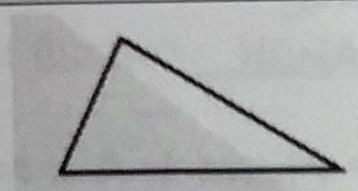
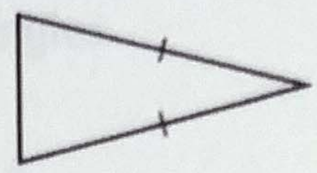
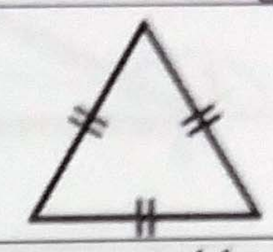
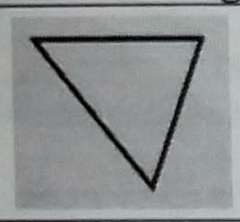
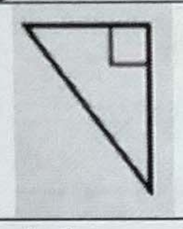
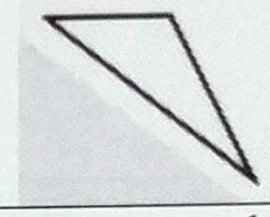
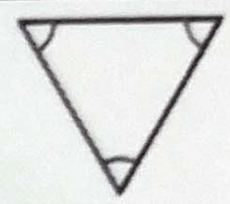
Geometry 5.1 Notes: Classifying Triangles

Classifying Triangles by their **SIDES**

Scalene Triangle	Isosceles Triangle	Equilateral Triangle
		
No congruent sides	At least 2 congruent sides	3 congruent sides

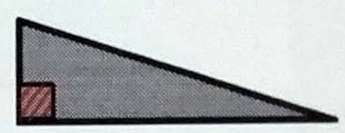
Classifying Triangles by their **ANGLES**

