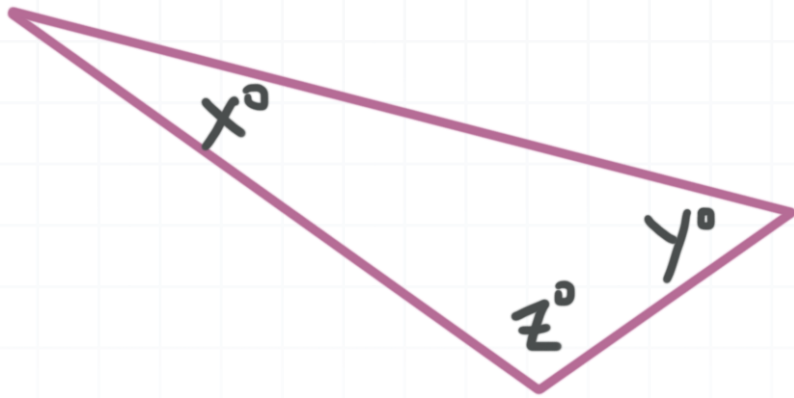


Interior angles of triangles

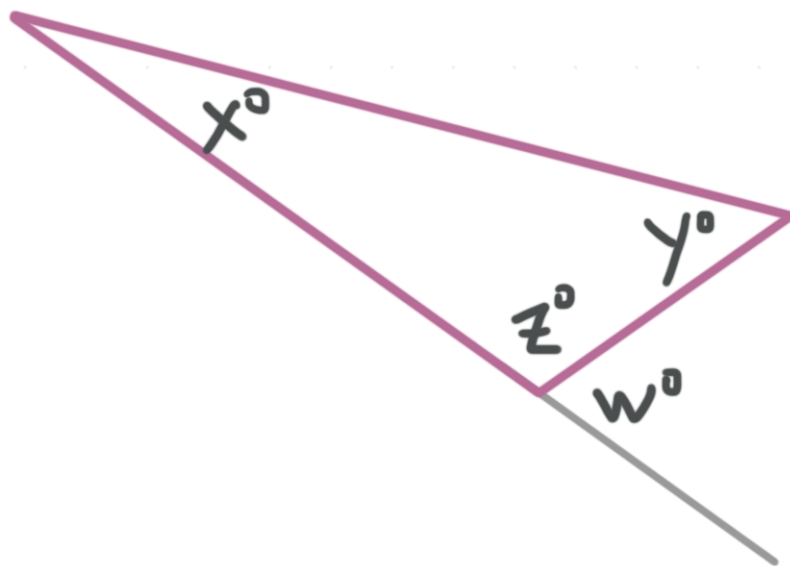
The interior angles of a triangle are the three angles on the inside of a triangle. The measures of these three angles always sum to 180° .



$$x^\circ + y^\circ + z^\circ = 180^\circ$$

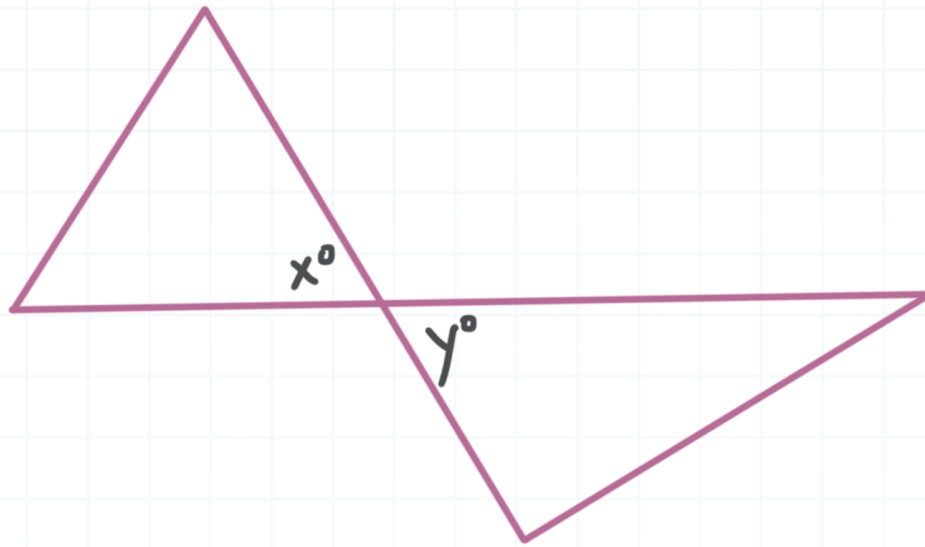
There are a few other angle relationships we need to remember:

