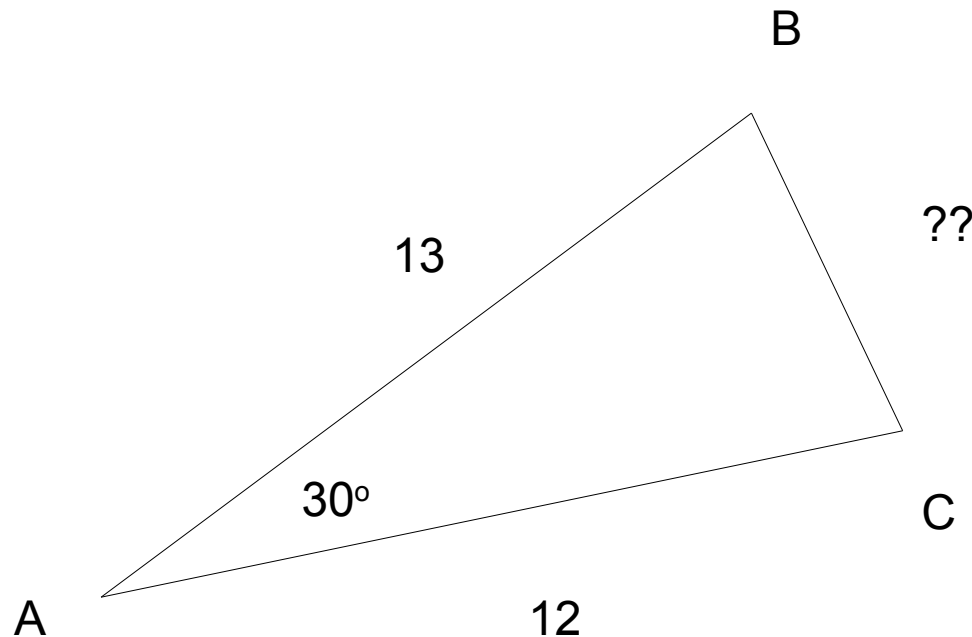


For a triangle A, B, C, the cosine law states:

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

$$a^2 = 144 + 169 - 2(12)(13)(0.86)$$

$$a = 6.68$$



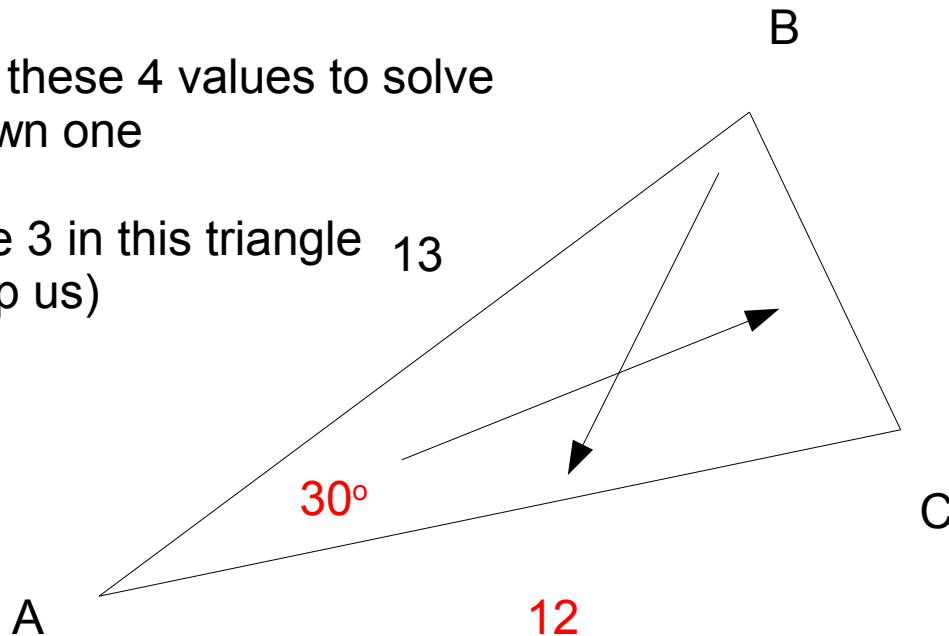
A more difficult question is determining when we need to use Cosine law

Remember Sine law

$$a / \sin(A) = b / \sin(B)$$

We need 3 of these 4 values to solve for the unknown one

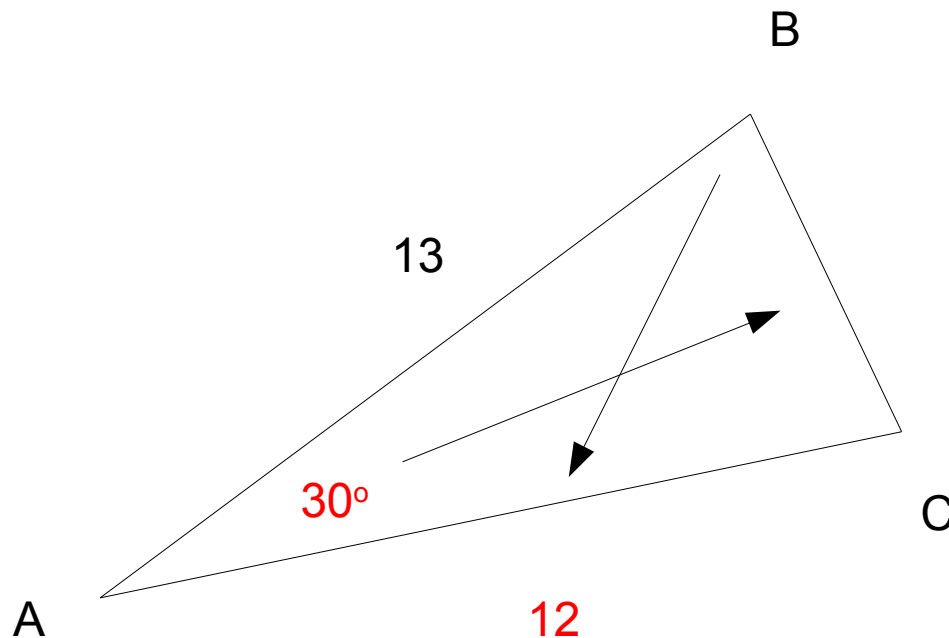
We don't have 3 in this triangle
(c doesn't help us)



