove that:

(i) $\sin^2\theta + \cos^2\theta = 1$

A.

B.

C.

D.

Answer:

Watch Video Solution

4. For any acute angle θ, prove that:

(ii) $1 + \cot^2\theta = \operatorname{cosec}^2\theta$

A.

B.

C.

D.

Answer:

Watch Video Solution

5. If $\sin A = \cos A$, find the value of $2\tan^2 A + \sin^2 A + 1$.

A.

B.

C.

D.

Answer: $\frac{7}{2}$

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6. If $\tan\theta + \cot\theta = 2$, find the value of $\sqrt{\tan^2\theta + \cot^2\theta}$.

A.

B.

C.

D.

Answer: $\sqrt{2}$

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7. If $\tan(A - B) = \frac{1}{\sqrt{3}}$ and $\tan(A + B) = \sqrt{3}$, find A and B.

A.

B.

C.

D.

Answer: $A = 45^\circ$ **and** $B = 15^\circ$

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8. If $x = r\cos\theta\sin\phi, y = r\sin\theta\sin\phi,$ and $z = r\cos\phi,$ prove that $x^2 + y^2 + z^2 = r^2.$

A.

B.

C.

D.

Answer:

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9. Prove that $\frac{\cot A - \cos A}{\cot A + \cos A} = \frac{\cos ecA - 1}{\cos ecA + 1}$.

A.

B.

C.

D.

Answer:

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10. If $\sin A = \cos A$, find the value of $2\tan^2 A + \sin^2 A - 1$.

A.

B.

C.

D.

Answer: $\frac{3}{2}$

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11. Prove that: $\sin\theta(1+\tan\theta)+\cos\theta(1+\cot\theta)=\sec\theta+\cos ec\theta.$

A.

B.

C.

D.

Answer:

Watch Video Solution

12. Prove that $\frac{\cos^2\theta}{1-\tan\theta}+\frac{\sin^3\theta}{\sin\theta-\cos\theta}=1+\sin\theta\cos\theta.$

A.

B.

C.

D.

Answer:

Watch Video Solution

13. Evaluate: $\frac{\sec^2(90^\circ - \theta) - \cot^2\theta}{2\left(\sin^2 25^\circ + \sin^2 65^\circ\right)} + \frac{2\sin^2 30^\circ \tan^2 32^\circ \tan^2 58^\circ}{3\left(\sec^2 33^\circ - \cot^2 57^\circ\right)}$.

A.

B.

C.

D.

Answer: $\frac{2}{3}$

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Zen Additional Questions Long Answer La Type Questions

1. If $\sin(A+B)=1$ and $\tan(A-B)=\frac{1}{\sqrt{3}}$, find the value of:

(i) $\tan A+\cot B$

(ii) $\sec A-\operatorname{cosec} B$

A.

B.

C.

D.

Answer: 0

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2. If $\operatorname{cosec}\theta+\cot\theta=q$, show that $\operatorname{cosec}\theta-\cot\theta=\frac{1}{q}$ and hence find the values of $\sin\theta$ and $\sec\theta$.

A.

B.

C.

D.

Answer: $\sec\theta = \frac{q^2 +}{q^2 - 1}.$

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3. Prove that :

$$\frac{1}{\cos ecA - \cot A} - \frac{1}{\sin A} = \frac{1}{\sin A} - \frac{1}{\cos ecA + \cot A}$$

A.

B.

C.

D.

Answer:

Watch Video Solution

4. If $\sec\theta + \tan\theta = p$, find the value of $\cos ec\theta$.

A.

B.

C.

D.

Answer: $\cos ec\theta = \frac{p^2+1}{p^2-1}$.

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5. ΔPQR is a right-angled triangle. If $PQ = 5$ cm and $RQ = 10cm$, then find:

(i) $\sin^2 P$

(ii) $\cos^2 R$ and $\tan R$

(iii) $\sin P.\cos P$

(iv) $\sin^2 P - \cos^2 P$

A.

B.

C.

D.

Answer: $\frac{3}{5}$

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6. Prove that:

$$\frac{\sin A + \cos A}{\sin A - \cos A} + \frac{\sin A - \cos A}{\sin A + \cos A} = \frac{2}{\sin^2 A - \cos^2 A} = \frac{2}{2\sin^2 A - 1} = \frac{}{1 -}$$

.

A.

B.

C.

D.

Answer:

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7. If a $\sec\theta + btan\theta + c = 0andp\sec\theta + q\tan\theta + r = 0,$ prove that $(br - qc)^2 - (pc - ar)^2 = (aq0bp)^2$

A.

B.

C.

D.

Answer:

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8. Prove that: $\frac{\tan\theta}{1-\cot\theta}+\frac{\cot\theta}{1-\tan\theta}=1+\sec\theta\cos ec\theta$

A.

B.

C.

D.

