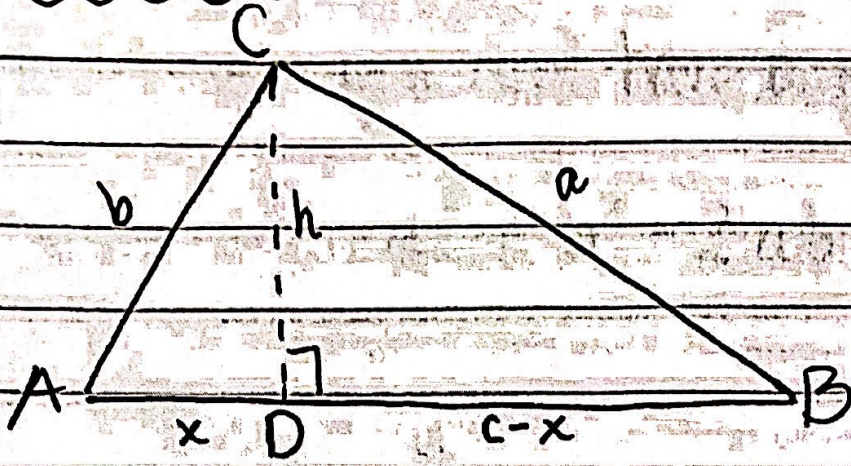


# Law of Cosines



(1) From  $\triangle ADC$  :  $x^2 + h^2 = b^2$

(2) Find  $\cos A$  :  $\cos A = \frac{x}{b} \rightarrow x = b \cos A$

(3) From  $\triangle BDC$  :  $(c-x)^2 + h^2 = a^2$

$$c^2 - 2cx + x^2 + h^2 = a^2$$

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

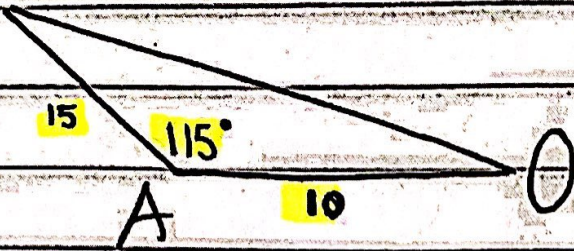
Law of Cosines  
 $a^2 = b^2 + c^2 - 2bc \cos A$

# Law of Cosines

\* Use when you don't have a pair (angle & opp. side)

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

ex: B



Angles	Sides
$B = 25.23^\circ$	$b = 10$
$A = 115^\circ$	$a = 21.26$
$C = 39.77^\circ$	$c = 15$

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

$$a^2 = 10^2 + 15^2 - 2(10)(15) \cos 115^\circ$$

$$a \approx 21.26$$

$$10^2 = 21.26^2 + 15^2 - 2(21.26)(15) \cos B$$

$$B \approx 25.23^\circ$$

ex: In  $\triangle DEF$ ,  $d=5$ ,  $e=12$ ,  $f=10$ . Find D.

$$d^2 = e^2 + f^2 - 2ef \cos D$$

$$5^2 = 12^2 + 10^2 - 2(12)(10) \cos D$$

$$D \approx 24.15^\circ$$