a

c

b

θ

**Pythagoras:**

If you have a and b and want to find c use:

If you have a and c and want to find b use:

If you have b and c and want to find a use:

Opposite

Hypotenuse

Adjacent

θ

**SOH CAH TOA:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Opposite . | | |  | Adjacent | | |
|  |  |  |  |  |  |  |
| Hypotenuse | x | sin θ |  | Hypotenuse | x | cos θ |

|  |  |  |
| --- | --- | --- |
| Opposite | | |
|  |  |  |
| Adjacent | x | tan θ |

Label the sides of these triangles as Opposite, Adjacent or Hypotenuse:Label the sides of these triangles as Opposite, Adjacent or Hypotenuse, then find the values for Sinθ Cosθ and Tanθ

*θ*

*θ*

*θ*

*θ*

*θ*

*θ*

*θ*

*θ*

*θ*

*θ*

A

B

C

D

E

10 cm

6 cm

8 cm

12 mm

5 mm

13 mm

15 m

17 m

8 m

5 km

4 km

3 km

11 m

12 m

16.28 m

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ∆A  sinθ= \_\_\_\_\_\_\_ cosθ= \_\_\_\_\_\_\_ tanθ= \_\_\_\_\_\_\_ | ∆B  sinθ= \_\_\_\_\_\_\_ cosθ= \_\_\_\_\_\_\_ tanθ= \_\_\_\_\_\_\_ | ∆C  sinθ= \_\_\_\_\_\_\_ cosθ= \_\_\_\_\_\_\_ tanθ= \_\_\_\_\_\_\_ | ∆D  sinθ= \_\_\_\_\_\_\_ cosθ= \_\_\_\_\_\_\_ tanθ= \_\_\_\_\_\_\_ | ∆E sinθ= \_\_\_\_\_\_\_ cosθ= \_\_\_\_\_\_\_ tanθ= \_\_\_\_\_\_\_ |

Use the sin cos and tan functions on your calculator to find their values for the angles shown.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| θ=45° sinθ= \_\_\_\_\_\_\_ cosθ= \_\_\_\_\_\_\_ tanθ= \_\_\_\_\_\_\_ | θ=30° sinθ= \_\_\_\_\_\_\_ cosθ= \_\_\_\_\_\_\_ tanθ= \_\_\_\_\_\_\_ | θ=25° sinθ= \_\_\_\_\_\_\_ cosθ= \_\_\_\_\_\_\_ tanθ= \_\_\_\_\_\_\_ | θ=60° sinθ= \_\_\_\_\_\_\_ cosθ= \_\_\_\_\_\_\_ tanθ= \_\_\_\_\_\_\_ | θ=90° sinθ= \_\_\_\_\_\_\_ cosθ= \_\_\_\_\_\_\_ tanθ= \_\_\_\_\_\_\_ |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| sin 12°= \_\_\_\_\_\_\_  cos 33°= \_\_\_\_\_\_\_  tan 72°= \_\_\_\_\_\_\_ | sin 52°= \_\_\_\_\_\_\_  cos 42°= \_\_\_\_\_\_\_  tan 65°= \_\_\_\_\_\_\_ | sin 32°= \_\_\_\_\_\_\_  cos 21°= \_\_\_\_\_\_\_  tan 52°= \_\_\_\_\_\_\_ | sin 78°= \_\_\_\_\_\_\_  cos 41°= \_\_\_\_\_\_\_  tan 63°= \_\_\_\_\_\_\_ | sin 40°= \_\_\_\_\_\_\_  cos 85°= \_\_\_\_\_\_\_  tan 25°= \_\_\_\_\_\_\_ |

If you know the value of sinθ, cosθ or tanθ we can use the calculator to find the angle for us. To do this use the Second Function or Shift Button and then the sin-1, cos-1 or tan-1 buttons.  
To find the angle given sinθ=0.5 on the Calculator

Use this to find the angle if:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| sin θ= 0.5  cos θ= 0.5  tan θ= 0.5 | sin θ= 0.6  cos θ= 0.4  tan θ= 0.9 | sin θ= 0.7  cos θ= 0.3  tan θ= 0.8 | sin θ= 1  cos θ= 1  tan θ= 1 | sin θ= 1.2  cos θ= 1.4  tan θ= 1.3 |

The angles of shadows can be used to help us find the heights of, and distances to, very large objects.

To make it easier on ourselves we set up a standard that we can control the easiest to use is a meter ruler. We measure the shadow of the ruler to help us find the angle of the sun in the sky.

Draw out this situation showing:

* The Sun
* The 1 metre ruler
* The shadow of the ruler (labelled ‘S’)
* The angle of the sun in the sky (labelled ‘*θ*’)
* The triangle that these things form

At this time the shadow is measured to be 1.6 metres, the shadow of a nearby building is also measured (it is 5.8 metre). Use the information that you have to find the height of the building.

In the distance there is a 1.2 km mountain, How long would its shadow be and what would be the distance from the mountains tip to the tip of its shadow?