MIND CURVE · INFINITY THINK BEYOND

Introduction to Trigonometry

Chapter 8 · Previous Year Questions with Answers · Class X Mathematics Basic (241)

01 TOPIC 1 Trigonometric Ratios & Values of Specific Angles

QUICK RECAP

- In right $\triangle ABC$ right-angled at B: $\sin A = \frac{BC}{AC}$, $\cos A = \frac{AB}{AC}$, $\tan A = \frac{BC}{AB}$; $\operatorname{cosec} A = \frac{1}{\sin A}$, $\sec A = \frac{1}{\cos A}$, $\cot A = \frac{1}{\tan A}$, and $\tan A = \frac{\sin A}{\cos A}$.
- Values: $\sin 0^\circ, 30^\circ, 45^\circ, 60^\circ, 90^\circ = 0, \frac{1}{2}, \frac{1}{\sqrt{2}}, \frac{\sqrt{3}}{2}, 1$; cos takes them in reverse order; $\tan = 0, \frac{1}{\sqrt{3}}, 1, \sqrt{3}$, not defined at 90°.
- For an acute angle, $0 < \sin A, \cos A < 1$; given one ratio, draw a right triangle (or use Pythagoras) to find the others.
- Recall (Class IX/Ch 6): Pythagoras theorem $AC^2 = AB^2 + BC^2$; angles of a triangle add up to 180°.

Q1 MCQ · 1 mark — **2023** – 430/C/1, 430/C/3

If $\operatorname{cosec} A = \frac{7}{5}$, then value of $\tan A \cdot \cos A$ is :

(A) $\frac{7}{5}$ (B) $\frac{2\sqrt{6}}{5}$

(C) $\frac{24}{49}$ (D) $\frac{5}{7}$

ANSWER (D) $\frac{5}{7}$

Q2 MCQ · 1 mark — **2023** – 430/C/2

If $\cos A = \frac{5}{8}$, then value of $\cot A \cdot \sin A$ is :

(A) $\frac{5}{\sqrt{39}}$ (B) $\frac{5}{8}$

(C) $\frac{8}{\sqrt{39}}$ (D) $\frac{8}{5}$

ANSWER (B) $\frac{5}{8}$

Q3 MCQ · 1 mark — **2023** – 430/C/B

If $\cos A = \frac{\sqrt{3}}{2}$, then the value of $\cot A$ is :

(A) $\sqrt{3}$ (B) $\frac{1}{\sqrt{3}}$

(C) $\frac{1}{2}$ (D) 1

ANSWER (A) $\sqrt{3}$

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Q4 MCQ · 1 mark — **2023** – 430(B)

If $\tan\theta = \frac{3}{4}$, then the value of $\cos\theta$ is :

(A) $\frac{3}{5}$ (B) $\frac{4}{5}$
(C) $\frac{3}{7}$ (D) $\frac{4}{7}$

ANSWER *

Hypotenuse $= \sqrt{3^2+4^2} = 5$; $\cos\theta = \frac{4}{5}$

(B) $\frac{4}{5}$

Q5 MCQ · 1 mark — **2023** – 430(B)

If $2\sin A = \text{cosec}\, A$, then $\angle A$ is equal to :

(A) 30° (B) 60°
(C) 45° (D) 90°

ANSWER *

$2\sin^2 A = 1 \Rightarrow \sin A = \frac{1}{\sqrt{2}} \Rightarrow A = 45^\circ$

(C) 45°

Q6 MCQ · 1 mark — **2023** – 430/1/1, 430/1/2

If $2\cos\theta = 1$, then the value of θ is

(A) 45° (B) 60°
(C) 30° (D) 90°

ANSWER *

$\cos\theta = \frac{1}{2} \Rightarrow \theta = 60^\circ$

(B) 60°

Q7 MCQ · 1 mark — **2023** – 430/2/1, 430/2/2

The value of $2\sin^2 30^\circ + 3\tan^2 60^\circ - \cos^2 45^\circ$ is :

(A) $3\sqrt{3}$ (B) $\frac{19}{2}$
(C) $\frac{9}{4}$ (D) 9

ANSWER *

$= 2\times\frac{1}{4} + 3\times 3 - \frac{1}{2} = 9$

(D) 9

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Q8 MCQ · 1 mark **2023** – 430/2/3

The value of $\frac{\sin 90^\circ + \cos 60^\circ}{\sec 45^\circ + \tan 45^\circ}$ is :

(A) 1
(B) $\frac{3}{2}(\sqrt{2}+1)$
(C) $\frac{3}{2}(\sqrt{2}-1)$
(D) $\frac{1+\sqrt{3}}{\sqrt{2}+1}$

ANSWER *

$= \frac{1+\frac{1}{2}}{\sqrt{2}+1} = \frac{3/2}{\sqrt{2}+1} \times \frac{\sqrt{2}-1}{\sqrt{2}-1} = \frac{3}{2}(\sqrt{2}-1)$

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

Q9 MCQ · 1 mark **2023** – 430/4/1

The value of $5\sin^2 90^\circ - 2\cos^2 0^\circ$ is :

(A) -2
(B) 5
(C) 3
(D) -3

ANSWER *

$5(1) - 2(1) = 3$

(C) 3

Q10 MCQ · 1 mark **2023** – 430/4/2

$\left(\frac{2}{3}\sin 0^\circ - \frac{4}{5}\cos 0^\circ\right)$ is equal to :

(A) $\frac{2}{3}$
(B) $-\frac{4}{5}$
(C) 0
(D) $-\frac{2}{15}$

ANSWER *

$= 0 - \frac{4}{5}$

(B) $-\frac{4}{5}$

Q11 MCQ · 1 mark **2023** – 430/4/3

$(3\sin^2 30^\circ - 4\cos^2 60^\circ)$ is equal to :

(A) $\frac{5}{4}$
(B) $-\frac{3}{4}$
(C) $-\frac{1}{4}$
(D) $-\frac{9}{4}$

ANSWER *

$= \frac{3}{4} - 1 = -\frac{1}{4}$

(C) $-\frac{1}{4}$

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Q12 MCQ · 1 mark — **2023** – 430/5/1, 430/5/2, 430/5/3

If $\sin\theta = \frac{a}{b}$, then $\sec\theta$ is equal to $(0 \le \theta < 90^\circ)$:

(A) $\frac{a}{\sqrt{b^2-a^2}}$
(B) $\frac{b}{\sqrt{b^2-a^2}}$
(C) $\frac{\sqrt{b^2-a^2}}{b}$
(D) $\frac{\sqrt{b^2-a^2}}{a}$

ANSWER *

$\cos\theta = \frac{\sqrt{b^2-a^2}}{b} \Rightarrow \sec\theta = \frac{b}{\sqrt{b^2-a^2}}$

(B) $\frac{b}{\sqrt{b^2-a^2}}$

Q13 MCQ · 1 mark — **2023** – 430/6/1, 430/6/2

In $\triangle ABC$, right angled at C, if $\tan A = \frac{8}{7}$, then the value of $\cot B$ is

(A) $\frac{7}{8}$
(B) $\frac{8}{7}$
(C) $\frac{7}{\sqrt{113}}$
(D) $\frac{8}{\sqrt{113}}$

ANSWER *

$\cot B = \frac{BC}{AC} = \tan A = \frac{8}{7}$

(B) $\frac{8}{7}$

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Q14 MCQ · 1 mark — **2024** – 430/S/3

If $\sin\theta = (\sqrt{2}-1)\cos\theta$, then :

(A) $\tan\theta = \sqrt{2}+1$
(B) $\cot\theta = \sqrt{2}+1$
(C) $\cot\theta = \sqrt{2}-1$
(D) $\tan\theta = \sqrt{2}$

ANSWER **(B)** $\cot\theta = \sqrt{2}+1$

Q15 MCQ · 1 mark — **2024** – 430(B)/S

The maximum value of $\frac{1}{\text{cosec}\,\theta}$, $(0 \le \theta \le 90^\circ)$ is :

(A) $\frac{\sqrt{3}}{2}$
(B) 1
(C) $\frac{1}{\sqrt{2}}$
(D) $\sqrt{2}$

ANSWER **(B) 1**

Q16 MCQ · 1 mark — **2024** – 430(B)/S

If $\text{cosec}\,B = \frac{2}{\sqrt{3}}$ and $A + B = 90^\circ$, then the value of $\sec A$ is :

(A) $\frac{2}{\sqrt{3}}$
(B) $\sqrt{2}$

(C) $\frac{\sqrt{3}}{2}$
(D) 2

ANSWER (A) $\frac{2}{\sqrt{3}}$

Q17 MCQ · 1 mark — 2024 – 430(B)

If $\cos\theta = \frac{p}{q}$, then $\sin\theta$ is equal to :

(A) $\frac{q}{\sqrt{q^2-p^2}}$
(B) $\frac{q}{p}$
(C) $\frac{\sqrt{q^2-p^2}}{q}$
(D) $\frac{p}{\sqrt{q^2-p^2}}$

ANSWER *

$\sin\theta = \sqrt{1-\frac{p^2}{q^2}} = \frac{\sqrt{q^2-p^2}}{q}$

(C) $\frac{\sqrt{q^2-p^2}}{q}$

Q18 MCQ · 1 mark — 2024 – 430(B)

The value of $\cos 60^\circ - \operatorname{cosec} 30^\circ + \tan 45^\circ$ is :

(A) 1
(B) $-\frac{1}{2}$
(C) $\frac{1}{2}$
(D) -1

ANSWER *

$\frac{1}{2} - 2 + 1 = -\frac{1}{2}$

(B) $-\frac{1}{2}$

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Q19 MCQ · 1 mark — 2024 – 430/1/1, 430/1/2, 430/1/3

If $\sin\theta = \frac{1}{3}$, then $\sec\theta$ is equal to :

(A) $\frac{2\sqrt{2}}{3}$
(B) $\frac{3}{2\sqrt{2}}$
(C) 3
(D) $\frac{1}{\sqrt{3}}$

ANSWER *

$\cos\theta = \frac{2\sqrt{2}}{3} \Rightarrow \sec\theta = \frac{3}{2\sqrt{2}}$

(B) $\frac{3}{2\sqrt{2}}$

Q20 MCQ · 1 mark — 2024 – 430/2/1, 430/2/2

If $\sin A = \frac{3}{5}$, then value of $\cot A$ is :

(A) $\frac{3}{4}$
(B) $\frac{4}{3}$

(C) $\frac{4}{5}$
(D) $\frac{5}{4}$

ANSWER *

$\cos A = \frac{4}{5} \Rightarrow \cot A = \frac{4}{3}$

(B) $\frac{4}{3}$

Q21 MCQ · 1 mark **2024** – 430/2/1, 430/2/3

$\frac{2\tan 30^\circ}{1-\tan^2 30^\circ}$ is equal to

(A) $\cos 60^\circ$
(B) $\sin 60^\circ$
(C) $\tan 60^\circ$
(D) $\sin 30^\circ$

ANSWER *

$= \frac{2/\sqrt{3}}{2/3} = \sqrt{3} = \tan 60^\circ$

(C) $\tan 60^\circ$

Q22 MCQ · 1 mark **2024** – 430/2/2

If $\sin^2\theta = \frac{3}{4}$, then θ is

(A) 30°
(B) 45°
(C) 60°
(D) 90°

ANSWER *

$\sin\theta = \frac{\sqrt{3}}{2} \Rightarrow \theta = 60^\circ$

(C) 60°

Q23 MCQ · 1 mark **2024** – 430/2/3

If $5\cos A - 4 = 0$, then the value of $\tan A$ is

(A) $\frac{3}{4}$
(B) $\frac{4}{3}$
(C) $\frac{3}{5}$
(D) $\frac{4}{5}$

ANSWER *

$\cos A = \frac{4}{5} \Rightarrow \sin A = \frac{3}{5} \Rightarrow \tan A = \frac{3}{4}$

(A) $\frac{3}{4}$

Q24 MCQ · 1 mark **2024** – 430/3/1, 430/3/2, 430/3/3

In a right-angled triangle ABC, $\angle A = 90^\circ$ and AB = AC. The value of $\sin C$ is :

(A) 0
(B) $\frac{\sqrt{3}}{2}$
(C) $\frac{1}{2}$
(D) $\frac{1}{\sqrt{2}}$

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ANSWER *

$AB = AC \Rightarrow \angle B = \angle C = 45^\circ; \sin 45^\circ = \frac{1}{\sqrt{2}}$

(D) $\frac{1}{\sqrt{2}}$

Q25 MCQ · 1 mark — **2024** – 430/3/1

If $\cos A = \frac{1}{2}$, then $\tan A$ is equal to

(A) $\frac{1}{\sqrt{3}}$
(B) $\sqrt{3}$
(C) 3
(D) $\frac{3}{2}$

ANSWER *

$A = 60^\circ \Rightarrow \tan A = \sqrt{3}$

(B) $\sqrt{3}$

Q26 MCQ · 1 mark — **2024** – 430/3/3

If $\cos \theta = \frac{1}{\sqrt{2}}$ then $\tan \theta$ is equal to

(A) $\frac{1}{\sqrt{2}}$
(B) 0
(C) 1
(D) $\sqrt{2} + 1$

ANSWER *

$\theta = 45^\circ \Rightarrow \tan \theta = 1$

(C) 1

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Q27 MCQ · 1 mark — **2024** – 430/4/3

If $5 \tan A = 3$, then the value of $\cot A$ is :

(A) $\frac{3}{5}$
(B) $\frac{5}{3}$
(C) $\frac{3}{4}$
(D) $\frac{4}{5}$

ANSWER *

$\tan A = \frac{3}{5} \Rightarrow \cot A = \frac{5}{3}$

(B) $\frac{5}{3}$

Q28 MCQ · 1 mark — **2024** – 430/5/1, 430/5/3

If $\tan^2 \theta = 3$, where θ is an acute angle, then the value of θ is :

(A) 30°
(B) 60°
(C) 0°
(D) 45°

ANSWER *

$\tan\theta = \sqrt{3} \Rightarrow \theta = 60^\circ$

(B) 60°

Q29 MCQ · 1 mark **2025** – 430/1/1, 430/1/2, 430/1/3

Which of the following statements is ***false*** ?

