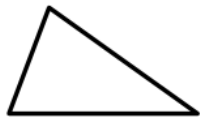
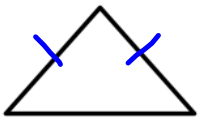
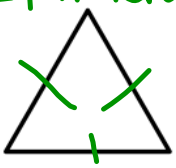
Introduction to Triangles

A TRIANGLE is a polygon w/3 sides

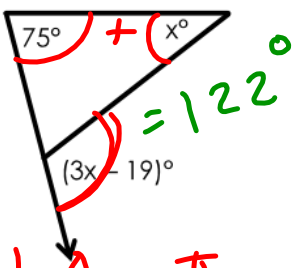
180° = Sum of angles

CLASSIFY A TRIANGLE BY ITS **SIDES**

Scalene	Isosceles	Equilateral
		
No ≅ sides	2 ≅ sides	All sides ≅

Ex. 4:

Find the measure of the exterior angle shown.



$75 + x = 122°$

Ext. Ang. Thm.

$75 + x = 3x - 19$

$3x - 19 = 95 + x$

$+19 \quad +19$

$3x = 94 + x$

$-x \quad 2x = 94$

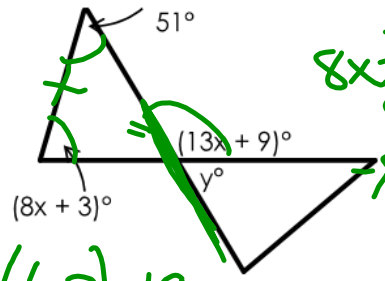
$x = 47$

$3(47) - 19$

$x = 47$

Ex. 5:

Find the values of x and y.



Ext. Ang. Th.

$8x + 3 + 51 = 13x + 9$

$8x + 54 = 13x + 9$

$-8x \quad -8x$

$54 = 5x + 9$

$-9 \quad -9$

$\frac{45}{5} = \frac{5x}{5}$

$x = 9$

$180 = y + 13(9) + 9$

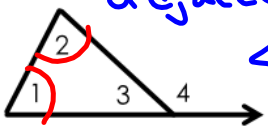
$180 = y + 126$

$54 = y$

EXTERIOR ANGLE THEOREM

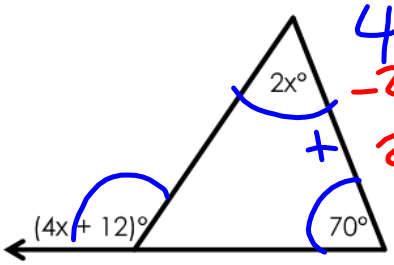
EXTERIOR ANGLE THEOREM:

The measure of an ext. angle of a △ is = to the sum of the two non-adjacent angles on the inside.



$\angle 4 = \angle 1 + \angle 2$

Ex. 3: Find the measure of the exterior angle shown.



$4x+12 = 2x+70$

$-2x \quad -2x$

$2x+12 = 70$

$-12 \quad -12$

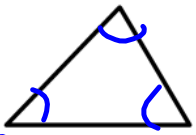
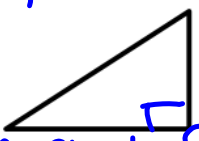
$\frac{2x}{2} = \frac{58}{2}$

$x = 29$

$4(29)+12$

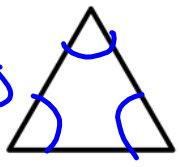
$116+12 = 128°$

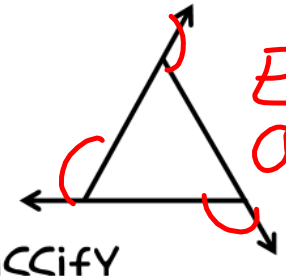
CLASSIFY A TRIANGLE BY ITS ANGLES

Acute	Obtuse	Rt.
		
All angles $< 90°$	one angle $> 90°$	one angle $= 90°$

EQUIANGULAR TRIANGLE:

Int. Angles



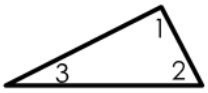


Ext. angles

CLASSIFY

Triangle Sum Theorem:

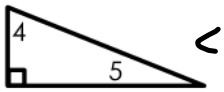
Sum of int. angles in a △ is = to 180°



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

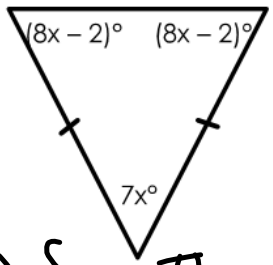
Corollary to the Triangle Sum Theorem:

The acute angles of Rt △ are complementary.



$\angle 4 + \angle 5 = 90°$

Ex. 1: Find the value of x.



△ Sum Th.

$180 = 7x + 8x - 2 + 8x - 2$

$180 = 23x - 4$

$+4 \quad +4$

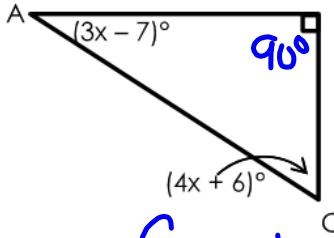
$\frac{184}{23} = \frac{23x}{23}$

$x = 8$

Triangle Sum Theorem

Ex. 2:

Find m∠ACB and m∠BAC.



