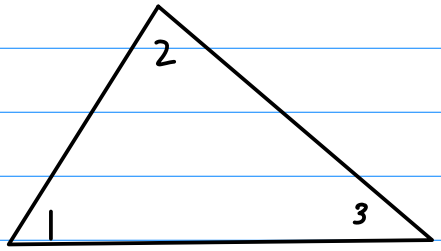
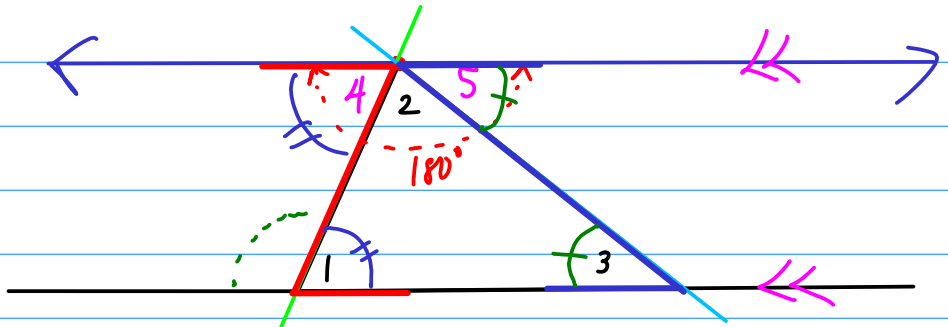
§4.1 : △ Sum Conjecture

* **△ Sum Conjecture**: The sum of the measures of the ∠'s of a △ is 180°.



$m\angle 1 + m\angle 2 + m\angle 3 = 180°$

Proof:



$m\angle 4 + m\angle 2 + m\angle 5 = 180°$

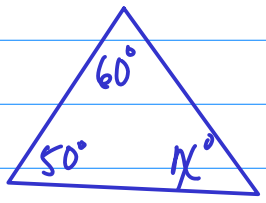
$m\angle 1 = m\angle 4$ (Alt. Int. ∠'s)

$m\angle 3 = m\angle 5$ (Alt. Int. ∠'s)

$m\angle 1 + m\angle 2 + m\angle 3 = 180°$ ∎

Ex:

2 ∠'s of a △ measure 50° & 60°. Find the 3rd ∠.



$50° + 60° + x° = 180°$

$110° + x° = 180°$

$-110° \quad -110°$

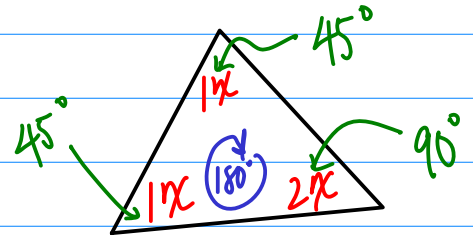
$x° = 70°$

Steps:

1. Draw a △ & label ∠'s
2. Write equation

Ex: A △ has ∠ measures in ratio 1:1:2. Find the ∠ measures.

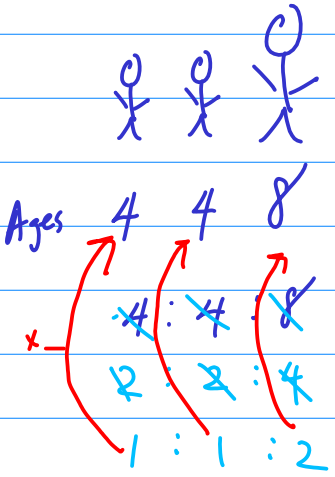
$1x : 1x : 2x$

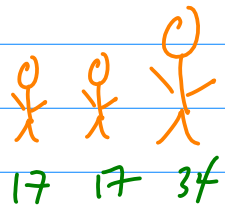


$x^\circ + x^\circ + 2x^\circ = 180^\circ$

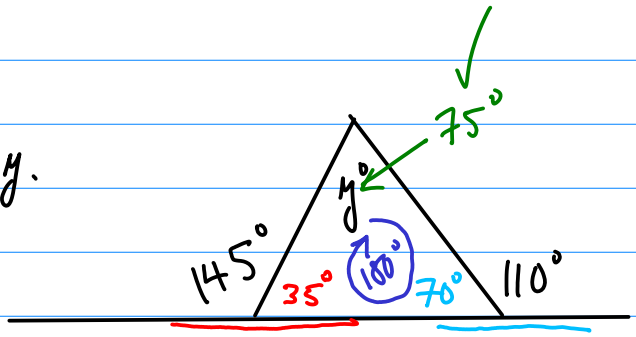
$\frac{4x}{4} = \frac{180}{4}$

$x = 45$





Ex: Find y.

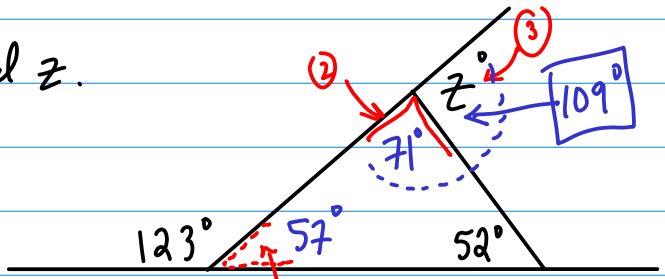


$35^\circ + 70^\circ + y^\circ = 180^\circ$

$105^\circ + y^\circ = 180^\circ$

$y^\circ = 75^\circ$

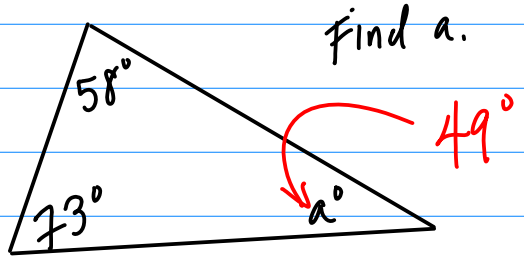
Ex: Find z.



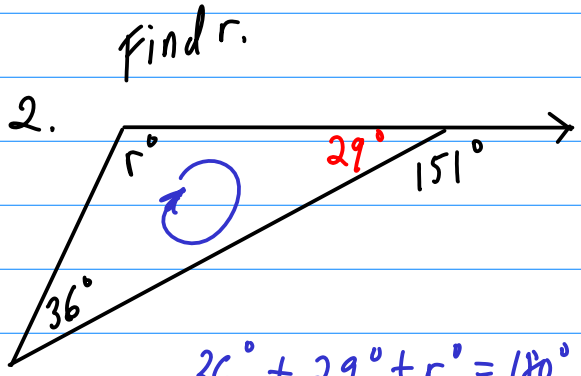
$180 - 109$

PRACTICE PROBLEMS:

1. Find a.



2. Find r.

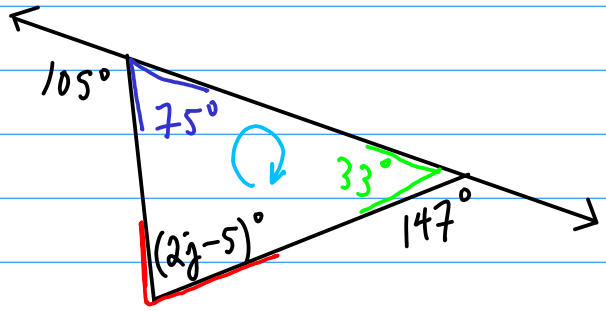


$36° + 29° + r° = 180°$

$65° + r° = 180°$

$r° = 115°$

3. Find j.



$75 + 33 + 2j - 5 = 180$

$103 + 2j = 180$

$2j = 77$

$j = \frac{77}{2} = 38\frac{1}{2}$