

CLASS 9 MATHS ASSIGNMENT

CHAPTER 17 TRIGONOMETRICAL RATIOS

General direction for the students :-Whatever be the notes provided , everything must be copied in the Maths Copy and then do the Home work in the same Copy.

Trigonometry :

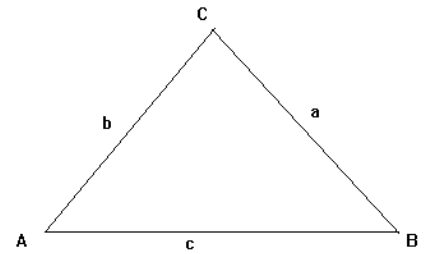
It is the branch of Mathematics , which deals with study of relationships between sides and angles of a triangle.

BASIC CONVENTIONS:

In a ΔABC , (i)side opposite to the angle A is denoted by a

(ii)side opposite to the angle B is denoted by b

(iii)side opposite to the angle C is denoted by c



BASIC RATIOS

Ratios	Reciprocal Ratios	Right angled Triangle (Basic conventions)
$\sin\theta = \frac{\text{Opposite side}}{\text{Hypotenuse}}$ $= \frac{AB}{AC}$	$\operatorname{cosec}\theta = \frac{\text{Hypotenuse}}{\text{Opposite side}}$ $= \frac{AC}{AB}$	
$\cos\theta = \frac{\text{Adjacent side}}{\text{Hypotenuse}}$ $= \frac{BC}{AC}$	$\sec\theta = \frac{\text{Hypotenuse}}{\text{Adjacent side}}$ $= \frac{AC}{BC}$	
$\tan\theta = \frac{\text{Opposite side}}{\text{Adjacent side}}$ $= \frac{AB}{BC}$	$\cot\theta = \frac{\text{Adjacent side}}{\text{Opposite side}}$ $= \frac{BC}{AB}$	

Results :

(1) $\operatorname{cosec}\theta = \frac{1}{\sin\theta}$ (2) $\sec\theta = \frac{1}{\cos\theta}$ (3) $\cot\theta = \frac{1}{\tan\theta}$ (4) $\tan\theta = \frac{\sin\theta}{\cos\theta}$

(1) $\sin\theta \times \operatorname{cosec}\theta = 1$ (2) $\cos\theta \times \sec\theta = 1$ (3) $\tan\theta \times \cot\theta = 1$

Trigonometric Identities:

$\sin^2\theta + \cos^2\theta = 1$	$\sec^2\theta - \tan^2\theta = 1$	$\operatorname{cosec}^2\theta - \cot^2\theta = 1$
$\sin^2\theta = 1 - \cos^2\theta$	$\sec^2\theta = 1 + \tan^2\theta$	$\operatorname{cosec}^2\theta = 1 + \cot^2\theta$

$\cos^2\theta = 1 - \sin^2\theta$	$\tan^2\theta = \sec^2\theta - 1$	$\cot^2\theta = \operatorname{cosec}^2\theta - 1$
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*** $\sin^2\theta$ is same as $(\sin\theta)^2$ similarly $\sin^5\theta = (\sin\theta)^5$

Exercise 17

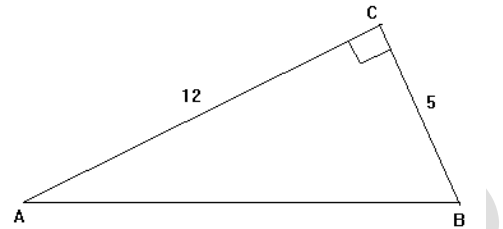
1b) $AB^2 = 12^2 + 5^2$ by Pythagoras theorem

$$\Rightarrow AB=13$$

(i) $\sin A = \frac{BC}{AB} = \frac{5}{13}$, (ii) $\cos A = \frac{AC}{AB} = \frac{12}{13}$,

$$\begin{aligned} \text{(iii)} \sin^2 A + \cos^2 A &= \left(\frac{5}{13}\right)^2 + \left(\frac{12}{13}\right)^2 \\ &= \frac{25 + 144}{169} = 1 \end{aligned}$$

$$\begin{aligned} \text{(iv)} \sec^2 A - \tan^2 A &= \left(\frac{13}{12}\right)^2 - \left(\frac{5}{12}\right)^2 \\ &= \frac{169 - 25}{144} = 1 \end{aligned}$$



4a) consider ΔBDC , $BC^2 = 9^2 + 12^2 \Rightarrow =225$

$$\Rightarrow BC = 15$$

Consider $AB^2 = AC^2 - BC^2$ by Pythagoras theorem

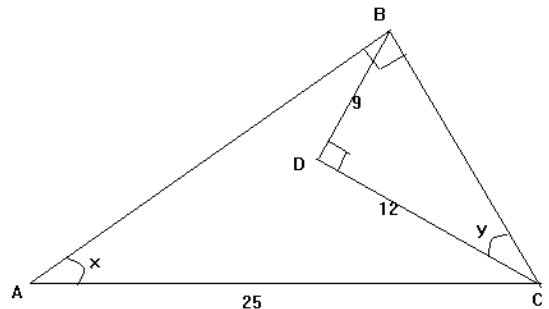
$$= 25^2 - 15^2 \Rightarrow =400$$

$$\Rightarrow AB = 20$$

(i) $2\sin y - \cos y = 2 \times \frac{9}{15} - \frac{12}{15} = \frac{18-12}{15} = \frac{6}{15} = 2/5$

(ii) $2\sin x - \cos x = 2 \times \frac{15}{25} - \frac{20}{25} = \frac{30-20}{25} = \frac{10}{25} = 2/5$

$$\begin{aligned} \text{(iii)} 1 - \sin x + \cos y &= 1 - \frac{15}{25} + \frac{12}{15} \\ &= 1 - \frac{3}{5} + \frac{4}{5} = 6/5 \end{aligned}$$



(iv) $2\cos x - 3\sin y + 4\tan x = 2 \times \frac{20}{25} - 3 \times \frac{9}{15} + 4 \times \frac{15}{20}$

$$= \frac{8}{5} - \frac{9}{5} + \frac{15}{5} = \frac{14}{5}$$

*** For further explanation of above points and more solutions watch the video.

Home Work: Left over questions up to question number 5 do as home work.