



MATHS

BOOKS - SUPER COMPANION MADE EASY

INTRODUCTION TO TRIGONOMETRY

Exercise 11 1

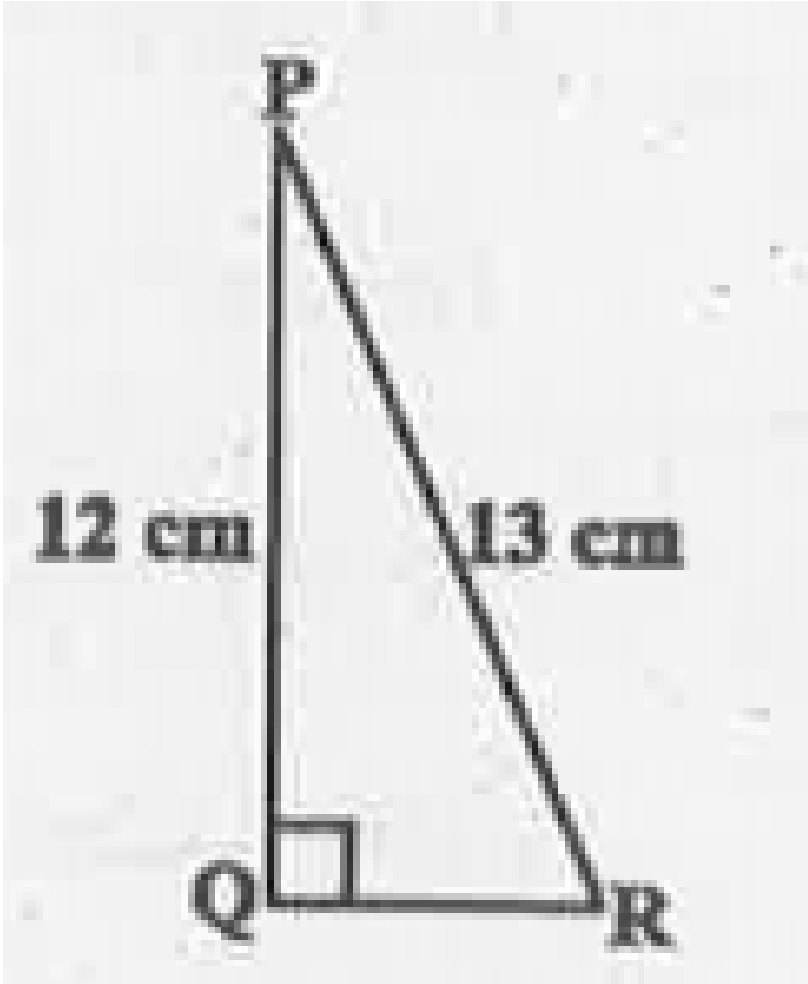
1. In $\triangle ABC$, right - angled at B , $AB = 24\text{cm}$, $BC = 7\text{cm}$. Determine :

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



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



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

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

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

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

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

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

(ii) $\cot^2 \theta$

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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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9. In $\triangle ABC$ 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) $\cos A \cos C - \sin A \sin C$

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10. In $\triangle PQR$, right - angled at Q , $PR + QR = 25\text{cm}$ and $PQ = 5\text{cm}$.

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

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Exercise 11 1 True Or False

1. State True or False and Justify

The value of $\tan A$ is always less than 1.

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2. State True or False and Justify

$\sec A = \frac{12}{5}$ for some value of angle A .

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3. State True or False and Justify

$\cos A$ is the abbreviation used for the co - secant of angle A .

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4. State True or False and Justify

$\cot A$ is the product of \cot and A

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5. State True or False and Justify

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

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Exercise 11 2

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

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2. $2 \tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ = ?$

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$$3. \frac{\cos 45^\circ}{\sec 30^\circ + \csc 30^\circ} = ?$$

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

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$$5. \frac{5 \cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$$

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Exercise 11 2 Multiple Choice Questions

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

A. $\sin 60^\circ$

B. $\cos 60^\circ$

C. $\tan 60^\circ$

D. $\sin 30^\circ$

Answer: A



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2. $\frac{1 - \tan^2 45^\circ}{1 + \tan^2 45^\circ} = ?$



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3. $\sin 2A = 2 \sin A$ is true when $A = ?$

A. 0°

B. 30°

C. 45°

D. 60°

Answer: A



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4.
$$\frac{2\tan 30^\circ}{1 - \tan^2 30^\circ}$$

A. $\sin 60^\circ$

B. $\sin 60^\circ$

C. $\tan 60^\circ$

D. $\sin 30^\circ$

Answer: C



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5. If

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

find A and B



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Exercise 11 2 True Or False

1. State True or False and Justify

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



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2. State True or False and Justify

The value of $\sin \theta$ increases as θ increases



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3. State True or False and Justify

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



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4. State True or False and Justify

$\sin \theta = \cos \theta$ for all values of θ .



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5. State True or False and Justify

$\cot A$ is not defined for $A = 0^\circ$



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1. $\frac{\sin 18^\circ}{\cos 72^\circ} = ?$

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2. $\frac{\tan 26^\circ}{\cot 64^\circ} = ?$

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3. $\cos 48^\circ - \sin 42^\circ = ?$

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4. $\cos ec 31^\circ - \sec 59^\circ = ?$

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5. Show that :

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

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6. Show that :

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

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

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

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

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

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

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

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

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

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

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Exercise 11 4 Multiple Choice Questions

1. $9\sec^2 A - 9\tan^2 A = ?$



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2. $(1 + \tan \theta + \sec \theta)(1 + \cot \theta - \operatorname{cosec} \theta) =$

A. 0

B. 1

C. 2

D. -1

Answer: C



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

A. $\sec A$

B. $\sin A$

C. $\cos ec A$

D. $\cos A$

Answer: D



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4. $\frac{1 + \tan^2 A}{1 + \cot^2 A} =$

A. $\sec 2A$

B. -1

C. $\cos 2A$

D. $\tan 2A$

Answer: D



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Exercise 11 4 Prove The Following

1. Prove the following identities , where the angles involved are acute angles for which the expressions are defined.

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

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

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$$3. \text{ Prove that: } \frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \operatorname{cosec} \theta$$

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$$4. \frac{1 + \sec A}{\sec A} = \frac{\sin^2 A}{1 - \cos A}$$

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$$5. \frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \operatorname{cosec} A + \cot A$$

$\operatorname{cosec} A + \cot A$, = using the identity $\operatorname{cosec}^2 A = 1 + \cot^2 A$.

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$$6. \sqrt{\frac{1 + \sin A}{1 - \sin A}} = \sec A + \tan A$$

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$$7. \frac{\sin \theta - 2 \sin^3 \theta}{2 \cos^3 \theta - \cos \theta} = \tan \theta$$

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$$8. (\sin A + \csc A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$$

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$$9. (\csc A - \sin A)(\sec A - \cos A) = \frac{1}{\tan A + \cot A}$$

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$$10. \left(\frac{1 + \tan^2 A}{1 + \cot^2 A} \right) = \left(\frac{1 - \tan A}{1 - \cot A} \right)^2 = \tan^2 A$$

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