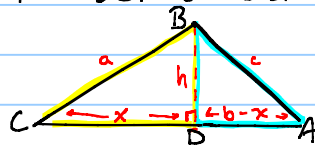


# Cosine Law Day 7

Note Title

02/10/2017

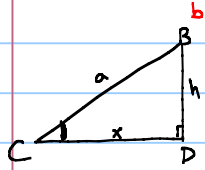
I TO "DERIVE" COSINE LAW means discover it ☺



$$(b-x)(b-x)$$

$$b^2 - bx - bx + x^2$$

$$b^2 - 2bx + x^2$$

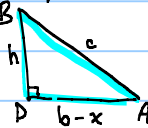


In  $\triangle CBD$

$$x = a \cos C$$

$$a^2 = x^2 + h^2$$

In  $\triangle ABD$



$$c^2 = h^2 + (b-x)^2$$

$$c^2 = h^2 + b^2 - 2bx + x^2$$

$$c^2 = x^2 + h^2 + b^2 - 2bx$$

$$c^2 = a^2 + b^2 - 2bx$$

$$c^2 = a^2 + b^2 - 2b(a \cos C)$$

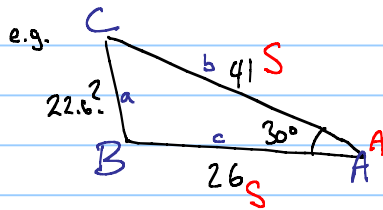
yellow sheet

$$c^2 = a^2 + b^2 - 2ab \cos C$$

~~$$b^2 = a^2 + c^2 - 2ac \cos B$$~~

~~$$a^2 = b^2 + c^2 - 2bc \cos A$$~~

II Use Coslaw for SAS (two sides of contained angle)



(Note: can't use Sine law b/c no  $\angle$  and opposite side pairing)

① Steps: Label diagram

② Pick cosine law with the letter required:

$$a^2 = b^2 + c^2 - 2bc \cos A$$

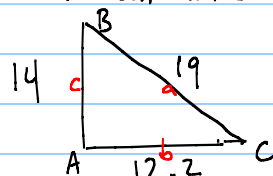
$$a^2 = 41^2 + 26^2 - 2(41)(26) \cos 30^\circ$$

$$a^2 = 510.63$$

$$a = \sqrt{510.63}$$

$$a = 22.6$$

e.g. 2 Given all three sides find an angle:



Find  $\angle C$

$$c^2 = a^2 + b^2 - 2ab \cos C$$

solve for  $\cos C$  first

$$\frac{c^2 - a^2 - b^2}{-2ab} = \frac{-2ab \cos C}{-2ab}$$

$$\frac{c^2 - a^2 - b^2}{-2ab} = \cos C$$

$$\frac{14^2 - 19^2 - 12.2^2}{-2(19)(12.2)} = \cos C$$

$$0.676 = \cos C$$

$$47.3^\circ = C$$