EXERCISE 8.1 - Question No. 1

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

Determine: (i) sin A, cos A (ii) sin C, cos C

EXERCISE 8.1 - Question No. 2

Find $\tan P - \cot R$.

EXERCISE 8.1 - Question No. 3

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

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EXERCISE 8.1 - Question No. 4

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

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EXERCISE 8.1 - Question No. 5

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

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EXERCISE 8.1 - Question No. 6

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

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EXERCISE 8.1 - Question No. 7

If $\cot \theta = \frac{7}{8}$, evaluate: (i) $\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$ (ii) $\cot^2\theta$

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EXERCISE 8.1 - Question No. 8

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

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EXERCISE 8.1 - Question No. 9

In triangle ABC, right-angled at B. if $\tan A = \frac{1}{\sqrt{3}}$ find the value of:

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

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EXERCISE 8.1 - Question No. 10

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

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

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EXERCISE 8.1 - Question No. 11

State whether the following are true or false. Justify your answer. (i) The value of tan A always less than 1. (ii) $\sec A = \frac{12}{5}$ for some value of angle A (iii) cos A is the abbreviation used for the cosecant of angle A. (iv) cot A is the product of cot and A (v)$\sin\theta = \frac{4}{3}$ for some angle θ

EXERCISE 8.2 - Question No. 1

Evaluate the following (i) $\sin 60^{\cos 30\,\hat{}} + \sin 30^{\cos 60\,\hat{}}$ (ii) $2\tan^2 45^{+}\cos^2 30^{-\sin\,\hat{}}\,260$ (iii) $\frac{\cos 45^{\square}}{\sec 30^{+}cosec30^{\square}}$ (iv) $\frac{\sin 30^{+}\tan 45^{-c}osec60^{\square}}{\sec 30^{+}\cos 60^{+}\cot 45^{\square}}$ (v) $\frac{5\cos^2 60^{+}4\sec^2 30^{-\tan\,\hat{}}\,245^{\square}}{\sin^2 30^{+}\cos^2 30^{\square}}$

EXERCISE 8.2 - Question No. 2

Choose the correct option and justify your choice : (i) $\frac{2\tan 30^{\square}}{1+\tan^2 30^{\square}}$

$(a)\sin 60^{b}\cos 60^{c}tan60^{d}\sin 30$

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EXERCISE 8.2 - Question No. 3

If $\tan(A+B)=\sqrt{3}$ and $tan(A-B)=\frac{1}{\sqrt{3}}$;

$0^{\leq} A+B \leq 90^{a} \leq B$, find A and B.

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EXERCISE 8.2 - Question No. 4

State whether the following are true or false. Justify your answer. (i) $\sin(A+B) = \sin A + \sin B$. (ii) The value of $\sin\theta$ increases as θ increases. (iii) The value of $\cos\theta$ increases as θ increases. (iv) $\sin\theta = \cos\theta$ for all v

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EXERCISE 8.3 - Question No. 1

Evaluate : (i) $\frac{\sin 18o}{\cos 72o}$ (ii) $\frac{\tan 26o}{\cot 64o}$ (iii) $\cos 48o - \sin 42o$ (iv) $cosec\ 31o \sec 59o$

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EXERCISE 8.3 - Question No. 2

Show that :

$(i) \quad tan\ 48o\ tan\ 23o\ tan\ 42o\ tan\ 67o\ =\ 1 (ii) \quad \cos 38o \cos 52$

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EXERCISE 8.3 - Question No. 3

If $tan2A\ =\ \cot\left(A - 18^{\square}\right)$, where 2A is an acute angle, find the value of A.

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EXERCISE 8.3 - Question No. 4

If $tanA\ =\ \cot B$, prove that $A + B = 90o$

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EXERCISE 8.3 - Question No. 5

If $sec4A = \cos ec\left(A - 20^{\square}\right)$, where 4A is an acute angle, find the value of A.

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EXERCISE 8.3 - Question No. 6

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

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EXERCISE 8.3 - Question No. 7

Express $s \in 67 \oplus \cos 75o$ in terms of trigonometric ratios of angles between $0o$ *and* $45o$.

