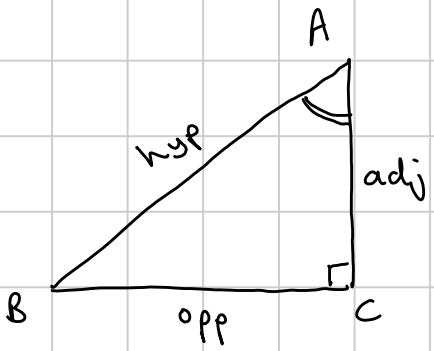
TRIGONOMETRY

Note Title 09/03/2009

This applies to RIGHT ANGLED triangles.



hypotenuse : opposite the right angle

opposite : the side opposite the angle we know or we want to find

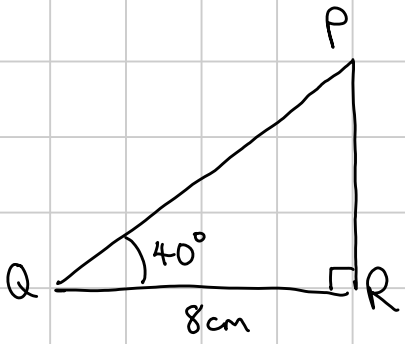
adjacent : the other one!

$$\text{Sine} = \frac{\text{opp}}{\text{hyp}} \qquad \text{cosine} = \frac{\text{adj}}{\text{hyp}} \qquad \text{tangent} = \frac{\text{opp}}{\text{adj}}$$

[SOH CAH TOA]

Examples

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



(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

$$\frac{PR}{8} = \tan 40^\circ$$

$(\times 8)$ $(\times 8)$

$$PR = 8 \times \tan 40^\circ$$

$$= 6.71 \text{ cm}$$

No need to draw out. Show working as in black

(b) Find PQ

We want to find HYP
We know ADJ
What links these? COS

$$\frac{\text{adj}}{\text{hyp}} = \cos$$

$$\frac{8}{PQ} = \cos 40^\circ$$

This time the side we want to find is on the bottom so the working is different

$(\times PQ)$ $(\times PQ)$

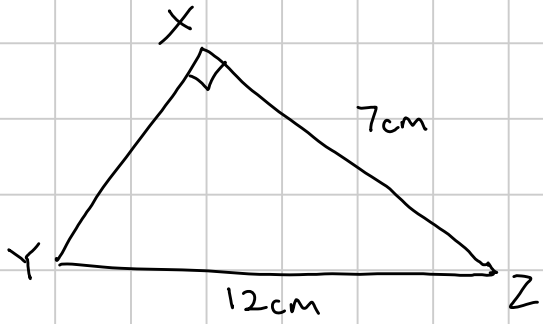
$$8 = PQ \times \cos 40^\circ$$

$(\div \cos 40^\circ)$ $(\div \cos 40^\circ)$

$$\frac{8}{\cos 40^\circ} = PQ$$

$$PQ = 10.4 \text{ cm} \quad (3 \text{ sf})$$

② Finding an angle if we know two sides



Find $\hat{Z}$

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: $\frac{ADJ}{HYP} = \cos$

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

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

$$= \underline{\underline{54.3^\circ}}$$