(A) $\tan 45^\circ = \cot 45^\circ$
(B) $\sin 90^\circ = \tan 45^\circ$
(C) $\sin 30^\circ = \cos 30^\circ$
(D) $\sin 45^\circ = \cos 45^\circ$

ANSWER *

$\sin 30^\circ = \frac{1}{2} \neq \frac{\sqrt{3}}{2} = \cos 30^\circ$

(C) $\sin 30^\circ = \cos 30^\circ$

Q30 MCQ · 1 mark **2025** – 430/2/1, 430/2/2, 430/2/3

The value of $\frac{2\tan 60^\circ}{1-\tan^2 60^\circ}$ is :

(A) -3
(B) $\sqrt{3}$
(C) $-\frac{1}{\sqrt{3}}$
(D) $-\sqrt{3}$

ANSWER *

$= \frac{2\sqrt{3}}{1-3} = -\sqrt{3}$

(D) $-\sqrt{3}$

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Q31 MCQ · 1 mark **2025** – 430/3/1

The value of $\frac{\sec^2 30^\circ + \tan^2 30^\circ}{\sin^2 45^\circ + \cos^2 45^\circ}$ is :

(A) 1
(B) $\frac{5}{3}$
(C) $\frac{13}{3}$
(D) 7

ANSWER *

$= \frac{\frac{4}{3}+\frac{1}{3}}{1} = \frac{5}{3}$

(B) $\frac{5}{3}$

Q32 MCQ · 1 mark **2025** – 430/3/3

The value of θ for which $\sin 2\theta = \tan 45^\circ$ is :

(A) 22.5°
(B) 30°
(C) 45°
(D) 90°

ANSWER *

$\sin 2\theta = 1 \Rightarrow 2\theta = 90^\circ \Rightarrow \theta = 45^\circ$

(C) 45°

Q33 MCQ · 1 mark — **2025** – 430/4/1, 430/4/2, 430/4/3

If $\sqrt{2}\sin\theta = 1$, then $\cot\theta \times \operatorname{cosec}\theta$ is equal to :

(A) $\frac{1}{\sqrt{2}}$
(B) $\frac{1}{2\sqrt{2}}$
(C) $\sqrt{2}$
(D) $\frac{1}{2}$

ANSWER *

$\sin\theta = \frac{1}{\sqrt{2}} \Rightarrow \theta = 45^\circ$; $\cot 45^\circ \times \operatorname{cosec} 45^\circ = 1 \times \sqrt{2}$

(C) $\sqrt{2}$

Q34 MCQ · 1 mark — **2025** – 430/4/1, 430/4/3

If $\sin A = \frac{2}{3}$, then $\cos A$ is equal to :

(A) $\frac{3}{2}$
(B) $\frac{\sqrt{5}}{3}$
(C) $\frac{1}{3}$
(D) $\frac{1}{\sqrt{3}}$

ANSWER *

$\cos A = \sqrt{1 - \frac{4}{9}} = \frac{\sqrt{5}}{3}$

(B) $\frac{\sqrt{5}}{3}$

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Q35 MCQ · 1 mark — **2025** – 430/4/2

If $\tan A = \frac{1}{2}$, then $\sin A$ is equal to :

(A) $\frac{2}{\sqrt{5}}$
(B) $\frac{1}{\sqrt{3}}$
(C) $\frac{1}{\sqrt{5}}$
(D) 1

ANSWER *

Opposite 1, adjacent 2, hypotenuse $\sqrt{5}$

(C) $\frac{1}{\sqrt{5}}$

Q36 MCQ · 1 mark — **2025** – 430/5/1, 430/5/2

If $\tan A = 1$, then $3\sin A + \cos A$ is equal to

(A) $4\sqrt{2}$
(B) 4
(C) $2\sqrt{2}$
(D) $4 \times 45^\circ$

ANSWER *

$A = 45°$: $\frac{3}{\sqrt{2}} + \frac{1}{\sqrt{2}} = \frac{4}{\sqrt{2}} = 2\sqrt{2}$

(C) $2\sqrt{2}$

Q37 MCQ · 1 mark — 2025 – 430/5/3

If $\sin A = \cos A$, then $\frac{1 - \tan A}{1 + \tan A}$ is equal to

(A) 1
(B) -1
(C) 0
(D) not defined

ANSWER *

$\tan A = 1 \Rightarrow \frac{1-1}{1+1} = 0$

(C) 0

Q38 MCQ · 1 mark — 2025 – 430/6/1, 430/6/3

If $\sqrt{3}\sin\theta = \cos\theta$, then value of θ is

(A) $\sqrt{3}$
(B) $60°$
(C) $\frac{1}{\sqrt{3}}$
(D) $30°$

ANSWER *

$\tan\theta = \frac{1}{\sqrt{3}} \Rightarrow \theta = 30°$

(D) $30°$

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Q39 MCQ · 1 mark — 2025 – 430/6/1, 430/6/2

In $\triangle ABC$, $\angle B = 90°$. If $\frac{AB}{AC} = \frac{1}{2}$, then $\cos C$ is equal to

(A) $\frac{3}{2}$
(B) $\frac{1}{2}$
(C) $\frac{\sqrt{3}}{2}$
(D) $\frac{1}{\sqrt{3}}$

ANSWER *

$\sin C = \frac{AB}{AC} = \frac{1}{2} \Rightarrow C = 30° \Rightarrow \cos C = \frac{\sqrt{3}}{2}$

(C) $\frac{\sqrt{3}}{2}$

Q40 MCQ · 1 mark — 2025 – 430/6/2

If $\sin\theta = \frac{1}{9}$, then $\tan\theta$ is equal to

(A) $\frac{1}{4\sqrt{5}}$
(B) $\frac{4\sqrt{5}}{9}$
(C) $\frac{1}{8}$
(D) $4\sqrt{5}$

ANSWER *

$\cos\theta = \sqrt{1 - \frac{1}{81}} = \frac{\sqrt{80}}{9} = \frac{4\sqrt{5}}{9}; \tan\theta = \frac{1}{4\sqrt{5}}$

(A) $\frac{1}{4\sqrt{5}}$

Q41 MCQ · 1 mark — **2026 (I)** – 430(B)

If $\cos A = \frac{3}{5}$, then the value of $\tan A$ is :

(A) $\frac{4}{5}$
(B) $\frac{5}{4}$
(C) $\frac{3}{4}$
(D) $\frac{4}{3}$

ANSWER *

$\sin A = \frac{4}{5} \Rightarrow \tan A = \frac{4}{3}$

(D) $\frac{4}{3}$

Q42 MCQ · 1 mark — **2026 (I)** – 430(B)

If $\sin\theta = \frac{\sqrt{3}}{2}$, then the value of $2\sqrt{3} \cdot \cos\frac{\theta}{2}$ is :

(A) 3
(B) $2\sqrt{3}$
(C) $\frac{3}{2}$
(D) $\sqrt{3}$

ANSWER *

$\theta = 60°$: $2\sqrt{3}\cos 30° = 2\sqrt{3} \times \frac{\sqrt{3}}{2} = 3$

(A) 3

Q43 MCQ · 1 mark — **2026 (I)** – 430/4/1

The value of $\sin 90° \cos 90° - \sin^2 60°$ is :

(A) $\frac{1}{4}$
(B) $\frac{3}{4}$
(C) $-\frac{3}{4}$
(D) $\frac{5}{4}$

ANSWER *

$1 \times 0 - \frac{3}{4} = -\frac{3}{4}$

(C) $-\frac{3}{4}$

Q44 MCQ · 1 mark — **2026 (I)** – 430/4/1, 430/4/3

If $\sin\theta = \frac{1}{7}$, then $\tan\theta$ is :

(A) $\frac{1}{4\sqrt{3}}$
(B) $\frac{1}{2\sqrt{3}}$

(C) $\frac{4\sqrt{3}}{7}$ (D) $\frac{6}{7}$

ANSWER *

$\cos\theta = \sqrt{1-\frac{1}{49}} = \frac{4\sqrt{3}}{7} \Rightarrow \tan\theta = \frac{1}{4\sqrt{3}}$

(A) $\frac{1}{4\sqrt{3}}$

Q45 MCQ · 1 mark **2026 (I)** – 430/4/2

The value of $\tan 30^\circ \tan 60^\circ - \sin 90^\circ \cos 90^\circ$ is :

(A) 1 (B) 0
(C) 2 (D) not defined

ANSWER *

$\frac{1}{\sqrt{3}} \times \sqrt{3} - 1 \times 0 = 1$

(A) 1

Q46 MCQ · 1 mark **2026 (I)** – 430/4/3

The value of $2\tan 45^\circ \sin^2 60^\circ - \cos 90^\circ$ is :

(A) $-\frac{1}{4}$ (B) $\frac{3}{2}$
(C) $\frac{3}{4}$ (D) $\frac{1}{4}$

ANSWER *

$2 \times 1 \times \frac{3}{4} - 0 = \frac{3}{2}$

(B) $\frac{3}{2}$

Q47 MCQ · 1 mark **2026 (I)** – 430/5/2

If $\sin\theta = \frac{1}{\sqrt{11}}$, then $\cot\theta$ equals

(A) $\frac{\sqrt{11}}{\sqrt{10}}$ (B) $\frac{\sqrt{10}}{\sqrt{11}}$
(C) $\sqrt{10}$ (D) $\sqrt{11}$

ANSWER *

$\cos\theta = \frac{\sqrt{10}}{\sqrt{11}} \Rightarrow \cot\theta = \sqrt{10}$

(C) $\sqrt{10}$

Q48 MCQ · 1 mark **2026 (II)** – 430/7/1, 430/7/2

If $\cos A = \frac{1}{m}$, then $\sin A$ equals :

(A) $\frac{\sqrt{m^2-1}}{m}$ (B) $\frac{\sqrt{1-m^2}}{m}$

(C) $\sqrt{1-m^2}$ (D) $\sqrt{m^2-1}$

ANSWER (A) $\frac{\sqrt{m^2-1}}{m}$

Q49 MCQ · 1 mark **2026 (II)** – 430/7/3

If $\sin\theta = \frac{1}{m}$, then $\tan\theta$ equals :

(A) $\frac{1}{\sqrt{1-m^2}}$ (B) $\frac{m}{\sqrt{m^2-1}}$

(C) $\frac{1}{\sqrt{m^2-1}}$ (D) $\frac{1}{\sqrt{m^2+1}}$

ANSWER (C) $\frac{1}{\sqrt{m^2-1}}$

Q50 MCQ · 1 mark **2026 (II)** – 430/8/1

If $3\cos\theta = 1$, then the value of $\cot\theta$ is

(A) $\frac{1}{3}$ (B) $\frac{1}{2\sqrt{2}}$

(C) $2\sqrt{2}$ (D) $\frac{2\sqrt{2}}{3}$

ANSWER (B) $\frac{1}{2\sqrt{2}}$

Q51 MCQ · 1 mark **2026 (II)** – 430(B)

$(3\cot^2 60^\circ + \text{cosec}^2 45^\circ - \cot^2 30^\circ)$ is equal to :

(A) 3 (B) 2

(C) 1 (D) 0

ANSWER (D) 0

Q52 MCQ · 1 mark **2026 (II)** – 430(B)

If $\cos\theta = \frac{1}{2}$, the value of $\frac{2}{1+\tan^2\theta}$ is :

(A) 2 (B) 1

(C) $\frac{1}{2}$ (D) $\frac{3}{2}$

ANSWER (C) $\frac{1}{2}$

Q53 Assertion–Reason · 1 mark **2025** – 430/3/2

Assertion (A) : For an acute angle θ, $\cot\theta = 1 \Rightarrow \text{cosec}\,\theta = 2$.

Reason (R) : $\text{cosec}^2\theta - \cot^2\theta = 1$.