The measures of a pair of adjacent angles that (together) form a straight line add to 180° , so $z^\circ + w^\circ = 180^\circ$.



Vertical angles are congruent, so $x^\circ = y^\circ$.

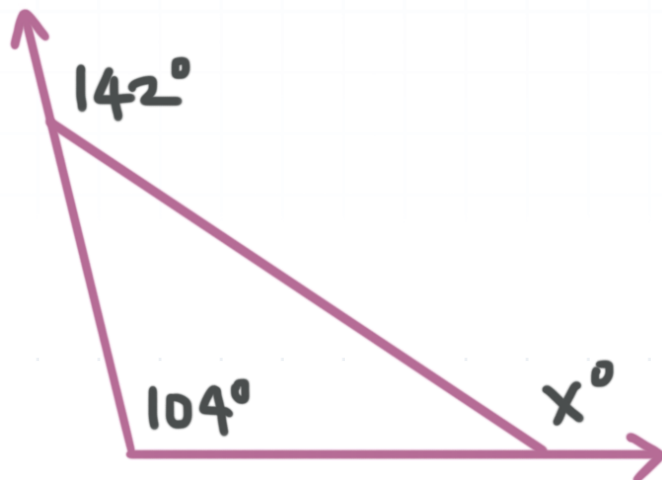




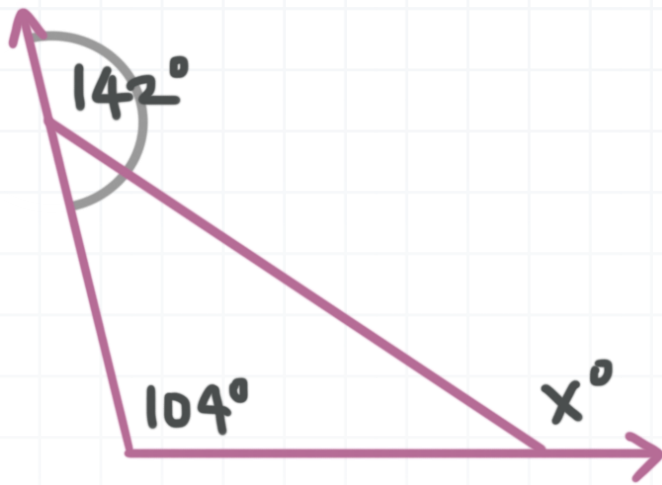
Let's start by working through an example.

Example

What is the value of x ?

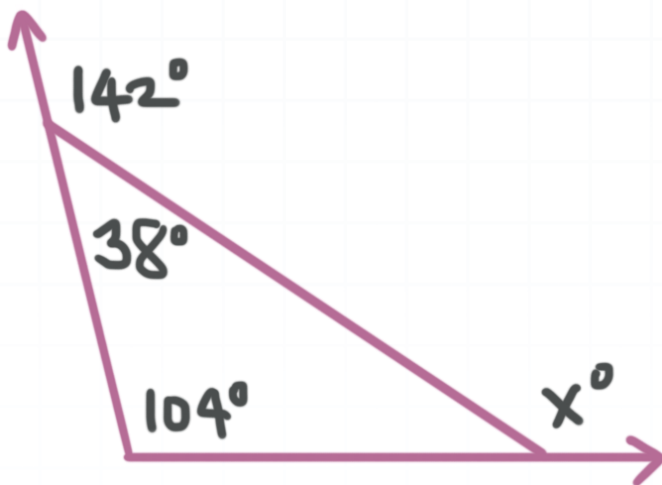


We know that the angle of measure 142° and the interior angle adjacent to it, together, form a straight line:



