SIN, COS, TAN

<https://www.youtube.com/watch?v=Pn1-DLihSh4&ab_channel=JayMcCaughrean>

WHAT/WHY ARE THEY?

Sin, cos and tan are mathematic functions, which take an input (an angle), and outputs the distance on a single unit cartesian plane.

1

-1

-1

1

45 deg

The *x* axis, is *cosine (orange line i.e. run)*

The *y* axis, is *sine (green line i.e. height/rise)*

The gradient, is tangent

Looking at the image above, you can see at 45 degrees, the green line (sin(45)), is about 0.7 of the full unit (y axis). Same when cos(45) in relation to the orange line (x-axis). 0.707… to be more precise.

**\*\* Tan(x) = sin(x) / cos(x) // gradient = rise / run \*\***

*Tan(45) = sin(45) / cos(45) = sin(0.707…) / cos(0.707…) = 1*

IMPORTANT ANGLES

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **0** | **30** | **45** | **60** | **90** |
| **Sin** | 0 | ½ |  |  | 1 |
| **Cos** | 1 |  |  | ½ | 0 |
| **Tan** | 0 |  | 1 |  | Error |

**Why is *tan(90)*** **an error?** Because sin(90) / cos(90) = 1 / 0 (cannot divide by 0!)

**Why is sin(0) 0?** Because at 0 degrees, the height on the y axis (looking at the cartesian plane will be 0 (i.e. no height))

**Why is cos(0) 1?** Because at 0 degrees, the width will be across the full x axis

**Why is tan(0) 0?** 0/1 equals 0 (sin(0)/cos(0))