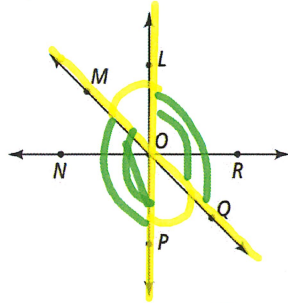


Vertical Angles

Vertical angles are two angles that are formed by two intersecting lines & they are opposite of each other.
They are equal!

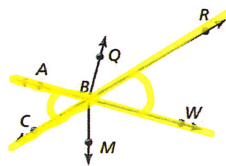


① $\angle MOL$ & $\angle POQ$

② $\angle MOP$ & $\angle LOQ$

EX: ①

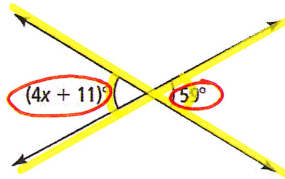
Name the angle that is the vertical to $\angle ABC$.



$\angle RBW$

EX: ②

What is the value of x ?



Since these are vertical angles they must be equal to one another.

Angle 1 = Angle 2

$$4x + 11 = 59$$

$$\underline{-11} \quad \underline{-11}$$

$$4x = 48$$

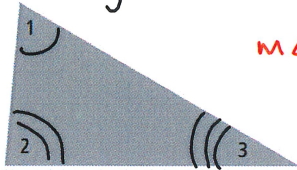
$$\underline{\div 4} \quad \underline{\div 4}$$

$$\boxed{x = 12}$$

"Geogebra"

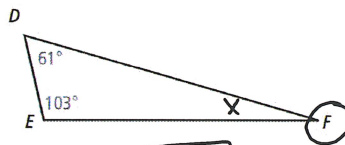
Interior Angles of Triangles

The three interior angles of a triangle add up to 180° .



$$m\angle 1 + m\angle 2 + m\angle 3 = 180^\circ$$

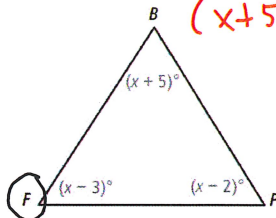
EX: ① What is $m\angle F$?



$$\begin{array}{r} 180 \\ - 61 \\ \hline 119 \end{array} \quad \begin{array}{r} 119 \\ - 103 \\ \hline 16 \end{array}$$

$$m\angle F = 16^\circ$$

EX: ② What is $m\angle F$?



$$m\angle B + m\angle F + m\angle P = 180^\circ$$

$$(x+5) + (x-3) + (x-2) = 180$$

$$(x+5) + (x-3) + (x-2) = 180$$

$$x + 5 + x - 3 + x - 2 = 180$$

$$3x$$

$$\div 3$$

$$= 180$$

$$\div 3$$

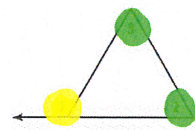
$$x = 60$$

$$m\angle F = x - 3$$

$$m\angle F = 60 - 3$$

$$m\angle F = 57^\circ$$

Exterior Angles of Triangles

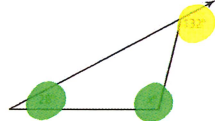


$\angle 1$ is an exterior angle because it's on the outside of the triangle.

$\angle 2$ & $\angle 3$ are remote interior angles because they are far away from $\angle 1$ & they are on the inside of the triangle.

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

EX: ① What is the value of x ?



$$\text{Exterior} = \text{Interior 1}$$

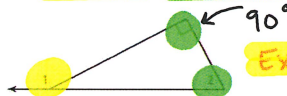
+

$$\text{Interior 2}$$

$$132 = x + 28$$

$$\begin{array}{r} 132 = x + 28 \\ -28 \quad -28 \\ \hline 104 = x \end{array}$$

EX: ② Given $m\angle 1 = (5x - 18)^\circ$ and $m\angle 2 = (3x - 40)^\circ$, what is $m\angle 1$?



$$\text{Exterior} = \text{Interior 1}$$

+

$$\text{Interior 2}$$

$$(5x - 18) = 90 + (3x - 40)$$

$$5x - 18 = 90 + 3x - 40$$

$$5x - 18 = 3x + 50$$

$$\begin{array}{r} 5x - 18 = 3x + 50 \\ -3x \quad -3x \\ \hline 2x - 18 = 50 \end{array}$$

$$2x - 18 = 50$$

$$\begin{array}{r} 2x - 18 = 50 \\ +18 \quad +18 \\ \hline 2x = 68 \end{array}$$

$$2x = 68$$

$$\begin{array}{r} 2x = 68 \\ \div 2 \quad \div 2 \\ \hline x = 34 \end{array}$$

$$\boxed{x = 34}$$

$$m\angle 1 = (5x - 18)^\circ$$

$$m\angle 1 = (5 \cdot 34 - 18)^\circ$$

$$m\angle 1 = (170 - 18)^\circ$$

$$\boxed{m\angle 1 = 152^\circ}$$