

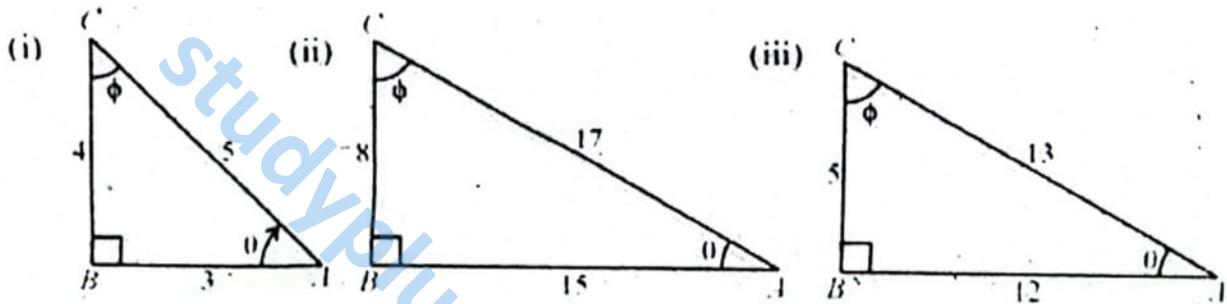


Exercise 6.2



1. For each of the following right-angled triangles, find the trigonometric ratios

- (i) $\sin \theta$ (ii) $\cos \theta$ (iii) $\tan \theta$
 (iv) $\sec \theta$ (v) $\operatorname{cosec} \theta$ (vi) $\cot \phi$
 (vii) $\tan \phi$ (viii) $\operatorname{cosec} \phi$ (ix) $\sec \phi$
 (x) $\cos \phi$



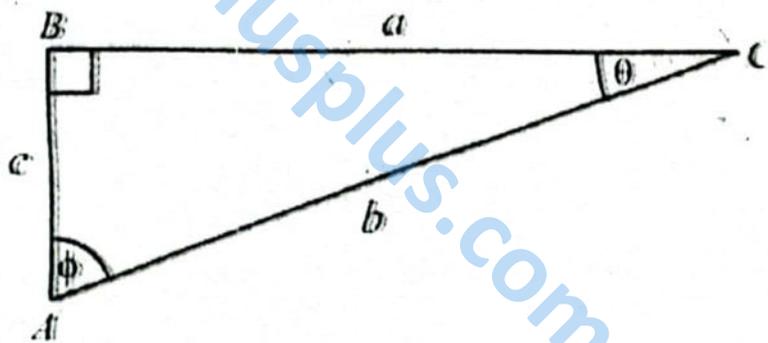
θ	Diagram (i)	Diagram (ii)	Diagram (iii)
$\sin \theta$	$\frac{4}{5}$	$\frac{8}{17}$	$\frac{5}{13}$
$\cos \theta$	$\frac{3}{5}$	$\frac{15}{17}$	$\frac{12}{13}$
$\tan \theta$	$\frac{4}{3}$	$\frac{8}{15}$	$\frac{5}{12}$
$\sec \theta$	$\frac{5}{3}$	$\frac{17}{15}$	$\frac{13}{12}$
$\operatorname{cosec} \theta$	$\frac{5}{4}$	$\frac{17}{8}$	$\frac{13}{5}$



$\cot \theta$	$\frac{3}{4}$	$\frac{8}{15}$	$\frac{12}{5}$
$\tan \phi$	$\frac{3}{4}$	$\frac{15}{8}$	$\frac{12}{5}$
$\operatorname{cosec} \phi$	$\frac{5}{3}$	$\frac{17}{8}$	$\frac{13}{12}$
$\sec \phi$	$\frac{5}{4}$	$\frac{17}{8}$	$\frac{13}{5}$
$\cos \phi$	$\frac{4}{5}$	$\frac{8}{17}$	$\frac{5}{13}$

2. For the following right-angled triangles ABC find the trigonometric ratios for which $m\angle A = \phi$ and $m\angle C = \theta$

- (i) $\sin \theta$ (ii) $\cos \theta$ (iii) $\tan \theta$ (iv) $\sin \phi$
 (v) $\cos \phi$ (vi) $\tan \phi$



θ	Diagram (a)	Diagram (b)
(i) $\sin m\angle \theta$	$\frac{AB}{AC}$	$\frac{AB}{AC}$
(ii) $\cos m\theta$	$\frac{BC}{AC}$	$\frac{BC}{AC}$
(iii) $\tan m\angle \theta$	$\frac{AB}{BC}$	$\frac{AB}{BC}$
(iv) $\sin \theta$	$\frac{AB}{AC}$	$\frac{AB}{AC}$
(v) $\cos \theta$	$\frac{BC}{AC}$	$\frac{BC}{AC}$
(vi) $\tan \theta$	$\frac{AB}{BC}$	$\frac{AB}{BC}$

3. Considering the adjoining triangle ABC , verify that:

(i) $\sin \theta \operatorname{cosec} \theta = 1$

(ii) $\cos \theta \sec \theta = 1$

(iii) $\tan \theta \cot \theta = 1$

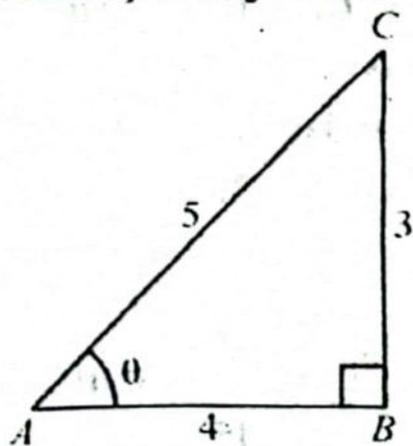
Solution:

$$\sin \theta \cdot \operatorname{cosec} \theta = \frac{BC}{AC} \cdot \frac{AC}{BC} = 1$$

$$\sin \theta \cdot \cos \theta = \left(\frac{\beta}{\beta} \times \frac{\beta}{\beta} = 1 \right)$$

$$\cos \theta \cdot \sec \theta = \frac{AB}{AC} \cdot \frac{AC}{AB} = 1 \quad \left(\frac{4}{5} \times \frac{5}{4} = 1 \right)$$

$$\tan \theta \cdot \cot \theta = \frac{BC}{AB} \cdot \frac{AB}{BC} = 1 \quad \left(\frac{3}{4} \times \frac{4}{3} = 1 \right)$$