We use the Cosine law when we have
Two sides and an angle between them

S-A-S

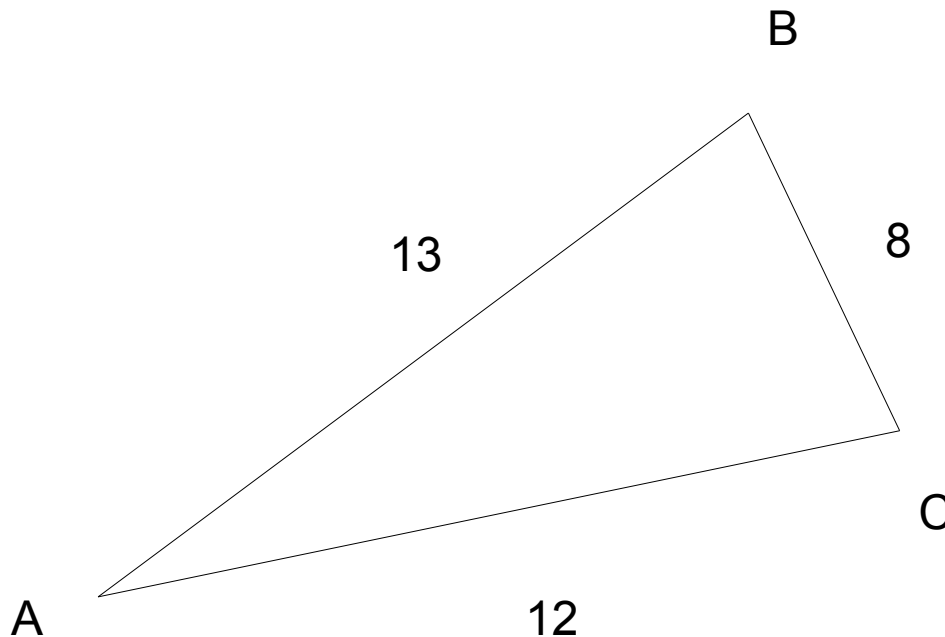
(not enough info for the sine law)



Another scenario that we use the **Cosine law** is:

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

What is angle A?



Another scenario that we use the **Cosine law** is:

What is angle A?

S-S-S

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

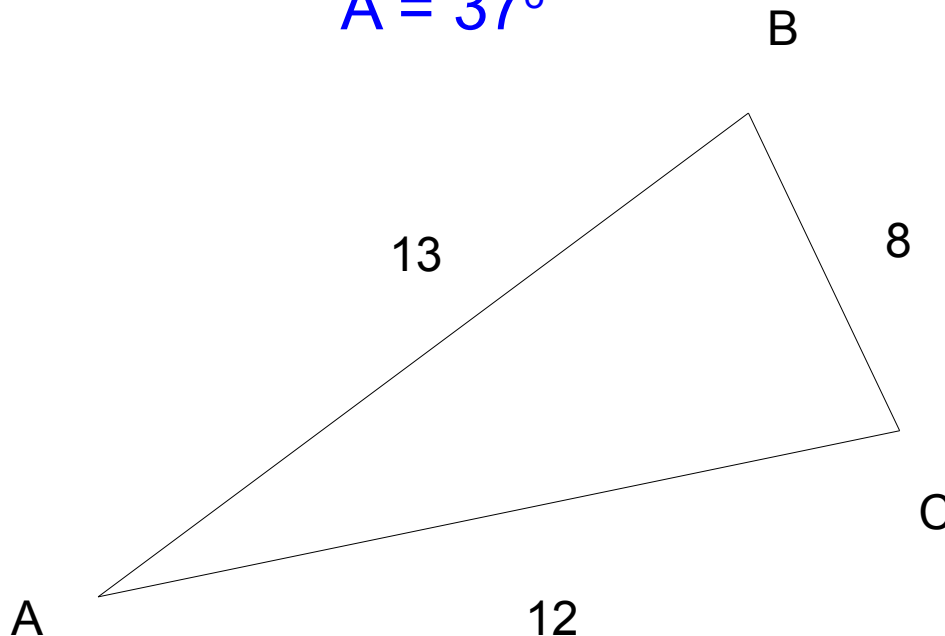
$$64 = 144 + 169 - 2(156) \cdot \cos(A)$$

$$(64 - 313) / -312 = \cos(A)$$

$$0.79 = \cos(A)$$

$$A = \cos^{-1}(0.79)$$

$$A = 37^\circ$$



When we want to find an unknown angle,
We can just rearrange the formula:

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

$$A = \cos^{-1} \left(\frac{a^2 - b^2 - c^2}{-2bc} \right)$$

