

chapter

2

Trigonometry 1

Section 2.2 Trigonometric ratios

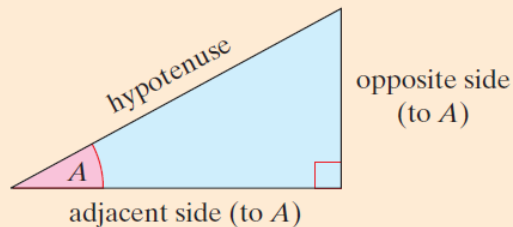
PROJECT MATHS – STRAND 2
Text & Tests 4
 LEAVING CERTIFICATE
 HIGHER LEVEL

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$$\sin A = \frac{\text{opposite side}}{\text{hypotenuse}}$$

$$\cos A = \frac{\text{adjacent side}}{\text{hypotenuse}}$$

$$\tan A = \frac{\text{opposite side}}{\text{adjacent side}}$$



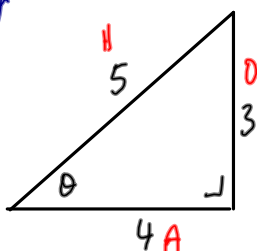
$$\text{Secant (sec } \theta) = \frac{1}{\cos \theta}; \quad \text{Cosecant (cosec } \theta) = \frac{1}{\sin \theta}; \quad \text{Cotangent (cot } \theta) = \frac{1}{\tan \theta}.$$

$$\text{Sec } \theta = \frac{H}{A}$$

$$\text{Cosec } \theta = \frac{H}{O}$$

$$\text{cot } \theta = \frac{A}{O}$$

eg.



$$\text{Sec } \theta = \frac{5}{4}$$

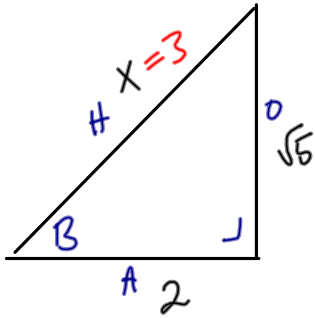
$$\text{Cosec } \theta = \frac{5}{3}$$

$$\text{cot } \theta = \frac{4}{3}$$

Example 1

If $\tan B = \frac{\sqrt{5}}{2}$, find the value of $\sin B$ and $\cos B$.

SOH
CAH
TOA



$$X^2 = 2^2 + \sqrt{5}^2 = 4 + 5 = 9$$

$$X = 3$$

$$\sin B = \frac{\sqrt{5}}{3}$$

$$\cos B = \frac{2}{3}$$

Parts of a degree

$$1^\circ = 60'$$

Example 2

- (i) Find $\cos 72^\circ 18'$, correct to 4 decimal places.
- (ii) If $\sin A = 0.5216$, find A correct to the nearest degree.

use calculator 0999 degrees · minutes · second button

$$(i) \cos 72^\circ 18' = 0.03403 \approx 0.0340 \text{ (4 dp)}$$

$$(ii) \sin A = 0.5216 \Rightarrow A = \sin^{-1}(0.5216)$$

$$= 31.43^\circ$$

$$\approx 31^\circ \text{ (nun)}$$

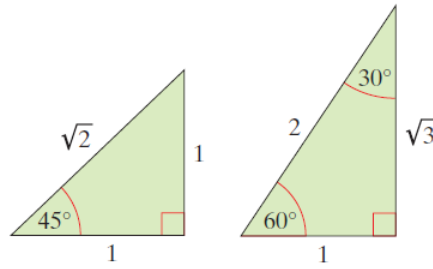
4. Use the given triangles to show that

(i) $\sin^2 45^\circ + \cos^2 45^\circ = 1$

(ii) $\sin 60^\circ \cos 30^\circ + \cos 60^\circ \sin 30^\circ = 1$

(iii) $\cos^2 60^\circ + \cos 60^\circ \sin 30^\circ = \frac{1}{2}$

Soh CAH ToA



(i) $\sin 45^\circ = \frac{1}{\sqrt{2}}$, $\cos 45^\circ = \frac{1}{\sqrt{2}}$

$\Rightarrow \sin^2 45^\circ + \cos^2 45^\circ = \left(\frac{1}{\sqrt{2}}\right)^2 + \left(\frac{1}{\sqrt{2}}\right)^2 = \frac{1}{2} + \frac{1}{2} = 1$ QED.

(ii) $\sin 60^\circ = \frac{\sqrt{3}}{2}$, $\cos 30^\circ = \frac{\sqrt{3}}{2}$, $\cos 60^\circ = \frac{1}{2}$, $\sin 30^\circ = \frac{1}{2}$

$\Rightarrow \sin 60^\circ \cos 30^\circ + \cos 60^\circ \sin 30^\circ = \left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{3}}{2}\right) + \left(\frac{1}{2}\right)\left(\frac{1}{2}\right) = \frac{3}{4} + \frac{1}{4} = 1$ QED

(iii) $\cos^2 60^\circ + \cos 60^\circ \sin 30^\circ = \left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)\left(\frac{1}{2}\right) = \frac{1}{4} + \frac{1}{4} = \frac{1}{2}$ QED.