



MATHEMATICS · CLASS 10

Trigonometry Basics

Sine, cosine and tangent in right triangles

TEACHER
Teacher Name

CLASS
10

PERIOD
40 minutes

Lesson plan

01

Warm-up

02

Learn

03

Explore

04

Practise

TODAY

Learning objectives

- Name the sides of a right triangle
- Define sin, cos and tan
- Recall standard angle values
- Solve height and distance problems

YOU ALREADY KNOW

**Pythagoras theorem
and similar
triangles.**



How can you find the height of a tree without climbing it?

Think about it

Ratios in a right triangle

**Trigonometric ratios
compare the sides of a right
triangle.**

For an angle θ : $\sin \theta = \text{opposite/hypotenuse}$, $\cos \theta = \text{adjacent/hypotenuse}$, $\tan \theta = \text{opposite/adjacent}$. The ratios are the same for every triangle with that angle.



Diagram / picture

Key terms



Hypotenuse

The longest side, opposite the right angle.



Opposite

The side facing angle θ .



Adjacent

The side next to θ .

Solving a height problem

1 Draw

Sketch the triangle

2 Label

Mark θ and the known side

3 Choose

sin, cos or tan

4 Solve

Rearrange and calculate

Standard values

Angle	sin	cos	tan
30°	$1/2$	$\sqrt{3}/2$	$1/\sqrt{3}$
45°	$1/\sqrt{2}$	$1/\sqrt{2}$	1
60°	$\sqrt{3}/2$	$1/2$	$\sqrt{3}$

Learn these with the hand trick.

FUN FACTS

Did you know?

2,000+

years of trigonometry

SOH-CAH-TOA

the classic memory aid

GPS

uses trigonometry

Real-life examples



Image 1

Architecture

Roofs and ramps



Image 2

Navigation

Ships and aircraft



Image 3

Surveying

Heights of buildings

sin vs cos

sin θ

- ✓ Opposite / hypotenuse
- ✓ Rises from 0° to 90°
- ✓ $\sin 90^\circ = 1$

cos θ

- Adjacent / hypotenuse
- Falls from 0° to 90°
- $\cos 0^\circ = 1$

Check your understanding

- Write $\sin \theta$ in terms of sides
- Find $\tan 45^\circ$
- If $\sin \theta = 1/2$, find θ
- A ladder makes 60° with the ground; find the height it reaches



Image

Activity time



Clinometer

Make one from a protractor and a straw.



Measure the school

Find the flagpole height.



Value bingo

Bingo with standard values.

Homework

- Exercise 8.1, questions 1–5
- Prove $\sin^2\theta + \cos^2\theta = 1$
- Estimate the height of a building near home



Image

Great work today!

Next lesson: Trigonometric identities

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