(A) Both true, R explains A · (B) Both true, R does not explain A · (C) A true, R false · (D) A false, R true

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ANSWER *

$\text{cosec}^2\theta = 1 + \cot^2\theta = 2 \Rightarrow \text{cosec}\,\theta = \sqrt{2} \neq 2$, so A is false; R is true.

(D) Assertion (A) is false, but Reason (R) is true.

Q54 Assertion–Reason · 1 mark — **2025** – 430/5/1, 430/5/2, 430/5/3

Assertion (A) : In a right angle triangle ABC, $\angle B = 90^\circ$. Therefore the value of $\cos(A + C)$ is equal to 0.
Reason (R) : $A + B + C = 180^\circ$ and $\cos 90^\circ = 0$.

(A) Both true, R explains A · (B) Both true, R does not explain A · (C) A true, R false · (D) A false, R true

ANSWER *

$A + C = 180^\circ - 90^\circ = 90^\circ$ and $\cos 90^\circ = 0$; R explains A.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q55 Assertion–Reason · 1 mark — **2026 (I)** – 430/5/1, 430/5/2, 430/5/3

Assertion (A) : For an acute angle θ, $\cos\theta$ is always less than 1.
Reason (R) : In a right-angled triangle, hypotenuse is the longest side and $\cos\theta = \dfrac{\text{Base}}{\text{Hypotenuse}}$.

(A) Both true, R explains A · (B) Both true, R does not explain A · (C) A true, R false · (D) A false, R true

ANSWER *

Base < hypotenuse, so $\cos\theta = \dfrac{\text{Base}}{\text{Hypotenuse}} < 1$; R explains A.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q56 Very Short Answer · 2 marks · Internal choice (OR) part — **2023** – 430/C/1, 430/C/2, 430/C/3

For $A = 30^\circ$ and $B = 60^\circ$, verify that $\tan(B - A) = \dfrac{\tan B - \tan A}{1 + \tan A \tan B}$

ANSWER

$\text{LHS} = \tan(60^\circ - 30^\circ) = \tan 30^\circ = \dfrac{1}{\sqrt{3}}$ ½

$\text{RHS} = \dfrac{\tan 60^\circ - \tan 30^\circ}{1 + \tan 60^\circ \tan 30^\circ} = \dfrac{\sqrt{3} - \frac{1}{\sqrt{3}}}{1 + \sqrt{3}\left(\frac{1}{\sqrt{3}}\right)} = \dfrac{1}{\sqrt{3}}$; $\therefore$ LHS = RHS 1½

Q57 Very Short Answer · 2 marks · Internal choice (OR) part — **2023** – 430/C/1, 430/C/2, 430/C/3

Evaluate : $\sin^2 60^\circ - 2\cos^2 45^\circ + \dfrac{1}{2}\text{cosec}^2 30^\circ$

ANSWER

$= \left(\dfrac{\sqrt{3}}{2}\right)^2 - 2\left(\dfrac{1}{\sqrt{2}}\right)^2 + \dfrac{1}{2}(2)^2$ 1½

$= \dfrac{7}{4}$ ½

$\boxed{\dfrac{7}{4}}$

Q58 Very Short Answer · 2 marks — **2023** – 430/C/B

Find the value of $\frac{3}{4}\tan^2 30^\circ - 3\sin^2 60^\circ + \frac{1}{\sin^2 45^\circ}$.

ANSWER

$= \frac{3}{4}\left(\frac{1}{\sqrt{3}}\right)^2 - 3\left(\frac{\sqrt{3}}{2}\right)^2 + \frac{1}{\left(\frac{1}{\sqrt{2}}\right)^2}$ — 1½

$= 0$ — ½

0

Q59 Very Short Answer · 2 marks · Internal choice (OR) part — **2023** – 430(B)

In a right-angled triangle ABC, right angled at C, if $\tan A = \sqrt{3}$, evaluate $\sin A \cos B + \cos A \sin B$.

ANSWER *

$\tan A = \sqrt{3} \Rightarrow A = 60^\circ$, so $B = 90^\circ - 60^\circ = 30^\circ$

$\sin 60^\circ \cos 30^\circ + \cos 60^\circ \sin 30^\circ = \frac{3}{4} + \frac{1}{4} = 1$

1

Q60 Very Short Answer · 2 marks — **2023** – 430/1/1

Evaluate : $\tan^2 60^\circ - 2\,\text{cosec}^2 30^\circ - 2\tan^2 30^\circ$.

ANSWER *

$= 3 - 2(4) - 2\left(\frac{1}{3}\right)$

$= -5 - \frac{2}{3} = -\frac{17}{3}$

$-\frac{17}{3}$

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Q61 Very Short Answer · 2 marks — **2023** – 430/1/2

Evaluate : $2(\sin^2 45^\circ + \cot^2 30^\circ) - 6(\cos^2 45^\circ - \tan^2 30^\circ)$

ANSWER *

$= 2\left(\frac{1}{2} + 3\right) - 6\left(\frac{1}{2} - \frac{1}{3}\right)$

$= 7 - 1 = 6$

6

Q62 Very Short Answer · 2 marks — **2023** – 430/1/3

Evaluate : $\frac{3}{2}\tan^2 30^\circ - 2\cos^2 90^\circ - \frac{1}{2}\text{cosec}^2 30^\circ$

ANSWER *

$= \frac{3}{2} \times \frac{1}{3} - 0 - \frac{1}{2} \times 4$

$= \frac{1}{2} - 2 = -\frac{3}{2}$

$\boxed{-\frac{3}{2}}$

Q63 Very Short Answer · 2 marks — **2023** – 430/4/1, 430/4/2

If $\sin\alpha = \frac{1}{2}$, then find the value of $(3\cos\alpha - 4\cos^3\alpha)$.

ANSWER *

$\alpha = 30^\circ, \cos\alpha = \frac{\sqrt{3}}{2}$

$3 \times \frac{\sqrt{3}}{2} - 4 \times \frac{3\sqrt{3}}{8} = \frac{3\sqrt{3}}{2} - \frac{3\sqrt{3}}{2} = 0$

$\boxed{0}$

Q64 Very Short Answer · 2 marks · Internal choice (OR) part — **2023** – 430/5/1, 430/5/2, 430/5/3

Evaluate : $\frac{\sin 30^\circ + \tan 45^\circ}{\sec 30^\circ + \cot 45^\circ}$

ANSWER *

$= \frac{\frac{1}{2} + 1}{\frac{2}{\sqrt{3}} + 1} = \frac{3\sqrt{3}}{2(2+\sqrt{3})}$

$= \frac{3\sqrt{3}(2-\sqrt{3})}{2(4-3)} = \frac{6\sqrt{3}-9}{2}$

$\boxed{\frac{6\sqrt{3}-9}{2}}$

Q65 Very Short Answer · 2 marks · Internal choice (OR) part — **2023** – 430/5/1, 430/5/2, 430/5/3

For $A = 30^\circ$ and $B = 60^\circ$, verify that : $\sin(A+B) = \sin A\cos B + \cos A\sin B$.

ANSWER *

$\text{LHS} = \sin 90^\circ = 1$

$\text{RHS} = \frac{1}{2} \cdot \frac{1}{2} + \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{3}}{2} = \frac{1}{4} + \frac{3}{4} = 1 = \text{LHS}$

Q66 Very Short Answer · 2 marks — **2023** – 430/6/1, 430/6/3

Evaluate : $5\,\text{cosec}^2 45° - 3\sin^2 90° + 5\cos 0°$.

ANSWER *

$= 5(\sqrt{2})^2 - 3(1)^2 + 5(1)$

$= 10 - 3 + 5 = 12$

$\boxed{12}$

Q67 Very Short Answer · 2 marks — **2023** – 430/6/2

Evaluate : $\dfrac{5\,\text{cosec}^2 30° - \cos 90°}{4\tan^2 60°}$

ANSWER *

$= \dfrac{5 \times 4 - 0}{4 \times 3}$

$= \dfrac{20}{12} = \dfrac{5}{3}$

$\boxed{\dfrac{5}{3}}$

Q68 Very Short Answer · 2 marks · Internal choice (OR) part — **2024** – 430/S/1, 430/S/2, 430/S/3

If $\tan A = \sqrt{3}$, then find the value of $\cos^2 A - \sin^2 A$.

ANSWER

$\tan A = \sqrt{3} \Rightarrow A = 60°$ ½

$\cos^2 A - \sin^2 A = \cos^2 60° - \sin^2 60° = \left(\dfrac{1}{2}\right)^2 - \left(\dfrac{\sqrt{3}}{2}\right)^2$ ½+½

$= -\dfrac{1}{2}$ ½

$\boxed{-\dfrac{1}{2}}$

Q69 Very Short Answer · 2 marks · Internal choice (OR) part — **2024** – 430/S/1, 430/S/2, 430/S/3

If $x \sin 60° + \cos 30° - \tan 45° = \dfrac{\sqrt{3}}{2}$, find the value of x.

ANSWER

$x\dfrac{\sqrt{3}}{2} + \dfrac{\sqrt{3}}{2} - 1 = \dfrac{\sqrt{3}}{2}$ 1½

$\Rightarrow x = \dfrac{2}{\sqrt{3}}$ or $\dfrac{2\sqrt{3}}{3}$ ½

$\boxed{x = \dfrac{2}{\sqrt{3}} \text{ or } \dfrac{2\sqrt{3}}{3}}$

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Q70 Very Short Answer · 2 marks | Internal choice (OR) part | **2024** – 430(B)/S

If $\cos\theta = \frac{3}{5}$, find the value of $\frac{\tan\theta - \sin\theta}{\text{cosec}\,\theta + \cot\theta}$.

ANSWER

$\cos\theta = \frac{3}{5}$, getting $\tan\theta = \frac{4}{3}$, $\sin\theta = \frac{4}{5}$ ½

hence, $\frac{\tan\theta - \sin\theta}{\text{cosec}\,\theta + \cot\theta} = \frac{\frac{4}{3} - \frac{4}{5}}{\frac{5}{4} + \frac{3}{4}}$ 1

$= \frac{4}{15}$ ½

$\boxed{\frac{4}{15}}$

Q71 Very Short Answer · 2 marks | Internal choice (OR) part | **2024** – 430(B)/S

For $\theta = 30°$, verify that $\cos 2\theta = \cos^2\theta - \sin^2\theta$.

ANSWER

$\text{LHS} = \cos 2\theta = \cos 60° = \frac{1}{2}$ ½

$\text{RHS} = \cos^2 30° - \sin^2 30° = \frac{3}{4} - \frac{1}{4}$ 1

$= \frac{1}{2} = \text{LHS}$, hence verified ½

Q72 Very Short Answer · 2 marks | Internal choice (OR) part | **2024** – 430(B)

If $\text{cosec}\,\theta = \sqrt{10}$, then find the values of $\tan\theta$ and $\sec\theta$.

ANSWER *

$\sin\theta = \frac{1}{\sqrt{10}} \Rightarrow \cos\theta = \frac{3}{\sqrt{10}}$

$\tan\theta = \frac{1}{3}$, $\sec\theta = \frac{\sqrt{10}}{3}$

$\boxed{\tan\theta = \frac{1}{3}, \sec\theta = \frac{\sqrt{10}}{3}}$

Q73 Very Short Answer · 2 marks | **2024** – 430/1/1, 430/1/3

Evaluate : $\sin A\cos B + \cos A\sin B$; if $A = 30°$ and $B = 45°$.

ANSWER *

$= \frac{1}{2}\cdot\frac{1}{\sqrt{2}} + \frac{\sqrt{3}}{2}\cdot\frac{1}{\sqrt{2}}$

$= \frac{1+\sqrt{3}}{2\sqrt{2}}$

$\boxed{\frac{1+\sqrt{3}}{2\sqrt{2}}}$

Q74 Very Short Answer · 2 marks **2024** – 430/1/2

In a $\triangle ABC$, $\angle A = 90^\circ$. If $\tan C = \sqrt{3}$, then find the value of $\sin B + \cos C - \cos^2 B$.

