

Y1 TRIGONOMETRY 1

Y1 PURE → TRIGONOMETRY

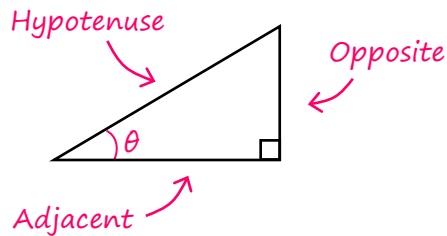


lesson link: parkermaths.com/y1trig

Objective

- Know and use exact values of $\sin$, $\cos$ and $\tan$ for 0° , 30° , 45° , 60° and 90° .
- Understand and use the sine, cosine and tangent functions, including their graphs.

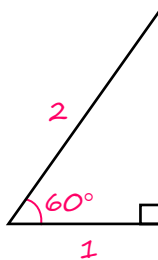
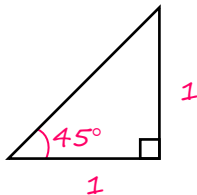
2.1 Trigonometric Ratios



TRIGONOMETRIC RATIOS

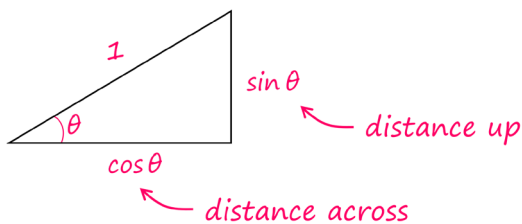
$$\sin \theta = \frac{\text{opp}}{\text{hyp}} \quad \cos \theta = \frac{\text{adj}}{\text{hyp}} \quad \tan \theta = \frac{\text{opp}}{\text{adj}}$$

Exact Values



Angle (θ)	$\sin \theta$	$\cos \theta$	$\tan \theta$
0°			
30°			
45°			
60°			
90°			

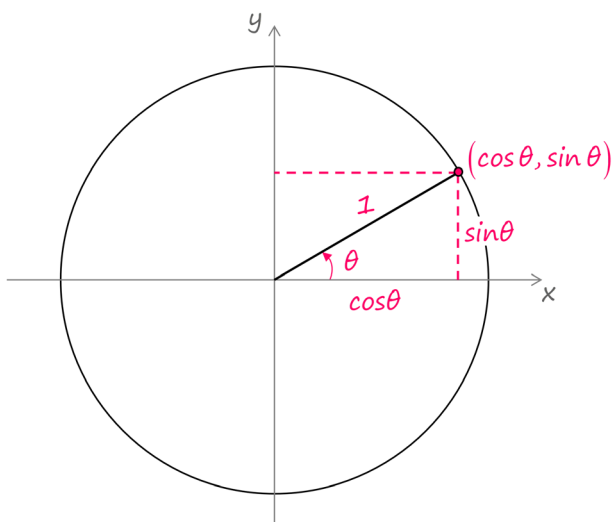
2.2 The Unit Circle



- The unit circle is a circle of **radius 1**, centre $(0,0)$.
- Angles are measured **anti-clockwise** from the **positive x-direction**.
- Points on the circumference have coordinates $(\cos \theta, \sin \theta)$.
- Unlike the trigonometric ratios above, the unit circle helps us give meaning to values of $\sin \theta$ and $\cos \theta$ outside the region $0^\circ < \theta < 90^\circ$.

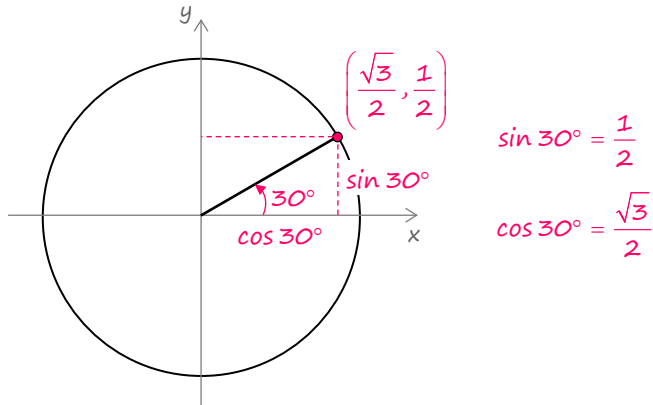


The convention is to measure angles **anti-clockwise** from the **positive x-direction**.

