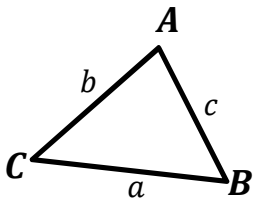
Trigonometry – The Law of Sines

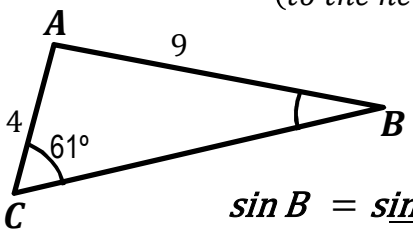
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} \quad or \quad \frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$



The law of sines can be used in ***any*** *triangle.*
You use it to:

Find a missing angle when you have 2 sides and 1 opposite angle.

Example: *Find angle B (to the nearest whole number).*



$$\frac{\sin B}{4} = \frac{\sin 61}{9}$$

$$\sin B = \frac{\sin 61}{9} \times 4 = 0.3887..$$

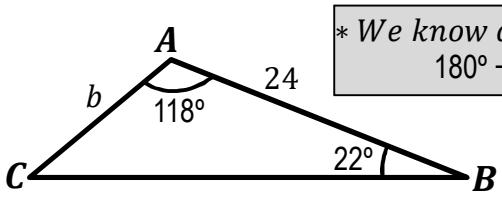
$$So,\ B = \sin^{-1}(0.3887..)$$

$$B = 23°$$

Find a missing side when you have 2 angles and 1 opposite side.

Example: *Find b (to the nearest whole number).*

∗ *We know angle C =* 180° − 118° − 22° = 40°

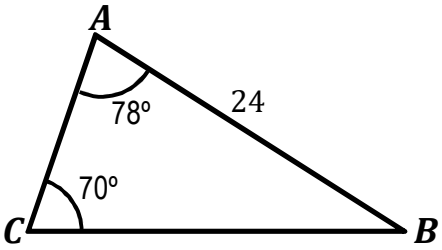


$$So,\ \frac{b}{\sin 22} = \frac{24}{\sin 40}$$

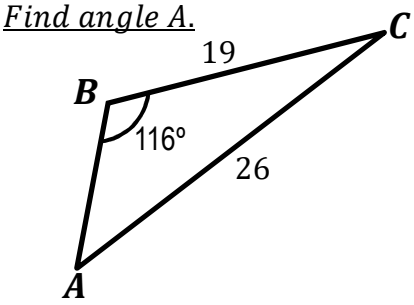
$$b = \frac{24}{\sin 40} \times \sin 22 = 14$$

Use this rule to solve the following problems (to the nearest whole number) and match to an answer in the middle.

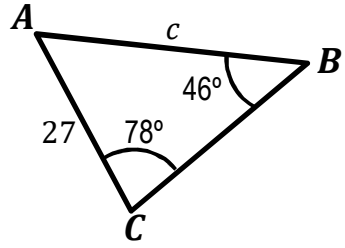
Find a.



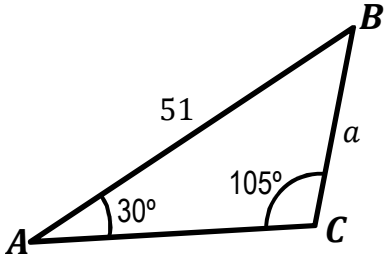
Find angle A.



Find c.



Find a.



41°

25

37

69°

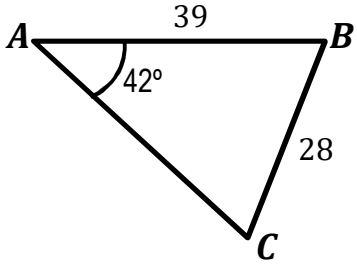
74°

48°

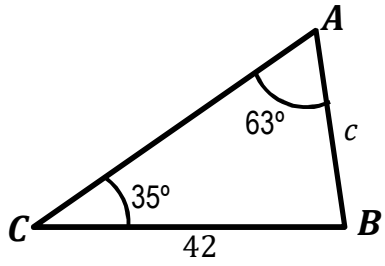
26

27

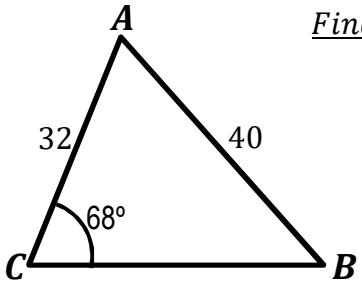
Find angle C.



Find c.



Find angle B.



Find angle C.