$\angle BAC \quad 3(13) - 7 = 32°$

$\angle ACB$

$4(13) + 6 = 58°$

Corollary △ Th.

$4x + 6 + 3x - 7 = 90$

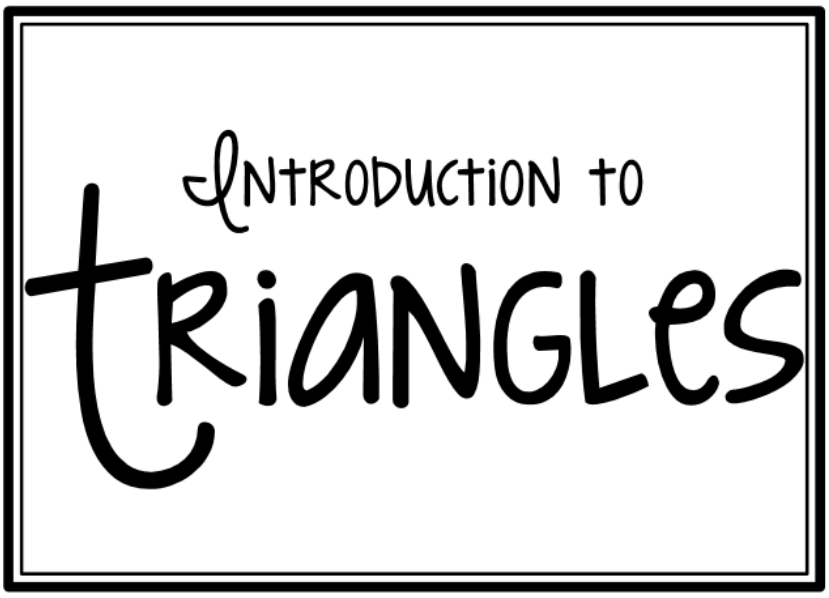
$7x - 1 = 90$

$+1 \quad +1$

$\frac{7x}{7} = \frac{91}{7}$

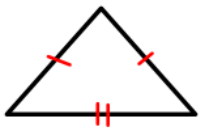
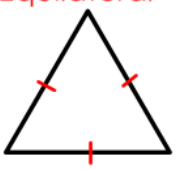
$x = 13$

Answer Key



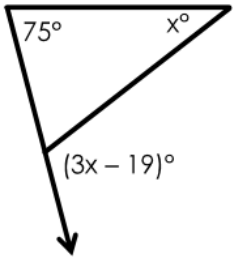
A TRIANGLE is a polygon with three sides.

CLASSIFY A TRIANGLE BY ITS SIDES

Scalene	Isosceles	Equilateral
		
No congruent sides	2 congruent sides	3 congruent sides

Ex. 4:

Find the measure of the exterior angle shown.

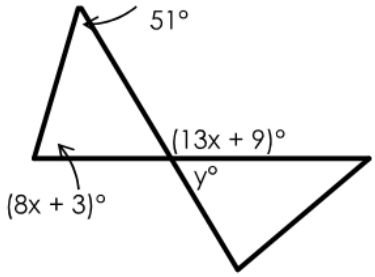


$75 + x = 3x - 19$
$94 = 2x$
$x = 47$

$(3x - 19)°$
$(3(47) - 19)°$
$(141 - 19)°$
$122°$

Ex. 5:

Find the values of x and y.



$51 + (8x + 3) = 13x + 9$
$8x + 54 = 13x + 9$
$45 = 5x$
$x = 9$

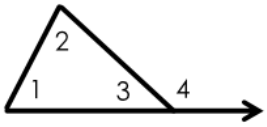
$13x + 9$
$13(9) + 9$
$117 + 9 = 126$

$180 - 126$
$y = 54$

EXTERIOR ANGLE THEOREM

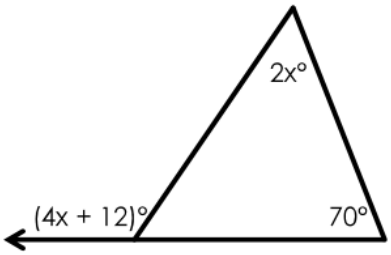
Exterior Angle Theorem:

The measure of an exterior angle of a triangle is equal to the sum of the measures of the two nonadjacent interior angles.



$m\angle 1 + m\angle 2 = m\angle 4$

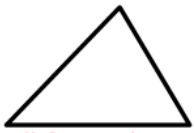
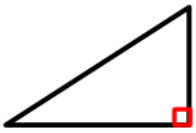
Ex. 3: Find the measure of the exterior angle shown.



$2x + 70 = 4x + 12$
$58 = 2x$
$x = 29$

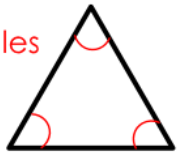
$4x + 12$
$4(29) + 12$
$116 + 12$
$128°$

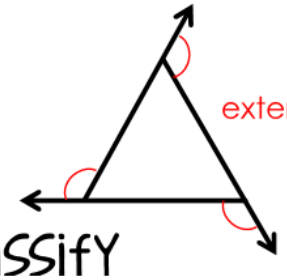
Classify a triangle by its **angles**

acute	obtuse	right
		
all 3 angles are acute	exactly 1 angle is obtuse	exactly 1 angle is right

Equiangular triangle: triangle with 3 congruent angles

interior angles





exterior angles

CLASSIFY