Answer:

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9. If $\cos ec\theta-\sin\theta=m$ and $\sec\theta-\cos\theta=n$, prove that: $\left(m^2n\right)^{\frac{2}{3}}+\left(n^2m\right)^{\frac{2}{3}}=1.$

A.

B.

C.

D.

Answer: 1

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10. In triangle ABC, angle $B = 90^\circ$, $BC = 5cm$,

$AC - AB = 1cm.$

Evaluate: $\frac{1 + \sin C}{\cos C}$.

A.

B.

C.

D.

Answer: Therefore, the value of $\frac{1 + \sin C}{\cos C}$ is 5.

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11. If $a\sin^3\theta + b\cos^3\theta = \sin^3\theta \cdot \cos\theta$ and $a\sin\theta - b\cos\theta = 0$, then prove that $a^2 + b^2 = 1$.

A.

B.

C.

D.

Answer: $a^2 + b^2 = 1$

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12. If $\sin A + \sin^2 A + \sin^3 A = 1$, then , prove that $\cos^6 A - 4\cos^4 A + 8\cos^2 A = 4$.

A.

B.

C.

D.

Answer:

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Zen Additional Questions Hots Higher Order Thinking Skills Questions

1. If $\sec A = x + \frac{1}{4x}$, prove that $\sec A + \tan A = 2x$ or $\frac{1}{2x}$

A.

B.

C.

D.

Answer:

Watch Video Solution

2. Prove that

$$\frac{\tan^3\theta}{1+\tan^2\theta}+\frac{\cot^3\theta}{1+\cot^2\theta}=\sec\theta\cos ec\theta-2\sin\theta\cos\theta$$

A.

B.

C.

D.

Answer:

Watch Video Solution

3. If $A+B=90^\circ$, prove that

$$\sqrt{\frac{\tan A\tan B+\tan A\cot B}{\sin A\sec B}-\frac{\sin^2 B}{\cos^2 A}}=\tan A.$$

A.

B.

C.

D.

Answer:

Watch Video Solution

4. If $\sec\theta - \tan\theta = x$, show that

$\sec\theta = \frac{1}{2}\left(x + \frac{1}{x}\right)$ and $\tan\theta = \frac{1}{2}\left(\frac{1}{x} - x\right)$.

A.

B.

C.

D.

Answer:

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5. If $\cos ecA + \cot A = m$, show that $\frac{m^2 - 1}{m^2 + 1} = \cos A$.

A.

B.

C.

D.

Answer:

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Zen Additional Questions Hots Higher Order Thinking Skills Questions Iit Olympiad Imo

1. $\sin(50^\circ + \theta) - \cos(40^\circ - \theta) =$ _____

A. 1

B. -1

C. 2

D. 0

Answer: D

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2. $\sqrt{\sec^2\theta + \cos ec^2\theta} =$ _____

A. $\tan\theta + \cot\theta$

B. $\frac{\sec^2\theta}{\cos ec^2\theta}$

C. $\sec\theta \cos ec\theta$

D. $\sec\theta - \tan\theta$

Answer: A

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3. If $3\cot\theta = 5$, $\dfrac{5\sin\theta - 3\cos\theta}{5\sin\theta + 3\cos\theta} =$ _____

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

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

C. 0

D. $\dfrac{4}{5}$

Answer: C

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4. What is $\sin^2 20^\circ + \sin^2 70^\circ$ equal to ?

A. 1

B. -1

C. 0

D. 2

Answer: A

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5. $\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} =$ -------

A. $\frac{\sin^2\theta}{\cos\theta}$

B. $\tan\theta$

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

D. $\cot\theta)$

Answer: B

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6. $\frac{1}{1+\sin\theta} + \frac{1}{1-\sin\theta} =$ --------

A. $2\sec^2\theta$

B. $2\cos^2\theta$

C. 0

D. 1

Answer: A

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7. If $\sin\theta - \cos\theta = \frac{3}{5}$, $\sin\theta\cos\theta =$ _____

A. $\frac{16}{25}$

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

C. $\frac{9}{25}$

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

Answer: D

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8. $\frac{\sin\theta+\cos\theta}{\sin\theta-\cos\theta}+\frac{\sin\theta-\cos\theta}{\sin\theta+\cos\theta}=$ --------

A. $\frac{2}{1-2\cos^2\theta}$

B. $\frac{2}{2\sin^2\theta-1}$

C. Both A and B

D. None of these

Answer: C

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9. The value of $\frac{\cos^4 x+\cos^2 x\sin^2 x+\sin^2 x}{\cos^2 x+\sin^2 x\cos^2 x+\sin^4 x}$ is ----------

A. 2

B. 1

C. 3

D. 0

Answer: B

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10. If $\sin\theta + \cos\theta = \sqrt{3}, \tan\theta + \cot\theta = ?$

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

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

C. 1

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

Answer: C

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