Acute Triangle	Right Triangle	Obtuse Triangle	Equiangular Triangle
			
3 acute angles	1 right angle	1 obtuse angle	3 congruent angles

1. Classify the triangular shape by its sides.

ISOSCELES △

2. Classify the triangular shape by its angles.



RIGHT △

In the Coordinate Plane

3. Classify ΔOPQ by its sides. Then determine whether it is a right triangle.

$PO = \sqrt{5}$
$PQ = 5\sqrt{2}$
$OQ = 3\sqrt{5}$

USE DISTANCE FORMULA
NONE MATCH
→ SCALENE △

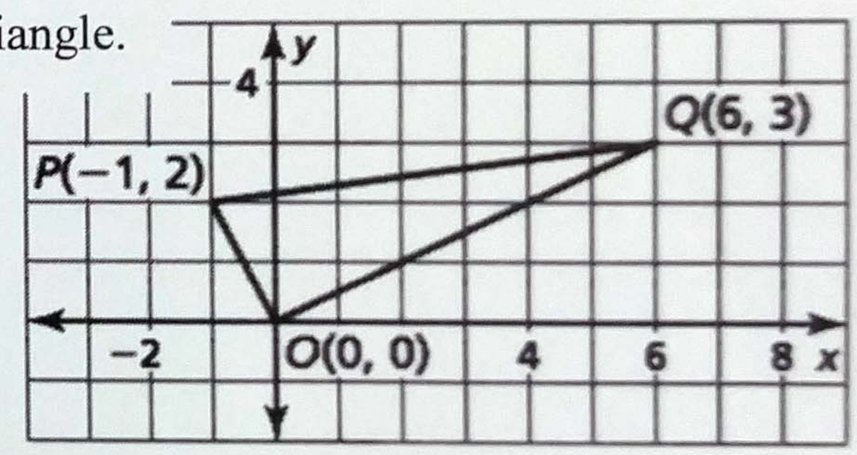
$m_{PO} = -2$
$m_{OQ} = \frac{1}{2}$

USE SLOPE FORMULA

$(-2)(\frac{1}{2}) = -1$

$OP \perp OQ$, SO $m\angle O = 90°$

→ RIGHT △

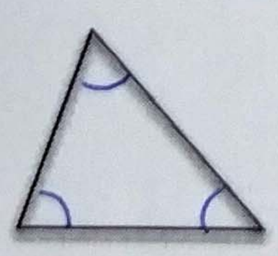


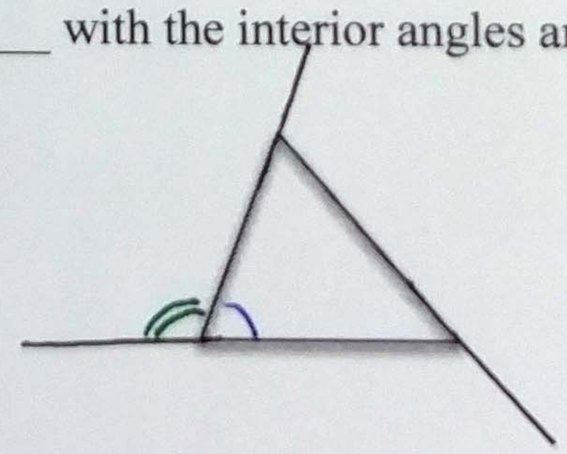
Finding Angle Measures of Triangles

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.

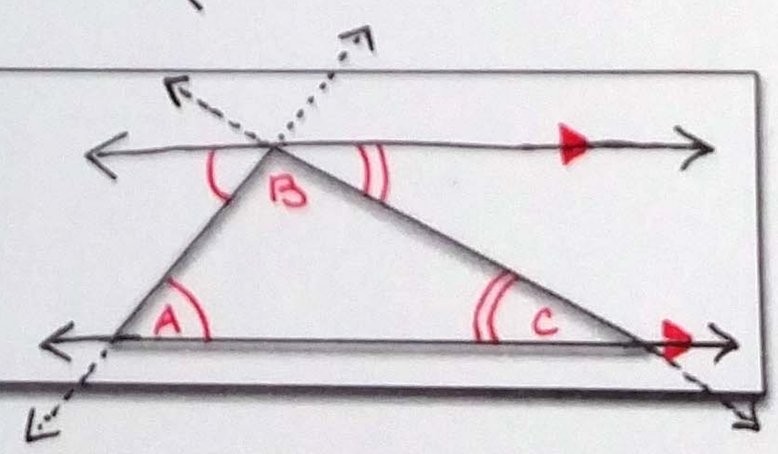




Triangle Sum Theorem

The sum of the measures of the interior angles of a triangle is 180°.

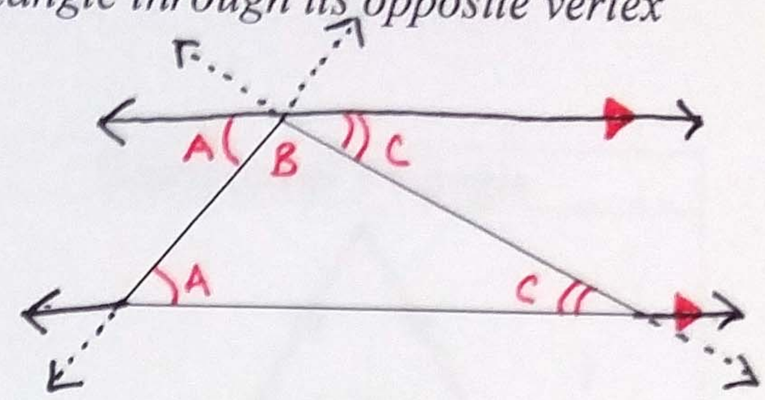
$m\angle A + m\angle B + m\angle C = 180°$



ıngle Sum Theorem PROOF: *hint: draw a line parallel to any side of the triangle through its opposite vertex

TWO-COLUMN

STATEMENTS	REASONS
① $\angle 1 \cong \angle 4$	① IF // → ALT. INT. ∠s ≅
② $\angle 3 \cong \angle 5$	② IF // → ALT. INT. ∠s ≅
③ $m\angle 1 = m\angle 4$ $m\angle 3 = m\angle 5$	③ IF ∠s ≅ → ∠s =
④ $m\angle 4 + m\angle 2 + m\angle 5 = 180°$	④ SUPP ∠s ADD TO 180°
⑤ $m\angle 1 + m\angle 2 + m\angle 3 = 180°$	⑤ SUBST. PROP. =