4. Fill in the blanks.

(i) $\sin 30^\circ = \sin(90^\circ - 60^\circ) = \underline{\hspace{2cm}}$

(ii) $\cos 30^\circ = \cos(90^\circ - 60^\circ) = \underline{\hspace{2cm}}$

(iii) $\tan 60^\circ = \tan(90^\circ - 30^\circ) = \underline{\hspace{2cm}}$

(iv) $\sin 60^\circ = \sin(90^\circ - 30^\circ) = \underline{\hspace{2cm}}$

(v) $\cos 60^\circ = \cos(90^\circ - 30^\circ) = \underline{\hspace{2cm}}$

(vi) $\sin 45^\circ = \sin(90^\circ - 45^\circ) = \underline{\hspace{2cm}}$

(vii) $\tan 45^\circ = \tan(90^\circ - 45^\circ) = \underline{\hspace{2cm}}$

(viii) $\cos 45^\circ = \cos(90^\circ - 45^\circ) = \underline{\hspace{2cm}}$

Solution: Let's solve these blanks step by step using the complementary angle identities:

$$\sin(90^\circ - \theta) = \cos \theta, \quad \cos(90^\circ - \theta) = \sin \theta,$$

$$\tan(90^\circ - \theta) = \cot \theta, \quad \cot(90^\circ - \theta) = \tan \theta.$$

(i) $\sin 30^\circ = \sin(90^\circ - 60^\circ) = \cos 60^\circ$

Answer: 60°

(ii) $\cos 30^\circ = \cos(90^\circ - 60^\circ) = \sin 60^\circ$

Answer: 60°



$$(iii) \tan 60^\circ = \tan(90^\circ - 30^\circ) = \cot 30^\circ$$

Answer: 30°

$$(iv) \sin 60^\circ = \sin(90^\circ - 30^\circ) = \cos 30^\circ$$

Answer: 30°

$$(v) \cos 60^\circ = \cos(90^\circ - 30^\circ) = \sin 30^\circ$$

Answer: 30°

$$(vi) \sin 45^\circ = \sin(90^\circ - 45^\circ) = \cos 45^\circ$$

Answer: 45°

$$(vii) \tan 45^\circ = \tan(90^\circ - 45^\circ) = \cot 45^\circ$$

Answer: 45°

$$(viii) \cos 45^\circ = \cos(90^\circ - 45^\circ) = \sin 45^\circ$$

Answer: 45°

5. In a right angled triangle ABC , $m\angle B = 90^\circ$ and C is an acute angle of 60° . Also $\sin m\angle A = \frac{c}{b}$, then find the x following trigonometric ratios.

$$(i) \frac{mBC}{mAB}$$

$$(ii) \cos 60^\circ$$

$$(iii) \tan 60^\circ$$

$$(iv) \operatorname{cosec} 60^\circ$$

$$(v) \cot 60^\circ$$

$$(vi) \sin 30^\circ$$

$$(vii) \cos 30^\circ$$

$$(viii) \tan 30^\circ$$

$$(ix) \sec 30^\circ$$

$$(x) \cot 30^\circ$$

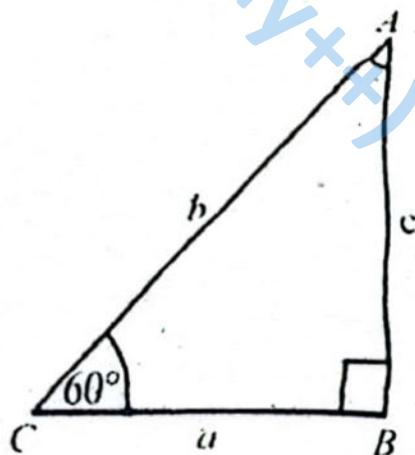
Solution:

$$(i) \frac{mBC}{mAB} = \frac{a}{c} = \tan 30^\circ = \cot 60^\circ$$

$$\therefore c = \frac{a}{\tan 30^\circ} = \frac{a}{\cot 60^\circ}$$

$$(ii) \cos 60^\circ = \frac{BC}{AC} = \frac{a}{b}$$

$$(iii) \tan 60^\circ = \frac{AB}{BC} = \frac{c}{a}$$



$$(iv) \quad \operatorname{cosec} 60^\circ = \frac{b}{c} = \frac{AC}{AB}$$

$$(v) \quad \cot 60^\circ = \frac{a}{c} = \frac{BC}{AB}$$

$$(vi) \quad \sin 30^\circ = \frac{a}{b} = \frac{BC}{AC}$$

$$(vii) \quad \cos 30^\circ = \frac{AB}{AC} = \frac{c}{b}$$

$$(viii) \quad \tan 30^\circ = \frac{BC}{AB} = \frac{a}{c}$$

$$(ix) \quad \sec 30^\circ = \frac{AC}{AB} = \frac{b}{c}$$

$$(x) \quad \cot 30^\circ = \frac{c}{a} = \frac{AB}{BC}$$

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