TRIGONOMETRY

This applies to **RIGHT ANGLED** triangles.

![Right Triangle Diagram](Image)

- **Hypotenuse**: opposite the right angle
- **Opposite**: the side opposite the angle we know or we want to find
- **Adjacent**: the other one!

\[
\text{Sine} = \frac{\text{opp}}{\text{hyp}} \quad \text{Cosine} = \frac{\text{adj}}{\text{hyp}} \quad \text{Tangent} = \frac{\text{opp}}{\text{adj}}
\]

[**SOH CAH TOA**]

Examples

1. Finding a side if we know one side and an angle.

![Example Triangle Diagram](Image)

(a) **Find PR**

What is the name of the side we want to find? **Answer**: OPP

What is the side we know? **Answer**: ADJ

What links these? **Answer**: TAN
\[
\frac{PR}{8} = \tan 40^\circ
\]
\[
(\times 8)
\]
\[
PR = 8 \times \tan 40^\circ
\]
\[
= 6.71 \text{ cm}
\]

(b) Find PQ

We want to find HYP
We know ADJ
What links these? \(\cos\)

\[
\frac{\text{adj}}{\text{hyp}} = \cos
\]
\[
\frac{8}{PQ} = \cos 40^\circ
\]
\[
(\times PQ)
\]
\[
8 = PQ \times \cos 40^\circ
\]
\[
(\div \cos 40^\circ)
\]
\[
\frac{8}{\cos 40^\circ} = PQ
\]
\[
PQ = \underline{10.4} \text{ cm} \quad (3 \text{ s.f.})
\]
(2) Finding an angle if we know two sides

Relative to the angle we are trying to find, what are the two sides we know?

Ans: 12 is HYP
7 is ADJ

What links these? Answer: $\frac{\text{ADJ}}{\text{HYP}} = \cos$

$$\cos Z = \frac{7}{12}$$

$$Z = \cos^{-1} \left( \frac{7}{12} \right)$$

$$= 54.3^\circ$$