ANSWER *

$C = 60^\circ \Rightarrow B = 30^\circ$

$\sin 30^\circ + \cos 60^\circ - \cos^2 30^\circ = \frac{1}{2} + \frac{1}{2} - \frac{3}{4} = \frac{1}{4}$

$\boxed{\frac{1}{4}}$

Q75 Very Short Answer · 2 marks **2024** – 430/3/1

Evaluate : $4\sin^2 60^\circ \tan^2 45^\circ - 2\sec^2 30^\circ \tan^2 60^\circ$

ANSWER *

$= 4 \times \frac{3}{4} \times 1 - 2 \times \frac{4}{3} \times 3$

$= 3 - 8 = -5$

$\boxed{-5}$

Q76 Very Short Answer · 2 marks **2024** – 430/3/2

Evaluate : $3\sec^2 30^\circ \operatorname{cosec} 30^\circ + \tan^2 60^\circ \cdot \tan^2 45^\circ$

ANSWER *

$= 3 \times \frac{4}{3} \times 2 + 3 \times 1$

$= 8 + 3 = 11$

$\boxed{11}$

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Q77 Very Short Answer · 2 marks **2024** – 430/3/3

Evaluate : $5\sin^2 45^\circ - \sec 60^\circ \cot^2 30^\circ$

ANSWER *

$= 5 \times \frac{1}{2} - 2 \times 3$

$= \frac{5}{2} - 6 = -\frac{7}{2}$

$\boxed{-\frac{7}{2}}$

Q78 Very Short Answer · 2 marks **2024** – 430/4/1, 430/4/2

Evaluate : $\sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ - \cot 45^\circ$

ANSWER *

$= \frac{1}{2} \times \frac{1}{2} + \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} - 1$

$= \frac{1}{4} + \frac{3}{4} - 1 = 0$

$\boxed{0}$

Q79 Very Short Answer · 2 marks **2024** – 430/4/3

Evaluate : $5\sin^2 60° + 3\cos^2 30° - \sec^2 45°$

ANSWER *

$= 5 \times \frac{3}{4} + 3 \times \frac{3}{4} - 2$

$= 6 - 2 = 4$

$\boxed{4}$

Q80 Very Short Answer · 2 marks **2024** – 430/5/1

Evaluate : $\sin^2 30° + \cos^2 45° - \cos 0° \cdot \tan 45°$

ANSWER *

$= \frac{1}{4} + \frac{1}{2} - 1 \times 1$

$= -\frac{1}{4}$

$\boxed{-\frac{1}{4}}$

Q81 Very Short Answer · 2 marks **2024** – 430/5/2

Evaluate : $\tan^2 30° - \tan^2 60° + \text{cosec}^2 45°$

ANSWER *

$= \frac{1}{3} - 3 + 2$

$= -\frac{2}{3}$

$\boxed{-\frac{2}{3}}$

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Q82 Very Short Answer · 2 marks **2024** – 430/5/3

If $x = \sin 60° \cos 30° + \cos 60° \sin 30°$, then find the value of x.

ANSWER *

$x = \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} + \frac{1}{2} \times \frac{1}{2}$

$= \frac{3}{4} + \frac{1}{4} = 1$

$\boxed{x = 1}$

Q83 Very Short Answer · 2 marks · Internal choice (OR) part — **2025** – 430/1/1, 430/1/2, 430/1/3

Find the values of A and B $(0 \le A < 90^\circ,\ 0 \le B < 90^\circ)$, if $\tan(A+B) = 1$ and $\tan(A-B) = \frac{1}{\sqrt{3}}$.

ANSWER *

$A + B = 45^\circ,\ A - B = 30^\circ$

$2A = 75^\circ \Rightarrow A = 37.5^\circ,\ B = 7.5^\circ$

$\boxed{A = 37.5^\circ,\ B = 7.5^\circ}$

Q84 Very Short Answer · 2 marks · Internal choice (OR) part — **2025** – 430/1/1, 430/1/2, 430/1/3

Prove that $\tan 45^\circ = 1$ geometrically.

ANSWER *

In $\triangle ABC$ with $\angle B = 90^\circ$ and $\angle A = 45^\circ$, $\angle C = 45^\circ$, so $AB = BC$ (sides opposite equal angles)

$\tan 45^\circ = \tan A = \frac{BC}{AB} = 1$

Q85 Very Short Answer · 2 marks — **2025** – 430/2/1

Evaluate : $\frac{\cos 45^\circ}{\sec 30^\circ + \operatorname{cosec} 30^\circ}$

ANSWER *

$= \frac{\frac{1}{\sqrt{2}}}{\frac{2}{\sqrt{3}} + 2} = \frac{\sqrt{3}}{2\sqrt{2}(1+\sqrt{3})}$

$= \frac{\sqrt{3}(\sqrt{3}-1)}{2\sqrt{2} \times 2} = \frac{3-\sqrt{3}}{4\sqrt{2}} = \frac{3\sqrt{2}-\sqrt{6}}{8}$

$\boxed{\frac{3\sqrt{2}-\sqrt{6}}{8}}$

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Q86 Very Short Answer · 2 marks — **2025** – 430/2/2

Evaluate : $\frac{\sin 45^\circ}{\sec 30^\circ - \tan 30^\circ}$

ANSWER *

$= \frac{\frac{1}{\sqrt{2}}}{\frac{2}{\sqrt{3}} - \frac{1}{\sqrt{3}}} = \frac{\frac{1}{\sqrt{2}}}{\frac{1}{\sqrt{3}}}$

$= \frac{\sqrt{3}}{\sqrt{2}} = \frac{\sqrt{6}}{2}$

$\boxed{\frac{\sqrt{6}}{2}}$

Q87 Very Short Answer · 2 marks **2025** – 430/2/3

Evaluate : $\dfrac{\sin^2 45^\circ}{\text{cosec}^2 30^\circ - \tan^2 45^\circ}$

ANSWER *

$= \dfrac{\frac{1}{2}}{4-1}$

$= \dfrac{1}{6}$

$\boxed{\dfrac{1}{6}}$

Q88 Very Short Answer · 2 marks Internal choice (OR) part **2025** – 430/3/1, 430/3/2, 430/3/3

If $\sin 3A = 1$, then find the value of $\cos 2A - \tan^2 45^\circ$.

ANSWER *

$3A = 90^\circ \Rightarrow A = 30^\circ$

$\cos 60^\circ - 1 = \dfrac{1}{2} - 1 = -\dfrac{1}{2}$

$\boxed{-\dfrac{1}{2}}$

Q89 Very Short Answer · 2 marks Internal choice (OR) part **2025** – 430/5/1, 430/5/2

Evaluate : $2\tan^2 45^\circ + \cos^2 30^\circ - \sin^2 90^\circ$.

ANSWER *

$= 2(1) + \dfrac{3}{4} - 1$

$= \dfrac{7}{4}$

$\boxed{\dfrac{7}{4}}$

Q90 Very Short Answer · 2 marks Internal choice (OR) part **2025** – 430/5/1, 430/5/2

Verify that $\cos 2A = \dfrac{1-\tan^2 A}{1+\tan^2 A}$ for $A = 30^\circ$.

ANSWER *

$\text{LHS} = \cos 60^\circ = \dfrac{1}{2}$

$\text{RHS} = \dfrac{1-\frac{1}{3}}{1+\frac{1}{3}} = \dfrac{2/3}{4/3} = \dfrac{1}{2} = \text{LHS}$

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Q91 Very Short Answer · 2 marks | Internal choice (OR) part | **2025** – 430/5/3

If $\sec A = \frac{25}{7}$, then find the value of $\operatorname{cosec} A$ and $\tan A$.

ANSWER *

$\cos A = \frac{7}{25} \Rightarrow \sin A = \frac{24}{25}$

$\operatorname{cosec} A = \frac{25}{24}, \tan A = \frac{24}{7}$

$\boxed{\operatorname{cosec} A = \frac{25}{24}, \tan A = \frac{24}{7}}$

Q92 Very Short Answer · 2 marks | Internal choice (OR) part | **2025** – 430/5/3

Verify that $\sin(A+B) = \sin A \cos B + \cos A \sin B$ for $A = 60^\circ$ and $B = 30^\circ$.

ANSWER *

$\text{LHS} = \sin 90^\circ = 1$

$\text{RHS} = \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{3}}{2} + \frac{1}{2} \cdot \frac{1}{2} = 1 = \text{LHS}$

Q93 Very Short Answer · 2 marks | Internal choice (OR) part | **2025** – 430/6/1, 430/6/2, 430/6/3

Evaluate : $\frac{\cos 45^\circ}{\tan 30^\circ + \sin 60^\circ}$

ANSWER *

$= \frac{\frac{1}{\sqrt{2}}}{\frac{1}{\sqrt{3}} + \frac{\sqrt{3}}{2}} = \frac{\frac{1}{\sqrt{2}}}{\frac{5}{2\sqrt{3}}}$

$= \frac{2\sqrt{3}}{5\sqrt{2}} = \frac{\sqrt{6}}{5}$

$\boxed{\frac{\sqrt{6}}{5}}$

Q94 Very Short Answer · 2 marks | Internal choice (OR) part | **2025** – 430/6/1, 430/6/2, 430/6/3

Verify that $\sin 2A = \frac{2\tan A}{1+\tan^2 A}$, for $A = 30^\circ$.

ANSWER *

$\text{LHS} = \sin 60^\circ = \frac{\sqrt{3}}{2}$

$\text{RHS} = \frac{2/\sqrt{3}}{1+1/3} = \frac{2}{\sqrt{3}} \times \frac{3}{4} = \frac{\sqrt{3}}{2} = \text{LHS}$

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Q95 Very Short Answer · 2 marks | Internal choice (OR) part | **2026 (I)** – 430(B)

If $\sin(A+2B)=\frac{\sqrt{3}}{2}$ and $\cos(A+4B)=0$, $A>B$, find A and B.

ANSWER *

$A+2B=60^\circ$ and $A+4B=90^\circ$

$2B=30^\circ \Rightarrow B=15^\circ$, $A=30^\circ$

$A=30^\circ,\ B=15^\circ$

Q96 Very Short Answer · 2 marks | **2026 (I)** – 430/4/1

If $\sin(A-B)=\frac{1}{2}$ and $\tan(A+B)=\sqrt{3}$, $0^\circ \le A+B < 90^\circ$, $A>B$ then find the values of A and B.

ANSWER *

$A-B=30^\circ$ and $A+B=60^\circ$

$A=45^\circ,\ B=15^\circ$

$A=45^\circ,\ B=15^\circ$

Q97 Very Short Answer · 2 marks | **2026 (I)** – 430/4/2

If $\sin 2A=\frac{\sqrt{3}}{2}$ and $2\tan B+1=3$, then find the value of $(A+B)$.

ANSWER *

$2A=60^\circ \Rightarrow A=30^\circ$; $\tan B=1 \Rightarrow B=45^\circ$

$A+B=75^\circ$

75°

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Q98 Very Short Answer · 2 marks | **2026 (I)** – 430/4/3

If $\sin A=\frac{1}{2}$ and $\tan B=\sqrt{3}$, then verify that $\cos(A+B)=\cos A\cos B-\sin A\sin B$.

ANSWER *

$A=30^\circ,\ B=60^\circ$; LHS $=\cos 90^\circ=0$

RHS $=\frac{\sqrt{3}}{2}\cdot\frac{1}{2}-\frac{1}{2}\cdot\frac{\sqrt{3}}{2}=0=$ LHS

Q99 Very Short Answer · 2 marks | Internal choice (OR) part | **2026 (I)** – 430/5/1, 430/5/3

If $\sec A=\sqrt{2}$ and $\tan B=\sqrt{3}$, then find the value of $2\sin A\cos B$.

ANSWER *

$A=45^\circ, B=60^\circ$

$2\times\frac{1}{\sqrt{2}}\times\frac{1}{2}=\frac{1}{\sqrt{2}}$

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

Q100 Very Short Answer · 2 marks · Internal choice (OR) part · **2026 (I)** – 430/5/1, 430/5/3

Evaluate : $\dfrac{4\cos^3 60^\circ + \operatorname{cosec} 30^\circ}{\tan^2 30^\circ}$

ANSWER *

$= \dfrac{4 \times \frac{1}{8} + 2}{\frac{1}{3}} = \dfrac{5/2}{1/3}$

$= \dfrac{15}{2}$

$\boxed{\dfrac{15}{2}}$

Q101 Very Short Answer · 2 marks · Internal choice (OR) part · **2026 (I)** – 430/5/2

Evaluate : $\dfrac{5\sin^2 45^\circ - 3\tan^2 30^\circ}{2\sec^2 30^\circ}$

ANSWER *

$= \dfrac{5 \times \frac{1}{2} - 3 \times \frac{1}{3}}{2 \times \frac{4}{3}} = \dfrac{3/2}{8/3}$

$= \dfrac{9}{16}$

$\boxed{\dfrac{9}{16}}$

Q102 Very Short Answer · 2 marks · Internal choice (OR) part · **2026 (I)** – 430/5/2

For $A = 60^\circ$ and $B = 30^\circ$, verify that $\tan(A - B) = \dfrac{\tan A - \tan B}{1 + \tan A \tan B}$.

ANSWER *

$\text{LHS} = \tan 30^\circ = \dfrac{1}{\sqrt{3}}$

$\text{RHS} = \dfrac{\sqrt{3} - \frac{1}{\sqrt{3}}}{1 + 1} = \dfrac{2/\sqrt{3}}{2} = \dfrac{1}{\sqrt{3}} = \text{LHS}$

Q103 Very Short Answer · 2 marks · **2026 (II)** – 430/7/1

Evaluate : $\dfrac{\tan^2 30^\circ - \operatorname{cosec}^2 60^\circ}{\cos^2 45^\circ}$

ANSWER

$= \dfrac{\left(\frac{1}{\sqrt{3}}\right)^2 - \left(\frac{2}{\sqrt{3}}\right)^2}{\left(\frac{1}{\sqrt{2}}\right)^2}$ 1½

$= -2$ ½

$\boxed{-2}$

Q104 Very Short Answer · 2 marks — **2026 (II)** – 430/7/2

For $\alpha = 45^\circ$ and $\beta = 30^\circ$, verify that $\sin^2\alpha \cot\beta = \cos\beta \tan\alpha$.