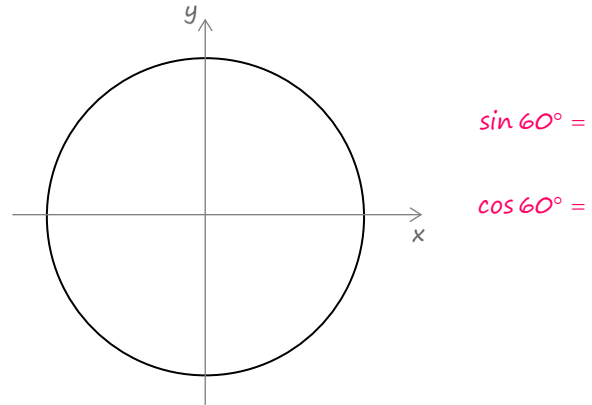


Examples: The Unit Circle

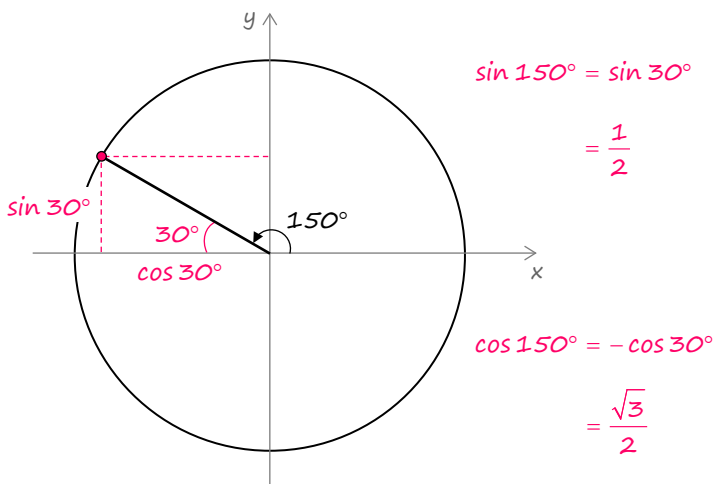
2.3e. Represent $\sin 30^\circ$ and $\cos 30^\circ$ on a unit circle diagram.



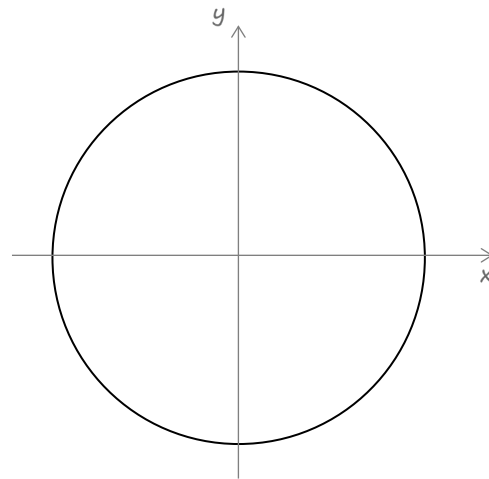
2.3p. Represent $\sin 60^\circ$ and $\cos 60^\circ$ on a unit circle diagram.



2.4e. Use a unit circle diagram to find the values of $\sin 150^\circ$ and $\cos 150^\circ$.



2.4p. Use a unit circle diagram to find the values of $\sin 330^\circ$ and $\cos 330^\circ$.



2.5 Activity: Drawing Unit Circles



Resources: Printed sheet for activity 2.5 (parkermaths.com/trig2-5)

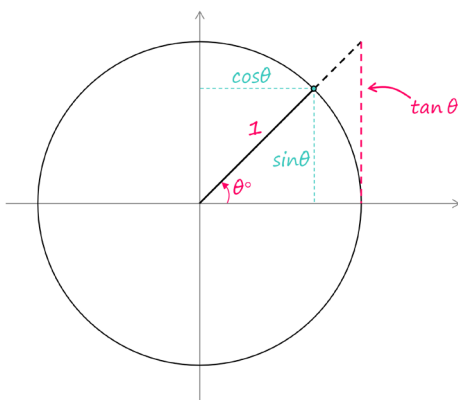


Instructions:

- Complete the grid in activity 2.5.
- Use the answers / video solutions to check and correct your answers.



2.6 Tangent



IDENTITY 2.6

$$\tan \theta \equiv \frac{\sin \theta}{\cos \theta}$$

PROOF

$$\begin{aligned} \tan \theta &= \frac{\text{opp}}{\text{adj}} \\ &= \frac{\text{opp/hyp}}{\text{adj/hyp}} \\ &= \frac{\sin \theta}{\cos \theta} \end{aligned}$$

QUICK EXAMPLE

Evaluate $\tan 150^\circ$ without a calculator.

$$\begin{aligned} \left. \begin{aligned} \sin 150^\circ &= \frac{1}{2} \\ \cos 150^\circ &= -\frac{\sqrt{3}}{2} \end{aligned} \right\} \text{from ex 2.4e} \\ \therefore \tan 150^\circ &= \frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} \\ &= -\frac{1}{\sqrt{3}} \end{aligned}$$