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EXERCISE 8.4 - Question No. 1

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

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EXERCISE 8.4 - Question No. 2

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

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EXERCISE 8.4 - Question No. 3

Evaluate: (i) $\frac{\sin^2 63 + \sin^2 27}{\cos^2 17 + \cos^2 73}$ (ii) $\sin 25 \ \cos 65^{+} \cos 25 \sin 65$

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EXERCISE 8.4 - Question No. 4

Choose the correct option. Justify your choice. (i)

$9 \sec^2 A - 9 \tan^2 A =$ (a) 1 (b) 9 (c) 8 (d) 0

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EXERCISE 8.4 - Question No. 5

Prove the following identity, where the angles involved are acute

angles for which the expressions are defined.

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

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EXERCISE 8.4 - Question No. 5

Prove the following identity, where the angles involved are acute

angles for which the expressions are defined. (iv)

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

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EXERCISE 8.4 - Question No. 5

Prove the following identity, where the angles involved are acute angles for which the expressions are defined. (ix)

$(cosec\ A\ \sin A)(\sec A - \cos A) = \dfrac{1}{\tan A + \cot A}$ [Hint : Simplify LHS and RHS separately]

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EXERCISE 8.4 - Question No. 5

Prove the following identity, where the angles involved are acute angles for which the expressions are defined. (viii)

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

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EXERCISE 8.4 - Question No. 5

Prove the following identity, where the angles involved are acute angles for which the expressions are defined. (x)

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

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EXERCISE 8.4 - Question No. 5

Prove the following identity, where the angles involved are acute angles for which the expressions are defined. (iii)

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

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EXERCISE 8.4 - Question No. 5

Prove the following identity, where the angles involved are acute angles for which the expressions are defined. (ii)

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

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EXERCISE 8.4 - Question No. 5

Prove the following identity, where the angles involved are acute angles for which the expressions are defined. (vii)

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

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EXERCISE 8.4 - Question No. 5

Prove the following identity, where the angles involved are acute angles for which the expressions are defined. (i)

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

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EXERCISE 8.4 - Question No. 5

Prove the following identity, where the angles involved are acute angles for which the expressions are defined. (vi)

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

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SOLVED EXAMPLES - Question No. 1

Given $\tan A = \frac{4}{3}$, find the other trigonometric ratios of the angle A.

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SOLVED EXAMPLES - Question No. 2

If $\angle B$ and $\angle Q$ are acute angles such that $\sin B = \sin Q$. Then prove that $\angle B = \angle Q$.

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SOLVED EXAMPLES - Question No. 3

Consider ΔACB, right-angled at C, in which $AB = 29$ units, $BC = 21$ units and $\angle ABC = \theta$. Determine the values of (i) $\cos 2\theta + \sin 2\theta$ (ii) $\cos 2\theta \sin 2\theta$

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SOLVED EXAMPLES - Question No. 4

In a right triangle ABC right-angled at B. if $tanA = 1$, then verify that $2 \sin A \cos A = 1.$

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SOLVED EXAMPLES - Question No. 5

In ΔOPQ , right-angled at P, $OP = 7\ cm$ and$OQ - PQ = 1\ cm$

Determine the values of $\sin Q\ and\ \cos Q.$

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SOLVED EXAMPLES - Question No. 6

In ΔABC , right-angled at B, $AB = 5\ cm$ and $\angle ACB = 30$ (see figure). Determine the lengths of the sides BC and AC.

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SOLVED EXAMPLES - Question No. 7

In ΔPQR, right-angled at Q (see figure), $PQ = 3\ cm\ and\ PR = 6\ cm$. Determine $\angle QPR$ and $\angle PRQ$

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SOLVED EXAMPLES - Question No. 8

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

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SOLVED EXAMPLES - Question No. 9

Evaluate $\frac{\tan 65^{\square}}{\cot 25^{\square}}$.

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SOLVED EXAMPLES - Question No. 10

If $\sin 3A = \cos\left(A - 26^{\square}\right)$, where 3A is an acute angle, find the value of A.

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SOLVED EXAMPLES - Question No. 11

Express $\cot 85^o + \cos 75^o$ in terms of trigonometric ratios of angles between 0^o and 45^o

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SOLVED EXAMPLES - Question No. 12

Express the ratios cosA, tanA and sec A in terms of sin A.

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SOLVED EXAMPLES - Question No. 13

Prove that $secA(1 - \sin A)(secA + tanA) = 1$

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SOLVED EXAMPLES - Question No. 14

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

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SOLVED EXAMPLES - Question No. 15

Prove that $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \frac{1}{\sec\theta - \tan\theta}$, using the identity $\sec^2\theta = 1 + \tan^2\theta$

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