

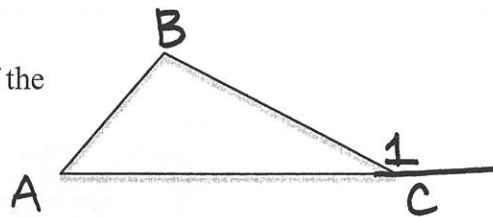
## Classifying Triangles (continued)

Lesson Objective: INBAT use theorems about angle measures in  $\Delta$ s

## Exterior Angle Theorem

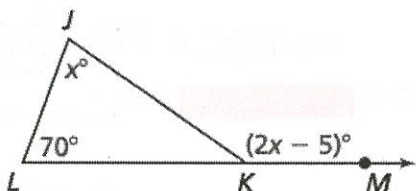
The measure of an exterior angle <sup>in</sup> a triangle is equal to the sum of the measures of the two nonadjacent interior angles.

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



Example:

4. Find  $m\angle JKM$



$$70 + x = 2x - 5$$

$$\downarrow$$

$$x = 75$$

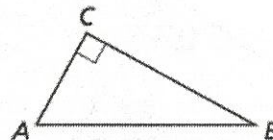
$$m\angle JKM = 145^\circ$$

Corollary: A corollary to a theorem is a statement that can be proved easily using the theorem.

## Corollary to the Triangle Sum Theorem

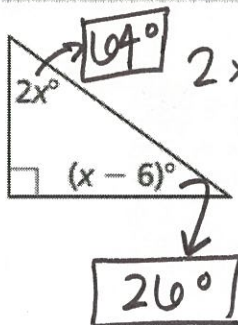
The acute angles of a right triangle are complementary.

$$m\angle A + m\angle B = 90^\circ$$



Examples:

5. Find the measure of each acute angle.



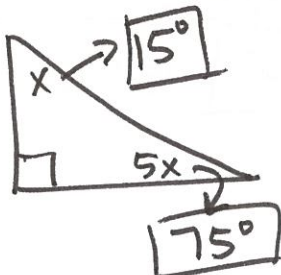
$$2x + x - 6 + 90 = 180$$

$$2x + x - 6 = 90$$

$$\downarrow$$

$$x = 32$$

6. The measure of one acute angle in a right triangle is 5 times the measure of the other acute angle. Find the measure of each acute angle in this right triangle.



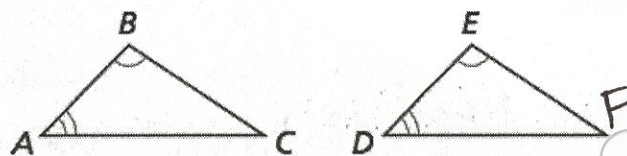
$$5x + x = 90$$

$$6x = 90$$

$$x = 15$$

## Third Angles Theorem

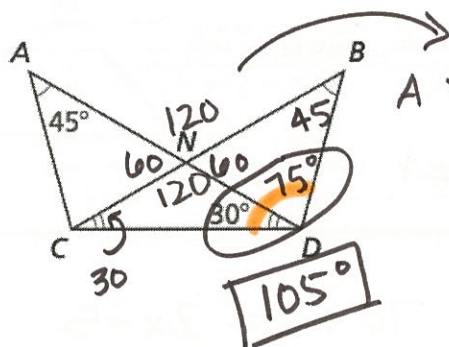
If two angles of one triangle are congruent to two angles of another triangle, then the third angles are also congruent.



if  $\angle A \cong \angle D$  and  $\angle B \cong \angle E$ , then  $\angle C \cong \angle F$

Examples:

7. Find  $m\angle BDC$ .



$$m\angle BDC = 180 - (30 + 45) = 105^\circ$$

8. Which of the following could represent the measures of an exterior angle and two interior angles of a triangle? Select all that apply.

(A)  $100^\circ, 62^\circ, 38^\circ$

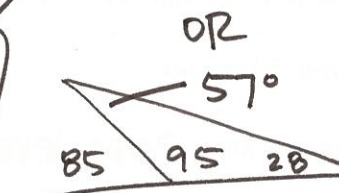
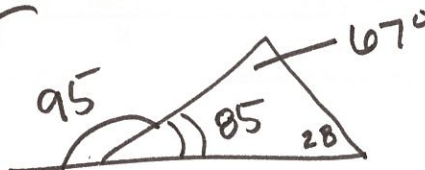
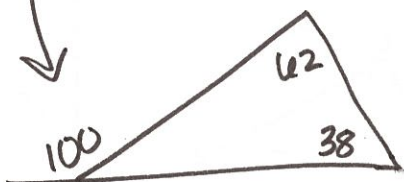
(C)  $119^\circ, 68^\circ, 49^\circ$

(E)  $92^\circ, 78^\circ, 68^\circ$

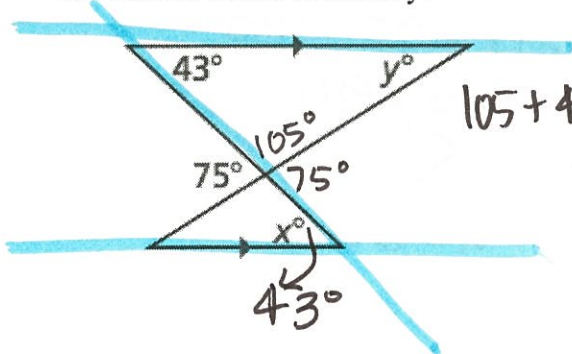
(B)  $81^\circ, 57^\circ, 24^\circ$

(D)  $95^\circ, 85^\circ, 28^\circ$

(F)  $149^\circ, 101^\circ, 48^\circ$



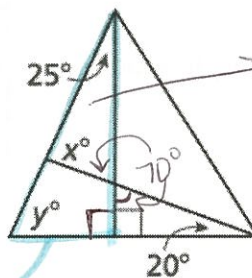
9. Find the values of  $x$  and  $y$ .



$$105 + 43 + y = 180$$

$$y = 32$$

10. Find the values of  $x$  and  $y$ .



$$25 + 70 + x = 180$$

$$x = 85$$



$$y + 25 = 90$$

$$y = 65$$