VOCABULARY

Triangle A triangle is a polygon with three sides.

Interior angles When the sides of a polygon are extended, the original angles are the interior angles.

Exterior angles When the sides of a polygon are extended, the angles that form linear pairs with the interior angles are the exterior angles.

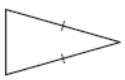
Corollary to a theorem A corollary to a theorem is a statement that can be proved easily using the theorem.

CLASSIFYING TRIANGLES BY SIDES

Scalene Triangle

No congruent sides

Isosceles Triangle



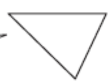
At least 2 congruent sides

Equilateral Triangle

3 congruent sides

CLASSIFYING TRIANGLES BY ANGLES

Acute Triangle



3 acute angles

Right Triangle

1 right angle

Obtuse Triangle

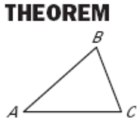
1 obtuse angle

Equiangular Triangle

3 congruent angles

THEOREM 4.1: TRIANGLE SUM THEOREM

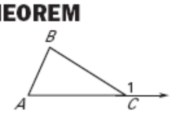
The sum of the measures of the interior angles of a triangle is 180°.



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

THEOREM 4.2: EXTERIOR ANGLE THEOREM

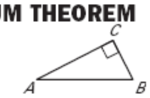
The measure of an exterior angle of a triangle is equal to the sum of the measures of the two nonadjacent interior angles.



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

COROLLARY TO THE TRIANGLE SUM THEOREM

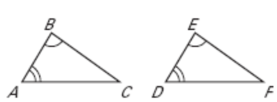
The acute angles of a right triangle are complementary.



$m\angle A + m\angle B =$ 90°

THEOREM 4.3: THIRD ANGLES THEOREM

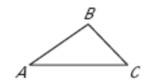
If two angles of one triangle are congruent to two angles of another triangle, then the third angles are also congruent.



THEOREM 4.4: PROPERTIES OF CONGRUENT TRIANGLES

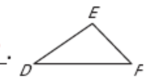
Reflexive Property of Congruent Triangles

For any triangle ABC, $\triangle ABC \cong \triangle ABC$.



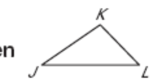
Symmetric Property of Congruent Triangles

If $\triangle ABC \cong \triangle DEF$, then $\triangle DEF \cong \triangle ABC$.



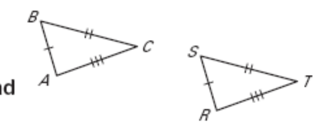
Transitive Property of Congruent Triangles

If $\triangle ABC \cong \triangle DEF$ and $\triangle DEF \cong \triangle JKL$, then $\triangle ABC \cong \triangle JKL$.



POSTULATE 19: SIDE-SIDE-SIDE (SSS) CONGRUENCE POSTULATE

If three sides of one triangle are congruent to three sides of a second triangle, then the two triangles are congruent.



If Side $\overline{AB} \cong \overline{RS}$,

Side $\overline{BC} \cong \overline{ST}$, and

Side $\overline{CA} \cong \overline{TR}$,

then $\triangle ABC \cong \triangle RST$.

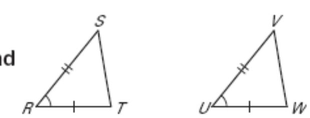
VOCABULARY

Leg of a right triangle In a right triangle, a side adjacent to the right angle is called a leg.

Hypotenuse In a right triangle, the side opposite the right angle is called the hypotenuse.

POSTULATE 20: SIDE-ANGLE-SIDE (SAS) CONGRUENCE POSTULATE

If two sides and the included angle of one triangle are congruent to two sides and the included angle of a second triangle, then the two triangles are congruent.



If Side $\overline{RS} \cong \overline{UV}$,

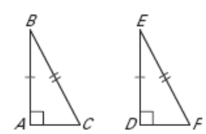
Angle $\angle R \cong \angle U$, and

Side $\overline{RT} \cong \overline{UW}$,

then $\triangle RST \cong \triangle UVW$.

