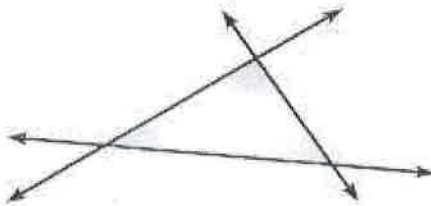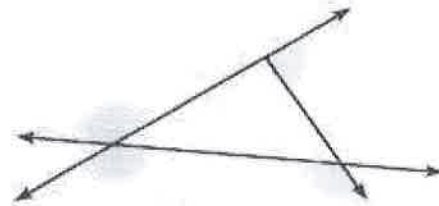**ANGLES** When the sides of a polygon are extended, other angles are formed. The original angles are the **interior angles**. The angles that form linear pairs with the interior angles are the **exterior angles**.
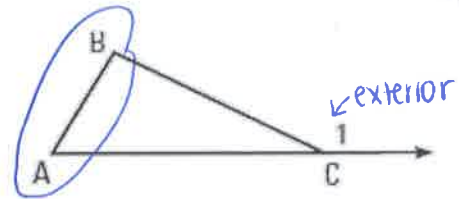
Interior angles
(inside) sum to 180°

exterior angles
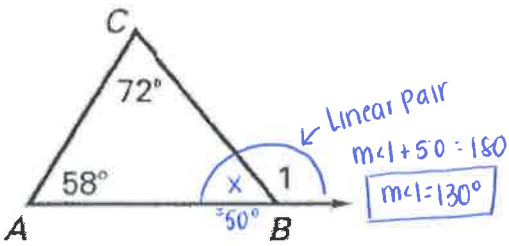(outside)

THEOREM 4.2 – Exterior Angle Theorem

Words The measure of an exterior angle of a triangle is equal to the __Sum__ of the measures of the two nonadjacent __interior__ angles.
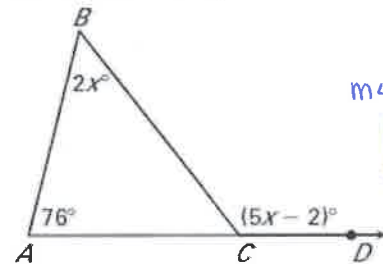
← exterior

Symbols: $m\angle 1 = m\angle A + m\angle B$

Example 1 – Find an Angle Measure

a) Find $m\angle 1$.

← Linear Pair
$m\angle 1 + 50 = 180$
$m\angle 1 = 130°$

$m\angle 1 = 58 + 72$ OR $58 + 72 + x = 180$
$m\angle 1 = 130°$ $130 + x = 180$
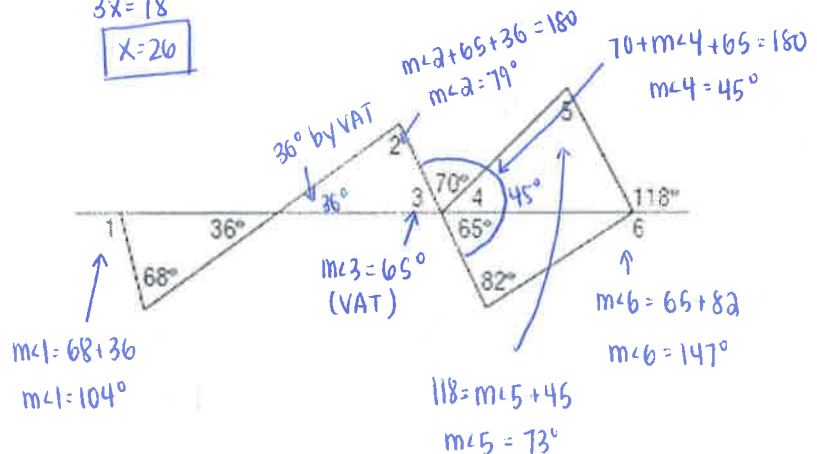 $x = 50$

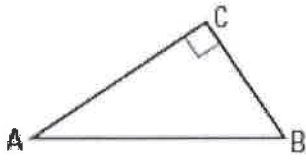b) Find $m\angle BCD$.

$m\angle BCD = 5(26) - 2$
$m\angle BCD = 128°$

$5x - 2 = 76 + 2x$
$3x - 2 = 76$
$3x = 78$
$x = 26$

c) Find the measure of each angle.

$m\angle 1 = $ __104°__ $m\angle 2 = $ __79°__

$m\angle 3 = $ __65°__ $m\angle 4 = $ __45°__

$m\angle 5 = $ __73°__ $m\angle 6 = $ __147°__

36° by VAT

$m\angle 2 + 65 + 36 = 180$
$m\angle 2 = 79°$

$70 + m\angle 4 + 65 = 180$
$m\angle 4 = 45°$

$m\angle 3 = 65°$
(VAT)

$m\angle 1 = 68 + 36$
$m\angle 1 = 104°$

$118 = m\angle 5 + 45$
$m\angle 5 = 73°$

$m\angle 6 = 65 + 82$
$m\angle 6 = 147°$

- A **corollary to a theorem** is a statement that can be proved easily using the theorem. The corollary below follows from the Triangle Sum Theorem.

Corollary to the Triangle Sum Theorem	
The acute angles of a right triangle are _always complementary_.	 $m\angle A$ + $m\angle B$ = 90°

Example 2 – Find angle measures from a verbal description.

a) The support for the skateboard ramp shown forms a right triangle. The measure of <u>one acute angle</u> in the triangle is five times the measure of <u>the other</u>. Find the measure of each acute angle.

   $5X$ X

   $x + 5x = 90$

   $6x = 90$

   $\boxed{x = 15}$

   one angle $(x) = 15°$

   other angle $(5x) = 15(5) = 75°$