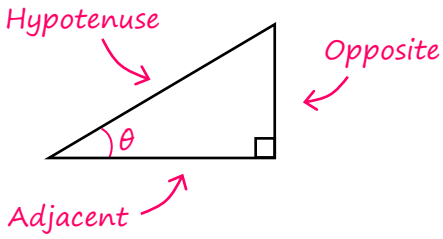
Y1 TRIGONOMETRY 1

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.

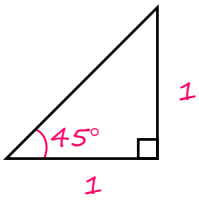
2.1 Trigonometric Ratios

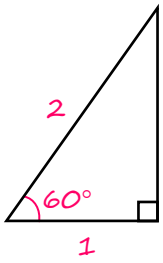


TRIGONOMETRIC RATIOS

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

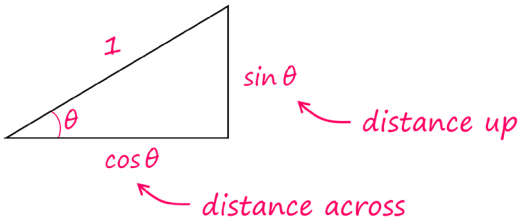
Exact Values

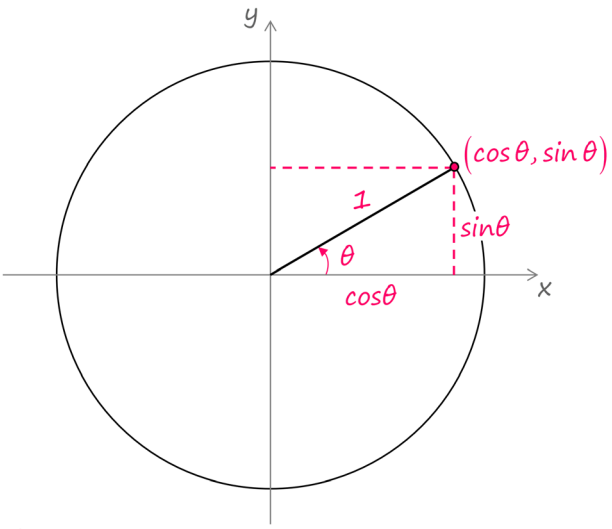




Angle (θ)	$\sin\theta$	$\cos\theta$	$\tan\theta$
0°			
30°			
45°			
60°			
90°			

2.2 The Unit Circle



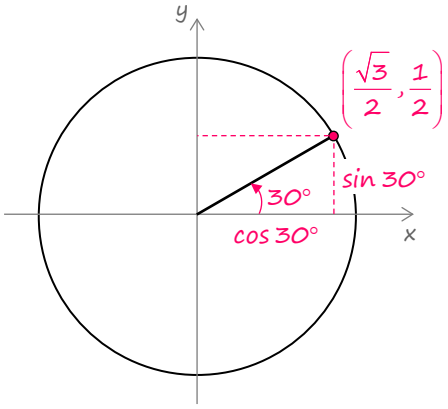


- The unit circle is a circle of **radius 1**, centre $(0,0)$.
- Angles are measured **anti-clockwise** from the **positive x-direction**.
- Points on the circumference have coordinates $(\cos\theta, \sin\theta)$.
- Unlike the trigonometric ratios above, the unit circle helps us give meaning to values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

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

Examples: The Unit Circle

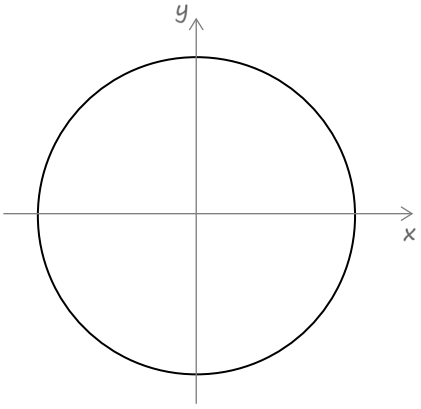
2.3e. Represent $\sin 30°$ and $\cos 30°$ on a unit circle diagram.



$\sin 30° = \frac{1}{2}$

$\cos 30° = \frac{\sqrt{3}}{2}$

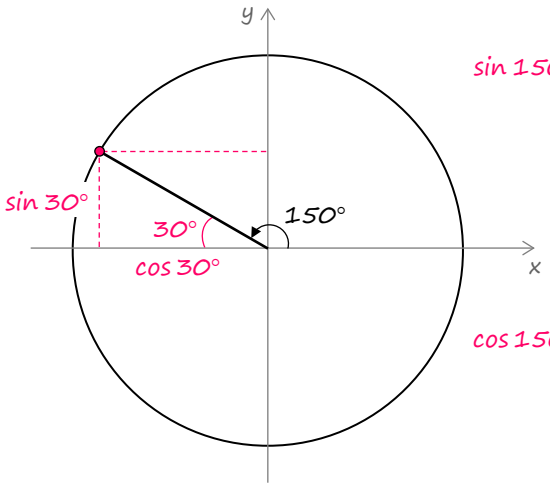
2.3p. Represent $\sin 60°$ and $\cos 60°$ on a unit circle diagram.



$\sin 60° =$

$\cos 60° =$

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



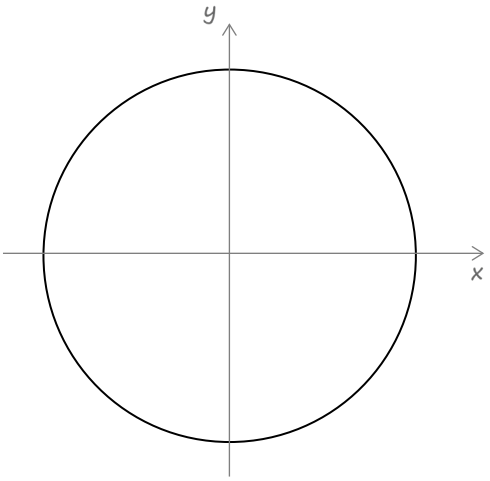
$\sin 150° = \sin 30°$

$= \frac{1}{2}$

$\cos 150° = -\cos 30°$

$= \frac{\sqrt{3}}{2}$

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



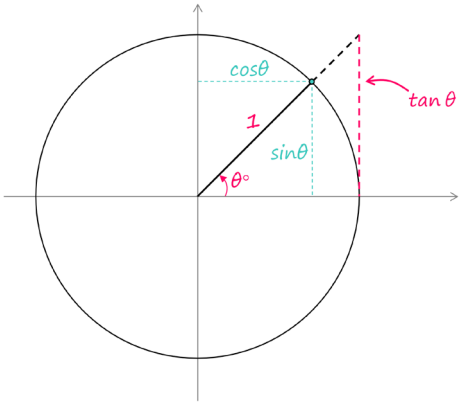
2.5 Activity: Drawing Unit Circles

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

$$\tan\theta = \frac{\text{opp}}{\text{adj}}$$

$$= \frac{\text{opp}/\text{hyp}}{\text{adj}/\text{hyp}}$$

$$= \frac{\sin\theta}{\cos\theta}$$

QUICK EXAMPLE

Evaluate $\tan 150°$ without a calculator.

$\sin 150° = \frac{1}{2}$

$\cos 150° = \frac{-\sqrt{3}}{2}$ } from ex 2.4e

$\therefore \quad \tan 150° = \frac{1/2}{-\sqrt{3}/2}$

$= -\frac{1}{\sqrt{3}}$