ANSWER

$\text{LHS} = \left(\frac{1}{\sqrt{2}}\right)^2 \times \sqrt{3} = \frac{\sqrt{3}}{2}$ — 1

$\text{RHS} = 1 \times \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{2}$. Hence verified — 1

Q105 Very Short Answer · 2 marks — **2026 (II)** – 430/7/3

Evaluate : $\frac{2\sin^2 60^\circ - \tan^2 60^\circ}{4\sec^2 45^\circ}$

ANSWER

Given expression is $= \frac{2 \times \left(\frac{\sqrt{3}}{2}\right)^2 - (\sqrt{3})^2}{4 \times (\sqrt{2})^2}$ — 1½

$= \frac{-3}{16}$ — ½

$\boxed{-\frac{3}{16}}$

Q106 Short Answer · 3 marks · Internal choice (OR) part — **2025** – 430(B)

Evaluate : $\frac{2}{3}(\cos^4 30^\circ - \sin^4 45^\circ) - 3(\sin^2 60^\circ - \sec^2 45^\circ) + \frac{1}{4}\cot^2 30^\circ$.

ANSWER *

$= \frac{2}{3}\left(\frac{9}{16} - \frac{1}{4}\right) - 3\left(\frac{3}{4} - 2\right) + \frac{1}{4} \times 3$

$= \frac{2}{3} \times \frac{5}{16} + \frac{15}{4} + \frac{3}{4}$

$= \frac{5}{24} + \frac{9}{2} = \frac{113}{24}$

$\boxed{\frac{113}{24}}$

Q107 Short Answer · 3 marks — **2026 (II)** – 430/8/1, 430/8/2, 430/8/3

If $\sin(A - B) = \frac{1}{2}$ and $\cos(A + B) = \frac{1}{2}$, $0 < A + B \leq 90^\circ$, $A > B$, then find the value of $\sin A$.

ANSWER

$\sin(A - B) = \frac{1}{2} \Rightarrow A - B = 30^\circ$ — 1

$\cos(A + B) = \frac{1}{2} \Rightarrow A + B = 60^\circ$ — 1

$\Rightarrow A = 45^\circ,\ B = 15^\circ$ — ½

$\sin A = \sin 45^\circ = \frac{1}{\sqrt{2}}$ — ½

$\boxed{\frac{1}{\sqrt{2}}}$

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Q108 Case Study · 4 marks — **2025** – 430(B)

A teacher asked his students to draw a right triangle ABC with AB = 8 cm, $\angle B = 90^\circ$ and BC = 15 cm. Based on the above, answer the following :

(i) Evaluate $(\sin^2 A - \cos^2 A)$ (1)

(ii) Evaluate $\left(\frac{1}{\cos^2 A} - \frac{1}{\cot^2 A}\right)$ (1)

(iii) (a) Evaluate $\frac{2\tan A}{1+\tan^2 A}$ and prove that it is equal to $2\sin A \cos A$. (2)

OR

(iii) (b) Evaluate $\frac{\tan^2 A - \sec^2 A}{\cot^2 A - \operatorname{cosec}^2 A}$ (2)

ANSWER *

$AC = \sqrt{8^2 + 15^2} = 17$; $\sin A = \frac{15}{17}$, $\cos A = \frac{8}{17}$, $\tan A = \frac{15}{8}$

(i) $\frac{225}{289} - \frac{64}{289} = \frac{161}{289}$

(ii) $\sec^2 A - \tan^2 A = 1$

(iii)(a) $\frac{2 \times \frac{15}{8}}{1 + \frac{225}{64}} = \frac{15/4}{289/64} = \frac{240}{289}$; $2\sin A \cos A = 2 \times \frac{15}{17} \times \frac{8}{17} = \frac{240}{289}$, hence equal

OR (iii)(b) $\frac{\tan^2 A - \sec^2 A}{\cot^2 A - \operatorname{cosec}^2 A} = \frac{-1}{-1} = 1$

(i) $\frac{161}{289}$ (ii) 1 (iii)(a) $\frac{240}{289}$ OR (iii)(b) 1

02 TOPIC 2 Trigonometric Identities

QUICK RECAP

- $\sin^2 A + \cos^2 A = 1$, $1 + \tan^2 A = \sec^2 A$ $(0^\circ \le A < 90^\circ)$, $1 + \cot^2 A = \operatorname{cosec}^2 A$ $(0^\circ < A \le 90^\circ)$.
- Useful forms: $\sec^2 A - \tan^2 A = 1$, $\operatorname{cosec}^2 A - \cot^2 A = 1$, so $(\sec A + \tan A)(\sec A - \tan A) = 1$.
- To prove an identity, usually start from the more complicated side and convert everything to sin and cos, or use the identities above; rationalise by multiplying with a conjugate.

Q109 MCQ · 1 mark — **2023** – 430/C/2

If $x = a\sin\theta$ and $y = b\cos\theta$, then $b^2x^2 + a^2y^2$ is equal to :

(A) 1
(B) a^2b^2
(C) $\frac{a^2+b^2}{a^2b^2}$
(D) $a^2 + b^2$

ANSWER **(B) a^2b^2**

Q110 MCQ · 1 mark — **2023** – 430/2/1, 430/2/3

$9\sec^2 A - 9\tan^2 A$ is equal to :

(A) 9
(B) 0
(C) 8
(D) $\frac{1}{9}$

ANSWER *

$= 9(\sec^2 A - \tan^2 A) = 9$

(A) 9

Q111 MCQ · 1 mark **2023** – 430/2/1, 430/2/2, 430/2/3

If $\tan A = \frac{2}{5}$, then the value of $\frac{1 - \cos^2 A}{1 - \sin^2 A}$ is :

(A) $\frac{25}{4}$ (B) $\frac{4}{25}$

(C) $\frac{4}{5}$ (D) $\frac{5}{4}$

ANSWER *

$= \frac{\sin^2 A}{\cos^2 A} = \tan^2 A = \frac{4}{25}$

(B) $\frac{4}{25}$

Q112 MCQ · 1 mark **2023** – 430/2/2

$8(\cos^2 A + \sin^2 A)$ is equal to :

(A) 1 (B) 0

(C) 9 (D) 8

ANSWER *

$\cos^2 A + \sin^2 A = 1$

(D) 8

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Q113 MCQ · 1 mark **2023** – 430/5/1, 430/5/3

If $\sin\theta = \frac{3}{4}$, then $\frac{(\sec^2\theta - 1)\cos^2\theta}{\sin\theta}$ equals :

(A) $\frac{3}{5}$ (B) $\frac{3}{4}$

(C) $\frac{4}{3}$ (D) $\frac{9}{16}$

ANSWER *

$= \frac{\tan^2\theta \cos^2\theta}{\sin\theta} = \frac{\sin^2\theta}{\sin\theta} = \sin\theta = \frac{3}{4}$

(B) $\frac{3}{4}$

Q114 MCQ · 1 mark **2023** – 430/5/2

If $\cos\theta = \frac{3}{7}$, then $\frac{\cos\theta}{1 - \sin^2\theta}$ is equal to :

(A) $\frac{3}{\sqrt{40}}$ (B) $\frac{3}{7}$

(C) $\frac{7}{3}$ (D) $\frac{7}{\sqrt{40}}$

ANSWER *

$= \frac{\cos\theta}{\cos^2\theta} = \frac{1}{\cos\theta} = \frac{7}{3}$

(C) $\frac{7}{3}$

Q115 MCQ · 1 mark — **2024** – 430/S/1, 430/S/2, 430/S/3

If $\tan A = \frac{3}{4}$, then $\frac{\sin^2 A + \cos^2 A}{\sec A}$ is equal to :

(A) $\frac{4}{3}$
(B) $\frac{4}{5}$
(C) $\frac{3}{5}$
(D) $\frac{5}{4}$

ANSWER (B) $\frac{4}{5}$

Q116 MCQ · 1 mark — **2024** – 430/S/1

The expression $\sec^4\theta - \sec^2\theta$ is equal to :

(A) $\tan^2\theta - \tan^4\theta$
(B) $-\tan^4\theta - \tan^2\theta$
(C) $\tan^2\theta + \tan^4\theta$
(D) $\tan^4\theta - \tan^2\theta$

ANSWER (C) $\tan^2\theta + \tan^4\theta$

Q117 MCQ · 1 mark — **2024** – 430/S/2

$3\sin^2\theta + 4\cos^2\theta$ is equal to :

(A) 1
(B) 2
(C) $\sin^2\theta + 3$
(D) $\cos^2\theta + 3$

ANSWER (D) $\cos^2\theta + 3$

Q118 MCQ · 1 mark — **2024** – 430/1/1, 430/1/2, 430/1/3

For what value of θ, $\sin^2\theta + \sin\theta + \cos^2\theta$ is equal to 2 ?

(A) $45°$
(B) $0°$
(C) $90°$
(D) $30°$

ANSWER *

$1 + \sin\theta = 2 \Rightarrow \sin\theta = 1 \Rightarrow \theta = 90°$

(C) $90°$

Q119 MCQ · 1 mark — **2024** – 430/2/1, 430/2/2

$\frac{1 + \tan^2 A}{1 + \cot^2 A}$ is equal to

(A) $\sec^2 A$
(B) -1
(C) $\cot^2 A$
(D) $\tan^2 A$

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ANSWER *

$= \frac{\sec^2 A}{\text{cosec}^2 A} = \frac{\sin^2 A}{\cos^2 A} = \tan^2 A$

(D) $\tan^2 A$

Q120 MCQ · 1 mark **2024** – 430/2/3

$\frac{\text{cosec}^2 A - \cot^2 A}{1 - \sin^2 A}$ is equal to

(A) $\sin^2 A$ (B) $\cos^2 A$

(C) $\sec^2 A$ (D) $\tan^2 A$

ANSWER *

$= \frac{1}{\cos^2 A} = \sec^2 A$

(C) $\sec^2 A$

Q121 MCQ · 1 mark **2024** – 430/4/1

$\left(\frac{1}{\tan^2 \theta} - \frac{1}{\sin^2 \theta}\right)$ is equal to :

(A) 1 (B) -1

(C) $\sec^2 \theta$ (D) $\sin^2 \theta$

ANSWER *

$= \cot^2 \theta - \text{cosec}^2 \theta = -1$

(B) -1

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Q122 MCQ · 1 mark **2024** – 430/4/2

$\left(\frac{1}{\cot^2 \theta}\right) - \left(\frac{1}{\cos^2 \theta}\right)$ is equal to :

(A) 1 (B) -1

(C) 0 (D) $\sec^2 \theta$

ANSWER *

$= \tan^2 \theta - \sec^2 \theta = -1$

(B) -1

Q123 MCQ · 1 mark **2024** – 430/5/1, 430/5/2

$\left(\frac{5}{\cot^2 \theta} - \frac{5}{\cos^2 \theta}\right)$ is equal to :

(A) 1 (B) 5

(C) -5 (D) 0

ANSWER *

$= 5(\tan^2\theta - \sec^2\theta) = -5$

(C) -5

Q124 MCQ · 1 mark **2024** – 430/5/2

If $\sin^2\theta = \frac{1}{2}$, then the value of $\tan^2\theta$ is :

(A) $\frac{1}{\sqrt{3}}$ (B) $\sqrt{3}$

(C) 0 (D) 1

ANSWER *

$\cos^2\theta = \frac{1}{2} \Rightarrow \tan^2\theta = 1$

(D) 1

Q125 MCQ · 1 mark **2025** – 430/1/1

The value of $\left(\tan^2 A - \frac{1}{\cos^2 A}\right)$ is :

(A) more than 1 (B) 1

(C) 0 (D) -1

ANSWER *

$= \tan^2 A - \sec^2 A = -1$

(D) -1

Q126 MCQ · 1 mark **2025** – 430/1/2

The value of $\left(\cot^2 A - \frac{1}{\sin^2 A}\right)$ is :

(A) more than 1 (B) 1

(C) 0 (D) -1

ANSWER *

$= \cot^2 A - \text{cosec}^2 A = -1$

(D) -1

Q127 MCQ · 1 mark **2025** – 430/1/3

The value of $\left(\frac{1}{\sec^2 A} + \frac{1}{\text{cosec}^2 A}\right)$ is :

(A) more than 1 (B) 1

(C) 0 (D) -1

ANSWER *

$= \cos^2 A + \sin^2 A = 1$

(B) 1

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Q128 MCQ · 1 mark **2025** – 430/2/1

The value of $(\sin^2 A + \cos^2 A) + (\sec^2 A - \tan^2 A) - (\cot^2 A - \operatorname{cosec}^2 A)$ is :