THEOREM 4.5: HYPOTENUSE-LEG CONGRUENCE THEOREM

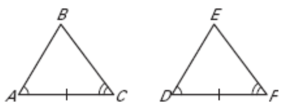
If the hypotenuse and a leg of a right triangle are congruent to the hypotenuse and a leg of a second triangle, then the two triangles are congruent.



POSTULATE 21: ANGLE-SIDE-ANGLE (ASA) CONGRUENCE POSTULATE

If two angles and the included side of one triangle are congruent to two angles and the included side of a second triangle, then the two triangles are congruent.

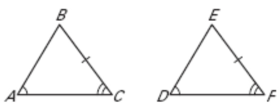
If Angle $\angle A \cong$ $\angle D$,
Side $\overline{AC} \cong$ $\overline{DF}$, and
Angle $\angle C \cong$ $\angle F$,
then $\triangle ABC \cong$ $\triangle DEF$.



THEOREM 4.6: ANGLE-ANGLE-SIDE (AAS) CONGRUENCE THEOREM

If two angles and a non-included side of one triangle are congruent to two angles and the corresponding non-included side of a second triangle, then the two triangles are congruent.

If Angle $\angle A \cong$ $\angle D$,
Angle $\angle C \cong$ $\angle F$, and
Side $\overline{BC} \cong$ $\overline{EF}$,
then $\triangle ABC \cong$ $\triangle DEF$.



VOCABULARY

Legs The legs of an isosceles triangle are the two congruent sides.

Vertex angle The vertex angle of an isosceles triangle is the angle formed by the legs.

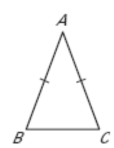
Base The base of an isosceles triangle is the side that is not a leg.

Base angles The base angles of an isosceles triangle are the two angles adjacent to the base.

THEOREM 4.7: BASE ANGLES THEOREM

If two sides of a triangle are congruent, then the angles opposite them are congruent.

If $\overline{AB} \cong \overline{AC}$, then $\angle B \cong$ $\angle C$.



THEOREM 4.8: CONVERSE OF BASE ANGLES THEOREM

If two angles of a triangle are congruent, then the sides opposite them are congruent.

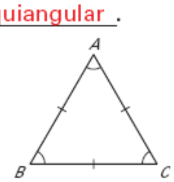
If $\angle B \cong \angle C$, then $\overline{AB} \cong$ $\overline{AC}$.

COROLLARY TO THE BASE ANGLES THEOREM

If a triangle is equilateral, then it is equiangular.

COROLLARY TO THE CONVERSE OF BASE ANGLES THEOREM

If a triangle is equiangular, then it is equilateral.



VOCABULARY

Transformation A transformation is an operation that moves or changes a geometric figure in some way to produce a new figure.

Image The new figure produced by a transformation is the image.

Translation A translation moves every point of a figure the same distance in the same direction.

Reflection A reflection uses a *line of reflection* to create a mirror image of the original figure.

Rotation A rotation turns a figure about a fixed point, called the *center of rotation*.

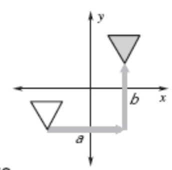
Congruence Transformation A congruence transformation changes the position of a figure without changing its size or shape.

COORDINATE NOTATION FOR A TRANSLATION

You can describe a translation by the notation

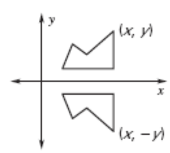
$(x, y) \rightarrow (x + a, y + b)$

which shows that each point (x, y) of the unshaded figure is translated horizontally a units and vertically b units.



COORDINATE NOTATION FOR A REFLECTION

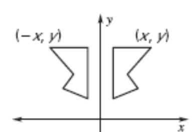
Reflection in the x-axis



Multiply y-coordinate by -1.

$(x, y) \rightarrow (x, -y)$

Reflection in the y-axis



Multiply x-coordinate by -1.

$(x, y) \rightarrow (-x, y)$