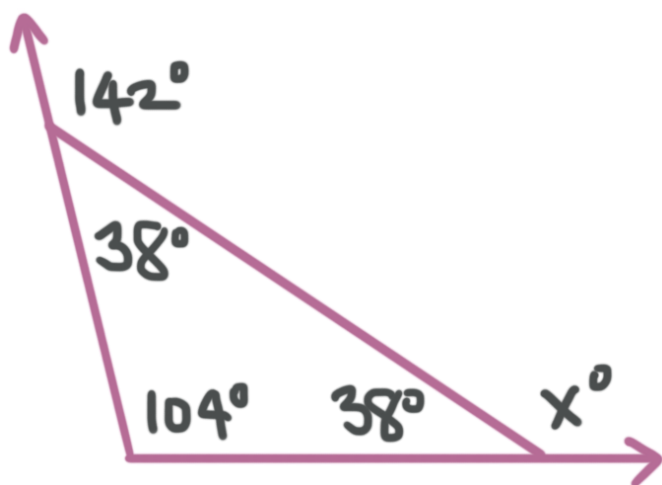
We can find the measure of that interior angle by subtraction:

$$180^\circ - 142^\circ = 38^\circ.$$



The measures of the three angles inside a triangle sum to 180° , so the measure of the third interior angle is

$$180^\circ - 104^\circ - 38^\circ = 38^\circ$$



We can see that the adjacent angles of measure x° and 38° , together, form a straight line, so

$$x^\circ + 38^\circ = 180^\circ$$

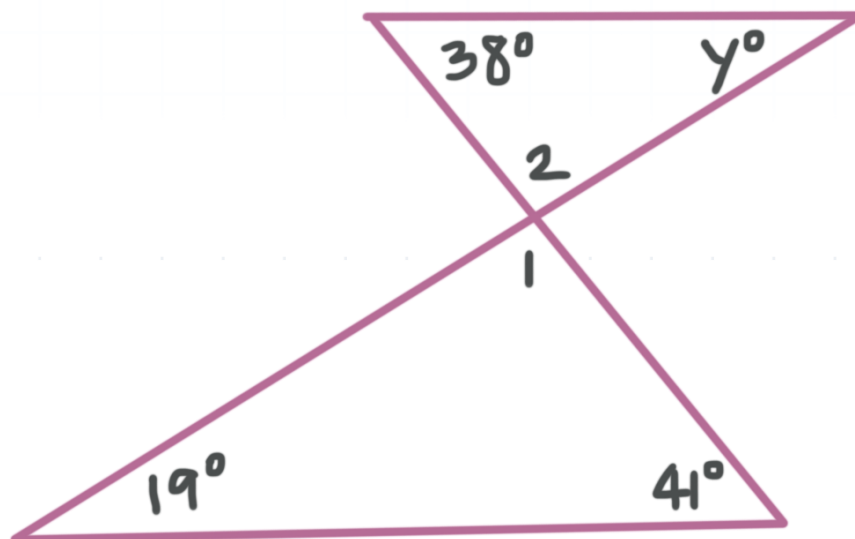
$$x^\circ = 142^\circ$$

$$x = 142$$

Let's try another one.

Example

What is the value of y ?



The measures of the three interior angles of a triangle sum to 180° , so

$$m\angle 1 + 19^\circ + 41^\circ = 180^\circ$$

$$m\angle 1 = 120^\circ$$



Angle 1 and angle 2 are a pair of vertical angles, and vertical angles are congruent, so

$$m\angle 1 = m\angle 2 = 120^\circ$$

Again, the measures of the three interior angles of a triangle sum to 180° , so we see that

$$m\angle 2 + 38^\circ + y^\circ = 180^\circ$$

$$120^\circ + 38^\circ + y^\circ = 180^\circ$$

$$y^\circ = 22^\circ$$

$$y = 22$$