(A) 1 (B) -1
(C) 3 (D) -2

ANSWER *
$= 1 + 1 - (-1) = 3$
(C) 3

Q129 MCQ · 1 mark **2025** – 430/2/2

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

(A) 1 (B) 2
(C) $2 + 2\sin\theta\cos\theta$ (D) $2 + 4\sin\theta\cos\theta$

ANSWER *
$= 2(\sin^2\theta + \cos^2\theta) = 2$
(B) 2

Q130 MCQ · 1 mark **2025** – 430/2/3

$(\sec\theta - \cos\theta)^2 + \sin^2\theta - \tan^2\theta = ?$

(A) 0 (B) 1
(C) 2 (D) 4

ANSWER *
$= \sec^2\theta - 2 + \cos^2\theta + \sin^2\theta - \tan^2\theta = 1 - 2 + 1 = 0$
(A) 0

Q131 MCQ · 1 mark **2025** – 430/3/2

The value of $\dfrac{\cot^2 A - \operatorname{cosec}^2 A}{\sin 30^\circ + \cos 60^\circ}$ is :

(A) 1 (B) -1
(C) $\dfrac{2}{1+\sqrt{3}}$ (D) $\dfrac{-2}{1+\sqrt{3}}$

ANSWER *
$= \dfrac{-1}{\frac{1}{2} + \frac{1}{2}} = -1$
(B) -1

Q132 MCQ · 1 mark **2025** – 430/4/1, 430/4/3

If $\sec\theta - \tan\theta = 2$, then $\sec\theta + \tan\theta$ is equal to :

(A) $\dfrac{1}{2}$ (B) $\sqrt{2}$

(C) $\frac{1}{\sqrt{2}}$
(D) 2

ANSWER *
$(\sec\theta + \tan\theta)(\sec\theta - \tan\theta) = 1$
(A) $\frac{1}{2}$

Q133 MCQ · 1 mark **2026 (I)** – 430/4/2

If $\sec\theta = \sqrt{3}$, then the value of $\tan\theta$ is :

(A) $\sqrt{3} - 1$
(B) $60°$
(C) 2
(D) $\sqrt{2}$

ANSWER *
$\tan^2\theta = \sec^2\theta - 1 = 2$
(D) $\sqrt{2}$

Q134 MCQ · 1 mark **2026 (I)** – 430/5/1, 430/5/3

If value of $\cot\theta$ is $\sqrt{5}$, then $\sin\theta$ equals

(A) $\frac{1}{\sqrt{6}}$
(B) $\sqrt{6}$
(C) $\frac{\sqrt{5}}{6}$
(D) $\frac{1}{2}$

ANSWER *
$\text{cosec}^2\theta = 1 + 5 = 6 \Rightarrow \sin\theta = \frac{1}{\sqrt{6}}$
(A) $\frac{1}{\sqrt{6}}$

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Q135 MCQ · 1 mark **2026 (II)** – 430/8/1, 430/8/2

If $x = a\sin\theta$ and $y = a\cos\theta$, then the value of $x^2 + y^2$ is

(A) 1
(B) a^2
(C) a
(D) 0

ANSWER **(B) a^2**

Q136 MCQ · 1 mark **2026 (II)** – 430/8/2

If $\sec\theta + \tan\theta = p$, then $\sin\theta$ is equal to

(A) $\frac{p^2 - 1}{p^2 + 1}$
(B) $\frac{p^2 + 1}{p^2 - 1}$
(C) $\frac{2p}{p^2 + 1}$
(D) $\frac{p^2 - 1}{2p}$

ANSWER **(A) $\frac{p^2 - 1}{p^2 + 1}$**

Q137 MCQ · 1 mark — **2026 (II)** – 430/8/3

$\frac{\cot\theta \sec^2\theta}{\operatorname{cosec}\theta}$ is equal to

(A) $\sec\theta$ (B) $\operatorname{cosec}\theta$

(C) $\sin\theta$ (D) $\tan\theta$

ANSWER **(A) $\sec\theta$**

Q138 Assertion–Reason · 1 mark — **2023** – 430/6/1, 430/6/2, 430/6/3

Assertion (A) : For $0 < \theta \leq 90^\circ$, $\operatorname{cosec}\theta - \cot\theta$ and $\operatorname{cosec}\theta + \cot\theta$ are reciprocal of each other.
Reason (R) : $\cot^2\theta - \operatorname{cosec}^2\theta = 1$

(A) Both true, R explains A · (B) Both true, R does not explain A · (C) A true, R false · (D) A false, R true

ANSWER *
$(\operatorname{cosec}\theta - \cot\theta)(\operatorname{cosec}\theta + \cot\theta) = \operatorname{cosec}^2\theta - \cot^2\theta = 1$, so A is true. $\cot^2\theta - \operatorname{cosec}^2\theta = -1$, so R is false.
(C) Assertion (A) is true, but Reason (R) is false.

Q139 Assertion–Reason · 1 mark — **2025** – 430/3/1

Assertion (A) : For $\sin\theta = 1$, $\cos\theta$ must be 0.
Reason (R) : $\sin^2\theta - \cos^2\theta = 1$.

(A) Both true, R explains A · (B) Both true, R does not explain A · (C) A true, R false · (D) A false, R true

ANSWER *
$\sin^2\theta + \cos^2\theta = 1 \Rightarrow \cos\theta = 0$ when $\sin\theta = 1$, so A is true; R is not an identity (it is $\sin^2\theta + \cos^2\theta = 1$), so R is false.
(C) Assertion (A) is true, but Reason (R) is false.

Q140 Assertion–Reason · 1 mark — **2025** – 430/3/3

Assertion (A) : For an angle θ, $\sec\theta = 1 \Rightarrow \tan\theta = 0$.
Reason (R) : $\sec^2\theta + \tan^2\theta = 1$.

(A) Both true, R explains A · (B) Both true, R does not explain A · (C) A true, R false · (D) A false, R true

ANSWER *
$\tan^2\theta = \sec^2\theta - 1 = 0 \Rightarrow \tan\theta = 0$, so A is true; the identity is $\sec^2\theta - \tan^2\theta = 1$, so R is false.
(C) Assertion (A) is true, but Reason (R) is false.

Q141 Assertion–Reason · 1 mark — **2026 (II)** – 430/7/1, 430/7/2, 430/7/3

Assertion (A) : For an acute angle A, the value of $\sec A$ is always greater than 1.
Reason (R) : $\sec^2 A = \sqrt{1 + \tan^2 A}$.

(A) Both true, R explains A · (B) Both true, R does not explain A · (C) A true, R false · (D) A false, R true

ANSWER **(C) Assertion (A) is true, but Reason (R) is false.**

Q142 Assertion–Reason · 1 mark — **2026 (II)** – 430(B)

Assertion (A) : For $0^\circ < \theta < 90^\circ$, $\sec\theta + \cos\theta \geq 2$.

Reason (R) : For $x > 0$, $x + \dfrac{1}{x} \geq 2$.

(A) Both true, R explains A · (B) Both true, R does not explain A · (C) A true, R false · (D) A false, R true

ANSWER

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q143 Very Short Answer · 2 marks · Internal choice (OR) part — **2023** – 430/C/B

Prove that : $1 - \dfrac{\sin^2 A}{1+\cos A} = \cos A$

ANSWER

$\text{LHS} = 1 - \dfrac{\sin^2 A}{1+\cos A} = 1 - \dfrac{1-\cos^2 A}{1+\cos A}$ — 1

$= 1 - (1 - \cos A) = \cos A = \text{RHS}$ — 1

Q144 Very Short Answer · 2 marks · Internal choice (OR) part — **2023** – 430/C/B

Prove that : $\dfrac{1-\cot^2\theta}{1+\cot^2\theta} + 2\cos^2\theta = 1$

ANSWER

$\text{LHS} = \dfrac{1-\cot^2\theta}{1+\cot^2\theta} + 2\cos^2\theta = \dfrac{\sin^2\theta - \cos^2\theta}{\sin^2\theta + \cos^2\theta} + 2\cos^2\theta$ — 1

$= \sin^2\theta - \cos^2\theta + 2\cos^2\theta = \sin^2\theta + \cos^2\theta = 1 = \text{RHS}$ — 1

Q145 Very Short Answer · 2 marks · Internal choice (OR) part — **2023** – 430(B)

If $\tan\theta = \dfrac{8}{7}$, evaluate : $\dfrac{(1-\sin\theta)(1+\sin\theta)}{(1-\cos\theta)(1+\cos\theta)}$

ANSWER *

$= \dfrac{1-\sin^2\theta}{1-\cos^2\theta} = \dfrac{\cos^2\theta}{\sin^2\theta} = \cot^2\theta$

$= \left(\dfrac{7}{8}\right)^2 = \dfrac{49}{64}$

$\boxed{\dfrac{49}{64}}$

Q146 Very Short Answer · 2 marks — **2024** – 430/1/1, 430/1/3, 430/4/2; **2026 (II)** – 430/8/3

Prove : $\dfrac{1-\cos\theta}{1+\cos\theta} = (\operatorname{cosec}\theta - \cot\theta)^2$

ANSWER

$\text{RHS} = \left(\dfrac{1}{\sin\theta} - \dfrac{\cos\theta}{\sin\theta}\right)^2 = \left(\dfrac{1-\cos\theta}{\sin\theta}\right)^2$ — ½+½

$= \dfrac{(1-\cos\theta)^2}{\sin^2\theta} = \dfrac{(1-\cos\theta)^2}{(1-\cos\theta)(1+\cos\theta)}$ — ½

$= \dfrac{1-\cos\theta}{1+\cos\theta} = \text{LHS}$ — ½

Q147 Very Short Answer · 2 marks · Internal choice (OR) part — **2024** – 430(B)

Prove that $\cos^4 A - \sin^4 A = 2\cos^2 A - 1$.

ANSWER *

$\text{LHS} = (\cos^2 A - \sin^2 A)(\cos^2 A + \sin^2 A) = \cos^2 A - \sin^2 A$

$= \cos^2 A - (1 - \cos^2 A) = 2\cos^2 A - 1 = \text{RHS}$

Q148 Very Short Answer · 2 marks · Internal choice (OR) part — **2025** – 430/3/1, 430/3/2, 430/3/3

If $(\sec A + \tan A)(1 - \sin A) = k\cos A$, then find the value of k.

ANSWER *

$(\sec A + \tan A)(1 - \sin A) = \dfrac{1 + \sin A}{\cos A}(1 - \sin A) = \dfrac{\cos^2 A}{\cos A} = \cos A$

$\therefore\ k = 1$

$\boxed{k = 1}$

Q149 Very Short Answer · 2 marks — **2026 (II)** – 430/8/1, 430/8/2

If $\cos\theta = \dfrac{4}{5}$, find the value of $\dfrac{\sec\theta - \tan\theta}{\sec\theta + \tan\theta}$.

ANSWER

$\sec\theta = \dfrac{5}{4}$ ½

$\tan\theta = \dfrac{3}{4}$ ½

$\dfrac{\sec\theta - \tan\theta}{\sec\theta + \tan\theta} = \dfrac{1}{4}$ 1

$\boxed{\dfrac{1}{4}}$

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Q150 Very Short Answer · 2 marks — **2026 (II)** – 430(B)

Prove that : $(a\sin\theta + b\cos\theta)^2 + (a\cos\theta - b\sin\theta)^2 = a^2 + b^2$.

ANSWER

$\text{LHS} = a^2\sin^2\theta + b^2\cos^2\theta + 2ab\sin\theta\cos\theta + a^2\cos^2\theta + b^2\sin^2\theta - 2ab\sin\theta\cos\theta$ 1

$= a^2(\sin^2\theta + \cos^2\theta) + b^2(\sin^2\theta + \cos^2\theta) = a^2 + b^2 = \text{RHS}$ 1

Q151 Very Short Answer · 2 marks — **2026 (II)** – 430(B)

Prove that : $(\sec\theta - \text{cosec}\,\theta)(1 + \tan\theta + \cot\theta) = \tan\theta\sec\theta - \cot\theta\,\text{cosec}\,\theta$.

