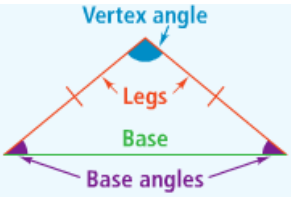
Geometry

Chapter 4
Section 4-5

Isosceles Triangles

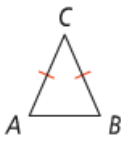
The congruent sides of an isosceles triangle are its **legs**. The third side is the **base**. The two congruent legs form the **vertex angle**. The other two angles are the **base angles**.



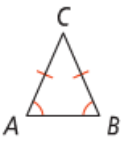
Theorem 4-3 Isosceles Triangle Theorem

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

If . . .
$\overline{AC} \cong \overline{BC}$



Then . . .
$\angle A \cong \angle B$

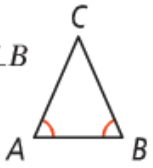


Converse of Isosceles Triangle Theorem

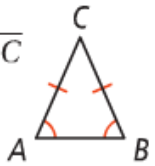
Theorem 4-4 Converse of the Isosceles Triangle Theorem

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

If . . . $\angle A \cong \angle B$



Then . . . $\overline{AC} \cong \overline{BC}$

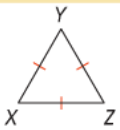


More Theorems and Corollaries

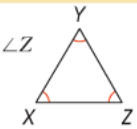
Corollary to Theorem 4-3

Corollary
If a triangle is equilateral, then the triangle is equiangular.

If . . . $\overline{XY} \cong \overline{YZ} \cong \overline{ZX}$



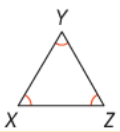
Then . . . $\angle X \cong \angle Y \cong \angle Z$



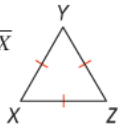
Corollary to Theorem 4-4

Corollary
If a triangle is equiangular, then the triangle is equilateral.

If . . . $\angle X \cong \angle Y \cong \angle Z$



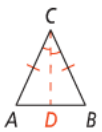
Then . . . $\overline{XY} \cong \overline{YZ} \cong \overline{ZX}$



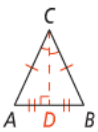
Theorem 4-5

Theorem
If a line bisects the vertex angle of an isosceles triangle, then the line is also the perpendicular bisector of the base.

If . . . $\overline{AC} \cong \overline{BC}$ and $\angle ACD \cong \angle BCD$



Then . . . $\overline{CD} \perp \overline{AB}$ and $\overline{AD} \cong \overline{BD}$



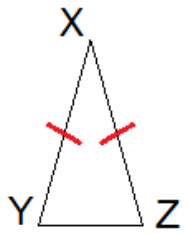
Isosceles Triangles

$XZ = 12 - b$
$XY = 7 + 4b$
$YZ = 3b$

Find the side lengths

$m\angle Y = 4a - 3$
$m\angle Z = a - 2$

Find the angle measures



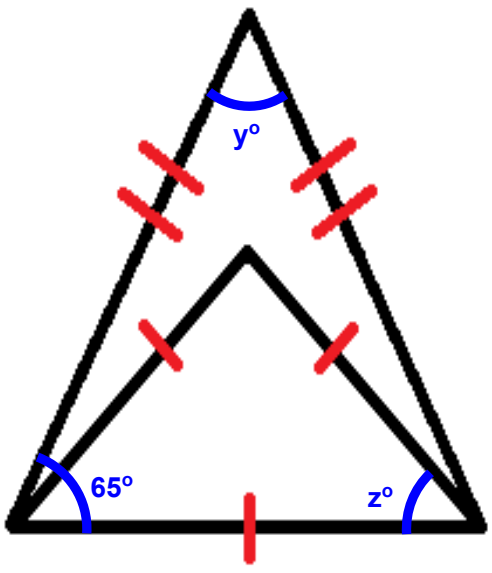
$m\angle X = 22$
$m\angle Z = n - 32$

Find the angle measure

Using Equilateral and Isosceles Triangles

$z + z + z = 180$
$3z = 180$
$z = 60$

$y + 65 + 65 = 180$
$y + 130 = 180$
$y = 50$



Homework

Pages 254-256
#6-13, 31