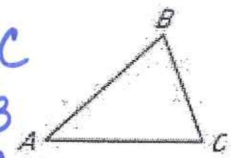
Learning Target(s): I can classify a triangle by it sides. I can classy a triangle by its angles.
I can identify angle pairs formed by three intersecting lines.
I can use the triangle sum theorem to solve problems about the measure of a triangle.
I can use the exterior angle theorem to solve problems about the measure of a triangle.

4.1 Notes: Apply Triangle Sum Properties

triangle: a polygon with 3 sides

$\triangle ABC$ $\triangle BAC$
$\triangle ACB$ $\triangle CAB$
$\triangle BCA$ $\triangle CBA$



$\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

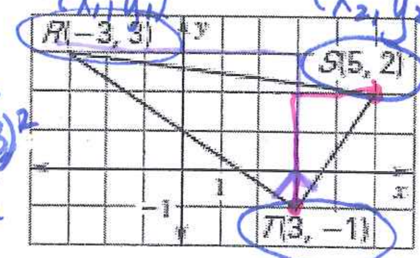
Ex. 1
Classify $\triangle RST$ by its sides. Then determine if the triangle is a right triangle.

Scalene ? ✓

$RT = \sqrt{(3--3)^2+(-1-3)^2}$
$= \sqrt{(6)^2+(-4)^2}$
$= \sqrt{36+16}$
$= \sqrt{52}$

$RS = \sqrt{(5--3)^2+(2-3)^2}$
$= \sqrt{(8)^2+(-1)^2}$
$= \sqrt{64+1}$
$= \sqrt{65}$

(x_1, y_1) (x_2, y_2)

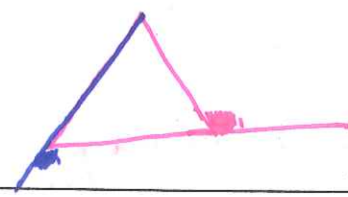


(x_2, y_2)

rt ∠? ✓
slopes → opp. reciprocal
$TS = \frac{3}{2}$
$RT = -\frac{4}{6} = -\frac{2}{3}$

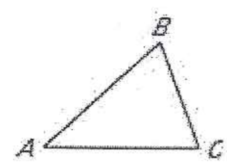
interior angles:

exterior angles:



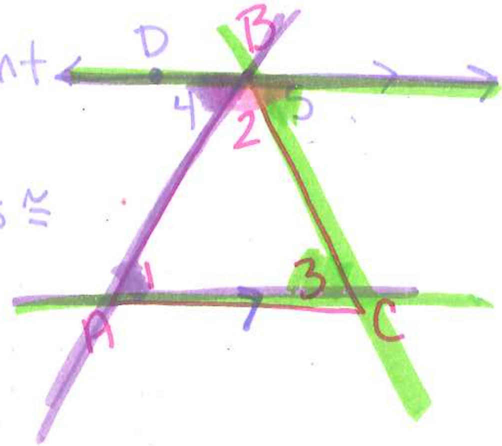
Triangle Sum Theorem:

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



Proof:

1. $\overleftrightarrow{BD} \parallel \overleftrightarrow{AC}$	1. 1 ∥ line through point
2. $m\angle 4 + m\angle 2 + m\angle 5 = 180°$	2. p+p+p = W
3. $\angle 1 \cong \angle 4$, $\angle 3 \cong \angle 5$	3. If ∥, then alt. int ∠s ≅
4. $m\angle 1 = m\angle 4$, $m\angle 3 = m\angle 5$	4. If ≅, then =
5. $m\angle 1 + m\angle 2 + m\angle 3 = 180°$	5. Substitution



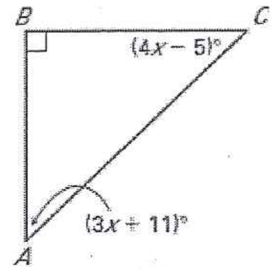
Ex. 2 Find the value of x.

$90 + 4x - 5 + 3x + 11 = 180°$

$96 + 7x = 180$

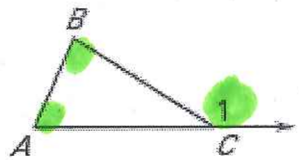
$-96 \qquad -96$

$\frac{7x}{7} = \frac{84}{7}$ $\quad x = 12$



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.



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

in + in = out

Ex. 3
Find the measure of $\angle DCB$.

$3x - 9 = 73 + x$

$-x \qquad -x$

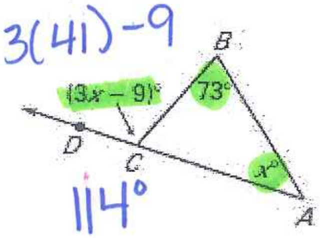
$2x - 9 = 73$

$+9 \quad +9$

$2x = 82$

$x = 41$

$3(41) - 9$

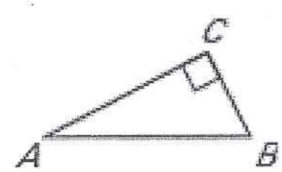


114°

corollary to a theorem: a statement that CAN be proved easily using the theorem

Corollary to the Triangle Sum Theorem:

The acute angles of a right triangle are complementary.



Ex. 4
The front face of the wheelchair ramp shown forms a right triangle. The measure of one acute angle in the triangle is eight times the measure of the other. Find the measure of the acute angle.

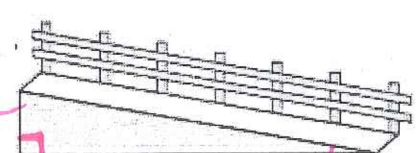
$8x + x = 90$

$\frac{9x}{9} = \frac{90}{9}$

$x = 10$

80°

8x°



x° 10°