ANSWER

$\text{LHS} = \left(\dfrac{1}{\cos\theta} - \dfrac{1}{\sin\theta}\right)\left(1 + \dfrac{\sin\theta}{\cos\theta} + \dfrac{\cos\theta}{\sin\theta}\right)$ ½

$= \left(\dfrac{\sin\theta - \cos\theta}{\sin\theta\cos\theta}\right)\left(\dfrac{\sin\theta\cos\theta + \sin^2\theta + \cos^2\theta}{\sin\theta\cos\theta}\right)$ ½

$= \dfrac{\sin^3\theta - \cos^3\theta}{\sin^2\theta\cos^2\theta} = \dfrac{\sin^3\theta}{\sin^2\theta\cos^2\theta} - \dfrac{\cos^3\theta}{\sin^2\theta\cos^2\theta} = \tan\theta\sec\theta - \cot\theta\,\text{cosec}\,\theta = \text{RHS}$ 1

Q152 Short Answer · 3 marks — **2023** – 430/C/1, 430/C/2; **2024** – 430/2/2, 430/2/3; **2026 (I)** – 430/4/2

Prove that : $\frac{\tan\theta}{1-\cot\theta}+\frac{\cot\theta}{1-\tan\theta}=1+\sec\theta\,\text{cosec}\,\theta$

ANSWER

$$\text{LHS}=\frac{\frac{\sin\theta}{\cos\theta}}{1-\frac{\cos\theta}{\sin\theta}}+\frac{\frac{\cos\theta}{\sin\theta}}{1-\frac{\sin\theta}{\cos\theta}}=\frac{\sin^2\theta}{(\sin\theta-\cos\theta)\cos\theta}+\frac{\cos^2\theta}{(\cos\theta-\sin\theta)\sin\theta}$$ — 1

$$=\frac{\sin^3\theta-\cos^3\theta}{\sin\theta\cos\theta(\sin\theta-\cos\theta)}$$ — 1

$$=\frac{\sin^2\theta+\cos^2\theta+\sin\theta\cos\theta}{\sin\theta\cos\theta}$$ — ½

$$=\sec\theta\,\text{cosec}\,\theta+1=\text{RHS}$$ — ½

Q153 Short Answer · 3 marks — **2023** – 430/C/3

Prove that : $\frac{\cot^2\theta(\sec\theta-1)}{1+\sin\theta}=\sec^2\theta\,\frac{(1-\sin\theta)}{(\sec\theta+1)}$

ANSWER

$$\text{LHS}=\frac{\frac{\cos^2\theta}{\sin^2\theta}\left(\frac{1}{\cos\theta}-1\right)}{1+\sin\theta}=\frac{\cos\theta}{(1+\cos\theta)(1+\sin\theta)}$$ — 1+½

$$\text{RHS}=\frac{1}{\cos^2\theta}\times\frac{(1-\sin\theta)\cos\theta}{1+\cos\theta}=\frac{(1-\sin\theta)\cos\theta}{(1-\sin^2\theta)(1+\cos\theta)}$$ — 1

$$=\frac{\cos\theta}{(1+\cos\theta)(1+\sin\theta)};\therefore\text{LHS}=\text{RHS}$$ — ½

Q154 Short Answer · 3 marks — **2023** – 430(B)

Prove that : $(\text{cosec}\,A-\sin A)(\sec A-\cos A)(\tan A+\cot A)=1$

ANSWER *

$$(\text{cosec}\,A-\sin A)(\sec A-\cos A)=\frac{\cos^2 A}{\sin A}\cdot\frac{\sin^2 A}{\cos A}=\sin A\cos A$$

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

$$\text{LHS}=\sin A\cos A\times\frac{1}{\sin A\cos A}=1=\text{RHS}$$

Q155 Short Answer · 3 marks · Internal choice (OR) part — **2023** – 430/1/1, 430/1/2

Prove that $\sec\theta(1-\sin\theta)(\sec\theta+\tan\theta)=1$

ANSWER *

$$\text{LHS}=\frac{1}{\cos\theta}(1-\sin\theta)\left(\frac{1+\sin\theta}{\cos\theta}\right)$$

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

$$=1=\text{RHS}$$

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Q156 Short Answer · 3 marks · Internal choice (OR) part · **2023** – 430/1/1, 430/1/2; **2024** – 430/4/3; **2025** – 430/3/2

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

ANSWER *

$\text{LHS} = \frac{1}{\sec\theta} + 1 = \cos\theta + 1$

$\text{RHS} = \frac{1-\cos^2\theta}{1-\cos\theta} = \frac{(1-\cos\theta)(1+\cos\theta)}{1-\cos\theta}$

$= 1 + \cos\theta = \text{LHS}$

Q157 Short Answer · 3 marks · Internal choice (OR) part · **2023** – 430/1/3; **2025** – 430/2/1

Prove that $\frac{\cos A}{1+\sin A} + \frac{1+\sin A}{\cos A} = 2\sec A.$

ANSWER *

$\text{LHS} = \frac{\cos^2 A + (1+\sin A)^2}{(1+\sin A)\cos A} = \frac{\cos^2 A + 1 + 2\sin A + \sin^2 A}{(1+\sin A)\cos A}$

$= \frac{2(1+\sin A)}{(1+\sin A)\cos A}$

$= \frac{2}{\cos A} = 2\sec A = \text{RHS}$

Q158 Short Answer · 3 marks · Internal choice (OR) part · **2023** – 430/1/3; **2024** – 430/3/2, 430/5/1; **2025** – 430/5/1

Prove that $(\sin A + \text{cosec}\, A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A.$

ANSWER *

$\text{LHS} = \sin^2 A + \text{cosec}^2 A + 2 + \cos^2 A + \sec^2 A + 2$

$= (\sin^2 A + \cos^2 A) + (1 + \cot^2 A) + (1 + \tan^2 A) + 4$

$= 7 + \tan^2 A + \cot^2 A = \text{RHS}$

Q159 Short Answer · 3 marks · Internal choice (OR) part · **2023** – 430/2/1, 430/2/2, 430/2/3

Prove that : $\frac{1-\cos\theta}{1+\cos\theta} = (\text{cosec}\,\theta - \cot\theta)^2$

ANSWER *

$\text{RHS} = \left(\frac{1-\cos\theta}{\sin\theta}\right)^2 = \frac{(1-\cos\theta)^2}{1-\cos^2\theta}$

$= \frac{(1-\cos\theta)^2}{(1-\cos\theta)(1+\cos\theta)}$

$= \frac{1-\cos\theta}{1+\cos\theta} = \text{LHS}$

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Q160 Short Answer · 3 marks · Internal choice (OR) part — **2023** – 430/2/1, 430/2/2, 430/2/3

Prove that : $\left(1+\frac{1}{\tan^2 A}\right)\left(1+\frac{1}{\cot^2 A}\right)=\frac{1}{\sin^2 A-\sin^4 A}$

ANSWER *

$\text{LHS}=(1+\cot^2 A)(1+\tan^2 A)=\operatorname{cosec}^2 A\sec^2 A$

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

$=\frac{1}{\sin^2 A-\sin^4 A}=\text{RHS}$

Q161 Short Answer · 3 marks — **2023** – 430/4/1

Prove that $\frac{1+\tan^2 A}{1+\cot^2 A}=\sec^2 A-1$

ANSWER *

$\text{LHS}=\frac{\sec^2 A}{\operatorname{cosec}^2 A}=\frac{\sin^2 A}{\cos^2 A}$

$=\tan^2 A$

$=\sec^2 A-1=\text{RHS}$

Q162 Short Answer · 3 marks — **2023** – 430/5/1; **2024** – 430/5/2; **2026 (I)** – 430/4/1, 430/4/3

Prove that : $(\operatorname{cosec} A-\sin A)(\sec A-\cos A)=\frac{1}{\tan A+\cot A}$

ANSWER *

$\text{LHS}=\frac{1-\sin^2 A}{\sin A}\cdot\frac{1-\cos^2 A}{\cos A}=\frac{\cos^2 A}{\sin A}\cdot\frac{\sin^2 A}{\cos A}=\sin A\cos A$

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

$=\sin A\cos A=\text{LHS}$

Q163 Short Answer · 3 marks — **2023** – 430/5/2

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

ANSWER *

$\text{LHS}=\frac{(\sin\theta+\cos\theta)^2+(\sin\theta-\cos\theta)^2}{\sin^2\theta-\cos^2\theta}=\frac{2(\sin^2\theta+\cos^2\theta)}{\sin^2\theta-\cos^2\theta}$

$=\frac{2}{\sin^2\theta-\cos^2\theta}$; dividing numerator and denominator by $\cos^2\theta$

$=\frac{2\sec^2\theta}{\tan^2\theta-1}=\text{RHS}$

Q164 Short Answer · 3 marks **2023** – 430/5/3

Prove that : $\sqrt{\frac{\sec\theta-1}{\sec\theta+1}}+\sqrt{\frac{\sec\theta+1}{\sec\theta-1}}=2\,\text{cosec}\,\theta$

ANSWER *

$$\text{LHS}=\frac{(\sec\theta-1)+(\sec\theta+1)}{\sqrt{\sec^2\theta-1}}=\frac{2\sec\theta}{\tan\theta}\ (\theta\text{ acute})$$
$$=\frac{2}{\cos\theta}\times\frac{\cos\theta}{\sin\theta}$$
$$=\frac{2}{\sin\theta}=2\,\text{cosec}\,\theta=\text{RHS}$$

Q165 Short Answer · 3 marks Internal choice (OR) part **2023** – 430/6/1, 430/6/2, 430/6/3

Prove that $\frac{\cot A-\cos A}{\cot A+\cos A}=\frac{\cos^2 A}{(1+\sin A)^2}$

ANSWER *

$$\text{LHS}=\frac{\cos A\left(\frac{1}{\sin A}-1\right)}{\cos A\left(\frac{1}{\sin A}+1\right)}=\frac{1-\sin A}{1+\sin A}$$
$$=\frac{(1-\sin A)(1+\sin A)}{(1+\sin A)^2}=\frac{1-\sin^2 A}{(1+\sin A)^2}$$
$$=\frac{\cos^2 A}{(1+\sin A)^2}=\text{RHS}$$

Q166 Short Answer · 3 marks Internal choice (OR) part **2023** – 430/6/1, 430/6/2, 430/6/3

Prove that $(\sec\theta+\tan\theta)(1-\sin\theta)=\cos\theta$

ANSWER *

$$\text{LHS}=\frac{1+\sin\theta}{\cos\theta}(1-\sin\theta)$$
$$=\frac{1-\sin^2\theta}{\cos\theta}=\frac{\cos^2\theta}{\cos\theta}$$
$$=\cos\theta=\text{RHS}$$

Q167 Short Answer · 3 marks **2024** – 430/S/1

Prove that : $\frac{\cot A-\cos A}{\cot A+\cos A}=(\sec A-\tan A)^2$

ANSWER

$$\text{LHS}=\frac{\frac{\cos A}{\sin A}-\cos A}{\frac{\cos A}{\sin A}+\cos A}=\frac{\cos A(1-\sin A)}{\cos A(1+\sin A)}$$ 1
$$=\frac{(1-\sin A)^2}{1-\sin^2 A}=\left(\frac{1-\sin A}{\cos A}\right)^2$$ 1
$$=(\sec A-\tan A)^2=\text{RHS}$$ 1

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Q168 Short Answer · 3 marks **2024** – 430/S/2

If $x\cos\theta + y\sin\theta = a$ and $x\sin\theta - y\cos\theta = b$, prove that $a^2 + b^2 = x^2 + y^2$.

ANSWER

$x^2\cos^2\theta + y^2\sin^2\theta + 2xy\sin\theta\cos\theta = a^2$ — 1

$x^2\sin^2\theta + y^2\cos^2\theta - 2xy\sin\theta\cos\theta = b^2$ — 1

adding, we get, $x^2(\cos^2\theta + \sin^2\theta) + y^2(\cos^2\theta + \sin^2\theta) = a^2 + b^2$ — ½

$\Rightarrow x^2 + y^2 = a^2 + b^2$ — ½

Q169 Short Answer · 3 marks **2024** – 430/S/3

Simplify : $(\text{cosec}\,\theta - \sin\theta)(\sec\theta - \cos\theta)(\tan\theta + \cot\theta)$.