FLOW CHART

$\angle 1 \cong \angle 4$ → $m\angle 1 = m\angle 4$
IF // → ALT. INT. ∠s ≅ — IF ∠s ≅ → ∠s =

$\angle 3 \cong \angle 5$ → $m\angle 3 = m\angle 5$
IF // → ALT. INT. ∠s ≅ — IF ∠s ≅ → ∠s =

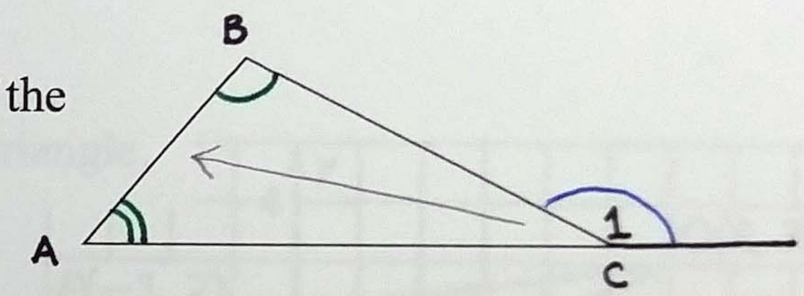
$m\angle 4 + m\angle 2 + m\angle 5 = 180°$
SUPP. ∠s ADD TO 180°

→ $m\angle 1 + m\angle 2 + m\angle 3 = 180°$
SUBST. PROP. =

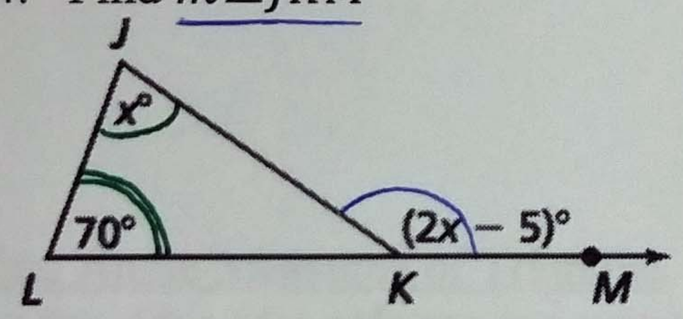
Exterior Angle Theorem

The measure of an exterior angle of a triangle is equal to the SUM (ADDITION) of the NONADJACENT (OPPOSITE) interior angles.

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



4. Find $m\angle JKM$

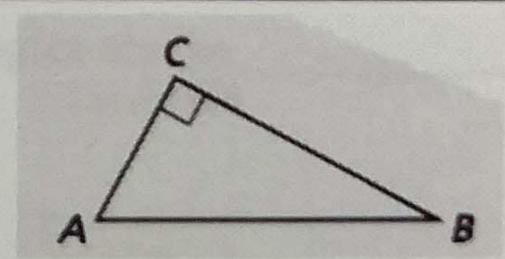


$x + 70 = 2x - 5$
$70 = x - 5$
$75 = x$
$2(75) - 5$
$= 150 - 5$
$\boxed{= 145°}$

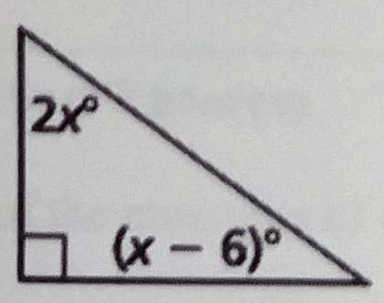
Corollary to the Triangle Sum Theorem

The acute angles of a right triangle are COMPLEMENTARY.

$m\angle A + m\angle B = 90°$



5. Find the measure of each acute angle.



$2x + (x - 6) = 90$
$3x - 6 = 90$
$3x = 96$
$x = 32$

$2(32)$ $\boxed{= 64°}$

$(32 - 6)$ $\boxed{= 26°}$