ANSWER

Given expression is $= \left(\frac{1}{\sin\theta} - \sin\theta\right)\left(\frac{1}{\cos\theta} - \cos\theta\right)\left(\frac{\sin\theta}{\cos\theta} + \frac{\cos\theta}{\sin\theta}\right)$ — 1

$= \left(\frac{1-\sin^2\theta}{\sin\theta}\right)\left(\frac{1-\cos^2\theta}{\cos\theta}\right)\left(\frac{\sin^2\theta+\cos^2\theta}{\cos\theta\sin\theta}\right)$ — 1

$= \left(\frac{\cos^2\theta}{\sin\theta}\right)\left(\frac{\sin^2\theta}{\cos\theta}\right)\left(\frac{1}{\cos\theta\sin\theta}\right) = 1$ — 1

1

Q170 Short Answer · 3 marks **2024** – 430(B)/S

Prove that : $\frac{1+\cos\theta+\sin\theta}{1+\cos\theta-\sin\theta} = \frac{1+\sin\theta}{\cos\theta}$

ANSWER

LHS $= \frac{(1+\cos\theta)+\sin\theta}{(1+\cos\theta)-\sin\theta} \times \frac{(1+\cos\theta)+\sin\theta}{(1+\cos\theta)+\sin\theta}$ — ½

$= \frac{(1+\cos\theta)^2 + \sin^2\theta + 2(1+\cos\theta)\sin\theta}{(1+\cos\theta)^2 - \sin^2\theta}$ — 1

$= \frac{2 + 2\cos\theta + 2(1+\cos\theta)\sin\theta}{1+\cos^2\theta + 2\cos\theta - \sin^2\theta}$ — ½

$= \frac{2(1+\cos\theta)(1+\sin\theta)}{2\cos^2\theta + 2\cos\theta}$ — ½

$= \frac{1+\sin\theta}{\cos\theta} = \text{RHS}$ — ½

Q171 Short Answer · 3 marks Internal choice (OR) part **2024** – 430(B); **2026 (I)** – 430(B)

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

ANSWER *

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

$\Rightarrow \cos\theta = \frac{\sin\theta}{\sqrt{2}-1} = (\sqrt{2}+1)\sin\theta$

$\Rightarrow \cos\theta - \sin\theta = \sqrt{2}\sin\theta$

Q172 Short Answer · 3 marks · Internal choice (OR) part — **2024** – 430(B); **2025** – 430/6/1

Prove that $\frac{\tan\theta}{1-\cot\theta}+\frac{\cot\theta}{1-\tan\theta}=1+\tan\theta+\cot\theta.$

ANSWER *

$$\text{LHS}=\frac{\sin^2\theta}{\cos\theta(\sin\theta-\cos\theta)}-\frac{\cos^2\theta}{\sin\theta(\sin\theta-\cos\theta)}=\frac{\sin^3\theta-\cos^3\theta}{\sin\theta\cos\theta(\sin\theta-\cos\theta)}$$
$$=\frac{1+\sin\theta\cos\theta}{\sin\theta\cos\theta}=1+\frac{\sin^2\theta+\cos^2\theta}{\sin\theta\cos\theta}$$
$$=1+\tan\theta+\cot\theta=\text{RHS}$$

Q173 Short Answer · 3 marks · Internal choice (OR) part — **2024** – 430/3/2

If $\cos A=\frac{5}{13}$, then verify that $\frac{\cos A}{1-\tan A}+\frac{\sin A}{1-\cot A}=\cos A+\sin A.$

ANSWER *

$$\sin A=\frac{12}{13},\ \tan A=\frac{12}{5},\ \cot A=\frac{5}{12}$$
$$\text{LHS}=\frac{5/13}{1-\frac{12}{5}}+\frac{12/13}{1-\frac{5}{12}}=-\frac{25}{91}+\frac{144}{91}=\frac{119}{91}=\frac{17}{13}$$
$$\text{RHS}=\frac{5}{13}+\frac{12}{13}=\frac{17}{13};\ \text{verified}$$

Q174 Short Answer · 3 marks — **2024** – 430/4/1

Prove that : $(\tan A+\sec A)^2+(\tan A-\sec A)^2=2\left(\frac{1+\sin^2 A}{1-\sin^2 A}\right)$

ANSWER *

$$\text{LHS}=2(\tan^2 A+\sec^2 A)$$
$$=2\left(\frac{\sin^2 A}{\cos^2 A}+\frac{1}{\cos^2 A}\right)=2\left(\frac{1+\sin^2 A}{\cos^2 A}\right)$$
$$=2\left(\frac{1+\sin^2 A}{1-\sin^2 A}\right)=\text{RHS}$$

Q175 Short Answer · 3 marks — **2024** – 430/5/3

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

ANSWER *

$$\text{LHS}=\sqrt{\frac{(1+\sin A)(1+\sin A)}{(1-\sin A)(1+\sin A)}}=\sqrt{\frac{(1+\sin A)^2}{1-\sin^2 A}}$$
$$=\frac{1+\sin A}{\cos A}$$
$$=\sec A+\tan A=\text{RHS}$$

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Q176 Short Answer · 3 marks · Internal choice (OR) part — **2025** – 430/5/2; **2026 (II)** – 430/7/1, 430/7/2, 430/7/3

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

ANSWER

$\text{LHS}=\frac{\cos A}{1-\frac{\sin A}{\cos A}}+\frac{\sin A}{1-\frac{\cos A}{\sin A}}$ — 1

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

$=\frac{1}{\cos A-\sin A}(\cos^2 A-\sin^2 A)$ — ½

$=\cos A+\sin A=\text{RHS}$ — ½

Q177 Short Answer · 3 marks · Internal choice (OR) part — **2025** – 430(B)

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

ANSWER *

$\text{LHS}=\frac{(\sin A+\cos A)^2+(\sin A-\cos A)^2}{\sin^2 A-\cos^2 A}=\frac{2(\sin^2 A+\cos^2 A)}{\sin^2 A-\cos^2 A}$

$=\frac{2}{(1-\cos^2 A)-\cos^2 A}$

$=\frac{2}{1-2\cos^2 A}=\text{RHS}$

Q178 Short Answer · 3 marks — **2025** – 430/1/1

Prove that : $\frac{1+\cot^2 A}{1+\tan^2 A}=\left(\frac{1-\cot A}{1-\tan A}\right)^2$

ANSWER *

$\text{LHS}=\frac{\text{cosec}^2 A}{\sec^2 A}=\frac{\cos^2 A}{\sin^2 A}=\cot^2 A$

$\text{RHS}=\left(\frac{\frac{\tan A-1}{\tan A}}{1-\tan A}\right)^2=\left(\frac{-1}{\tan A}\right)^2$

$=\cot^2 A=\text{LHS}$

Q179 Short Answer · 3 marks — **2025** – 430/1/2

Prove the following trigonometric identity : $\sqrt{\frac{\text{cosec}\,A-1}{\text{cosec}\,A+1}}=\sec A-\tan A$

ANSWER *

$\text{LHS}=\sqrt{\frac{(\text{cosec}\,A-1)^2}{\text{cosec}^2 A-1}}=\frac{\text{cosec}\,A-1}{\cot A}$

$=\left(\frac{1}{\sin A}-1\right)\frac{\sin A}{\cos A}=\frac{1-\sin A}{\cos A}$

$=\sec A-\tan A=\text{RHS}$

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Q180 Short Answer · 3 marks **2025** – 430/1/3

Prove the following trigonometric identity : $(\sin A - \operatorname{cosec} A)(\cos A - \sec A) = \dfrac{1}{\tan A + \cot A}$

ANSWER *

$$\text{LHS} = \left(\frac{\sin^2 A - 1}{\sin A}\right)\left(\frac{\cos^2 A - 1}{\cos A}\right) = \frac{(-\cos^2 A)(-\sin^2 A)}{\sin A \cos A} = \sin A \cos A$$

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

$$= \sin A \cos A = \text{LHS}$$

Q181 Short Answer · 3 marks **2025** – 430/2/2

Prove the following trigonometric identity : $\dfrac{1 - \sin\theta}{\cos\theta} + \dfrac{\cos\theta}{1 - \sin\theta} = 2\sec\theta$

ANSWER *

$$\text{LHS} = \frac{(1 - \sin\theta)^2 + \cos^2\theta}{\cos\theta(1 - \sin\theta)} = \frac{1 - 2\sin\theta + \sin^2\theta + \cos^2\theta}{\cos\theta(1 - \sin\theta)}$$

$$= \frac{2(1 - \sin\theta)}{\cos\theta(1 - \sin\theta)}$$

$$= \frac{2}{\cos\theta} = 2\sec\theta = \text{RHS}$$

Q182 Short Answer · 3 marks **2025** – 430/2/3

Prove the following trigonometric identity : $\dfrac{\cos A - 2\cos^3 A}{2\sin^3 A - \sin A} = \cot A$

ANSWER *

$$\text{LHS} = \frac{\cos A(1 - 2\cos^2 A)}{\sin A(2\sin^2 A - 1)}$$

$$1 - 2\cos^2 A = 1 - 2(1 - \sin^2 A) = 2\sin^2 A - 1$$

$$\therefore \text{LHS} = \frac{\cos A}{\sin A} = \cot A = \text{RHS}$$

Q183 Short Answer · 3 marks **2025** – 430/3/3

Prove the following trigonometric identity : $\dfrac{\tan\theta}{1 + \cot\theta} + \dfrac{\cot\theta}{1 + \tan\theta} = \tan\theta + \cot\theta - 1$

ANSWER *

Let $t = \tan\theta$: $\text{LHS} = \dfrac{t}{1 + \frac{1}{t}} + \dfrac{\frac{1}{t}}{1 + t} = \dfrac{t^2}{t + 1} + \dfrac{1}{t(t + 1)}$

$$= \frac{t^3 + 1}{t(t + 1)} = \frac{(t + 1)(t^2 - t + 1)}{t(t + 1)} = \frac{t^2 - t + 1}{t}$$

$$= t - 1 + \frac{1}{t} = \tan\theta + \cot\theta - 1 = \text{RHS}$$

Q184 Short Answer · 3 marks — **2025** – 430/5/3

Prove that : $(\sin\theta + \sec\theta)^2 + (\cos\theta + \operatorname{cosec}\theta)^2 = (1 + \sec\theta\operatorname{cosec}\theta)^2$.

ANSWER *

$\text{LHS} = \sin^2\theta + \cos^2\theta + \sec^2\theta + \operatorname{cosec}^2\theta + 2(\tan\theta + \cot\theta)$

$\sec^2\theta + \operatorname{cosec}^2\theta = \sec^2\theta\operatorname{cosec}^2\theta$ and $\tan\theta + \cot\theta = \sec\theta\operatorname{cosec}\theta$

$\text{LHS} = 1 + 2\sec\theta\operatorname{cosec}\theta + \sec^2\theta\operatorname{cosec}^2\theta = (1 + \sec\theta\operatorname{cosec}\theta)^2 = \text{RHS}$

Q185 Short Answer · 3 marks — **2025** – 430/6/3; **2026 (I)** – 430(B)

Prove that $\dfrac{\sin\theta}{1+\cos\theta} + \dfrac{1+\cos\theta}{\sin\theta} = 2\operatorname{cosec}\theta$.

ANSWER *

$$\text{LHS} = \frac{\sin^2\theta + (1+\cos\theta)^2}{(1+\cos\theta)\sin\theta} = \frac{\sin^2\theta + 1 + 2\cos\theta + \cos^2\theta}{(1+\cos\theta)\sin\theta}$$
$$= \frac{2(1+\cos\theta)}{(1+\cos\theta)\sin\theta}$$
$$= \frac{2}{\sin\theta} = 2\operatorname{cosec}\theta = \text{RHS}$$

Q186 Short Answer · 3 marks · Internal choice (OR) part — **2026 (I)** – 430/4/1, 430/4/3

Prove that $\dfrac{\cot A - \cos A}{\cot A + \cos A} = \dfrac{\sec A - \tan A}{\sec A + \tan A}$

ANSWER *

$$\text{LHS} = \frac{\cos A\left(\frac{1}{\sin A} - 1\right)}{\cos A\left(\frac{1}{\sin A} + 1\right)} = \frac{1 - \sin A}{1 + \sin A}$$
$$\text{RHS} = \frac{\frac{1-\sin A}{\cos A}}{\frac{1+\sin A}{\cos A}} = \frac{1 - \sin A}{1 + \sin A}$$
$\therefore$ LHS = RHS

Q187 Short Answer · 3 marks · Internal choice (OR) part — **2026 (I)** – 430/4/2

Prove that $\dfrac{(\sec\theta + \tan\theta)^2 - 1}{(\sec\theta + \tan\theta)^2 + 1} = \sin\theta$.

ANSWER *

$$(\sec\theta + \tan\theta)^2 = \frac{(1+\sin\theta)^2}{\cos^2\theta} = \frac{(1+\sin\theta)^2}{(1-\sin\theta)(1+\sin\theta)} = \frac{1+\sin\theta}{1-\sin\theta}$$
$$\text{LHS} = \frac{\frac{1+\sin\theta}{1-\sin\theta} - 1}{\frac{1+\sin\theta}{1-\sin\theta} + 1} = \frac{2\sin\theta}{2}$$
$$= \sin\theta = \text{RHS}$$

Q188 Short Answer · 3 marks — **2026 (I)** – 430/5/2

Prove that : $\tan^2\theta + \cot^2\theta + 2 = \sec^2\theta\,\text{cosec}^2\theta$.

ANSWER *

$\text{LHS} = (\tan\theta + \cot\theta)^2$ (as $\tan\theta\cot\theta = 1$)

$= \left(\frac{\sin^2\theta + \cos^2\theta}{\sin\theta\cos\theta}\right)^2 = \frac{1}{\sin^2\theta\cos^2\theta}$

$= \sec^2\theta\,\text{cosec}^2\theta = \text{RHS}$

Q189 Short Answer · 3 marks — Internal choice (OR) part — **2026 (II)** – 430/7/1, 430/7/2, 430/7/3

Prove that : $\frac{\cot A - \cos A}{\cot A + \cos A} = \frac{(\text{cosec}\,A - 1)^2}{\cot^2 A}$

ANSWER

$\text{LHS} = \frac{\frac{\cos A}{\sin A} - \cos A}{\frac{\cos A}{\sin A} + \cos A} = \frac{\cos A(\text{cosec}\,A - 1)}{\cos A(\text{cosec}\,A + 1)}$ — 1

$= \frac{\text{cosec}\,A - 1}{\text{cosec}\,A + 1} = \frac{(\text{cosec}\,A - 1)^2}{\text{cosec}^2 A - 1}$ — 1

$= \frac{(\text{cosec}\,A - 1)^2}{\cot^2 A} = \text{RHS}$ — 1

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