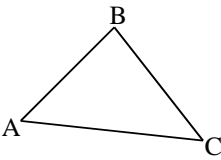


Lesson 8-4

Objective - To classify triangles and to solve problems involving triangles.




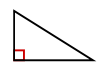
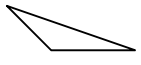


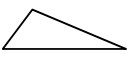
Triangles consist of ...

Vertices
A, B, C

Sides
 \overline{AB} , \overline{BC} , \overline{AC}


Angles
 $\angle A$, $\angle B$, $\angle C$

Ways to Name
 $\triangle ABC$ $\triangle BAC$ $\triangle CAB$
 $\triangle ACB$ $\triangle BCA$ $\triangle CBA$

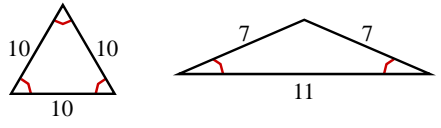
<u>Triangle Names</u>			
Angle Name	 Acute - <u>All</u> angles less than 90° .	 Right - <u>Only One</u> angle equal to 90° .	 Obtuse - <u>Only One</u> angle more than 90° .
Side Name	 Equilateral - <u>All</u> three sides equal.	 Isosceles - <u>Two</u> sides equal.	 Scalene - No equal sides.

Angle-Side Relationships

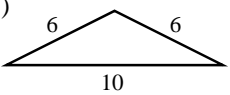
Sides opposite congruent angles are congruent.

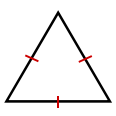


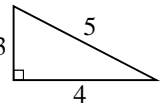
Angles opposite congruent sides are congruent.

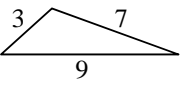


Name each triangle below.

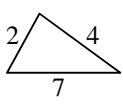
1) 
Obtuse Isosceles

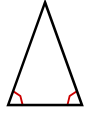
2) 
Acute Equilateral

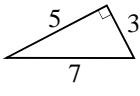
3) 
Right Scalene

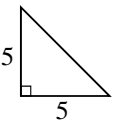
4) 
Obtuse Scalene

Name each triangle below.

5) 
Acute Scalene

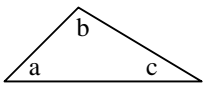
6) 
Acute Isosceles

7) 
Right Scalene

8) 
Right Isosceles

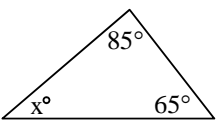
180° Rule

Every triangle has angles whose sum equals 180° .



$$m\angle a + m\angle b + m\angle c = 180^\circ$$

Solve for x.



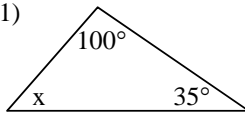
$$m\angle x + 85^\circ + 65^\circ = 180^\circ$$

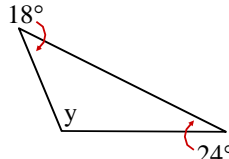
$$x + 150 = 180$$

$$\begin{array}{r} x + 150 = 180 \\ -150 \quad -150 \\ \hline x = 30 \end{array}$$

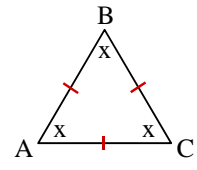
Lesson 8-4 (cont.)

Find the missing angle.

1)  $m\angle x + 100^\circ + 35^\circ = 180^\circ$
 $x + 135 = 180$
 $\quad -135 \quad -135$
 $\quad\quad\quad x = 45$
 $m\angle x = 45^\circ$

2)  $m\angle y + 18^\circ + 24^\circ = 180^\circ$
 $y + 42 = 180$
 $\quad\quad -42 \quad -42$
 $\quad\quad\quad y = 138$
 $m\angle y = 138^\circ$

Equilateral Triangles

 $m\angle A = m\angle B = m\angle C = 180^\circ$

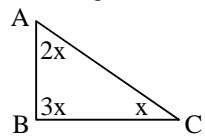
$\frac{3x}{3} = \frac{180^\circ}{3}$
 $x = 60^\circ$

All equilateral triangles must be acute.

Impossible Triangle Names

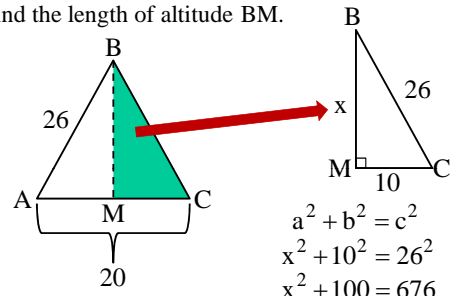
Right Equilateral
 Obtuse Equilateral

Find each angle in the triangle below.

 $x + 2x + 3x = 180^\circ$
 $\frac{6x}{6} = \frac{180^\circ}{6}$
 $x = 30^\circ$

$m\angle A = 2x = 2(30) = 60^\circ$
 $m\angle B = 3x = 3(30) = 90^\circ$
 $m\angle C = x = 30^\circ$

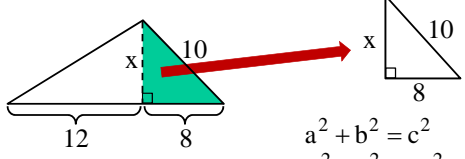
$\triangle ABC$ is isosceles. M is the midpoint of \overline{AC} .
 Find the length of altitude \overline{BM} .



$a^2 + b^2 = c^2$
 $x^2 + 10^2 = 26^2$
 $x^2 + 100 = 676$
 $x^2 = 576$
 $x = \sqrt{576} = 24$

Altitude $\overline{BM} = 24$ units

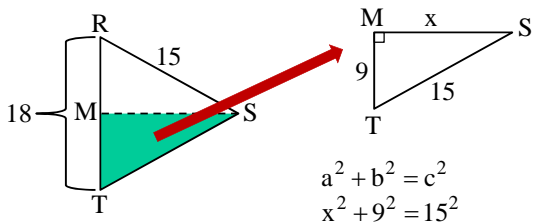
Find the length of altitude x .



$a^2 + b^2 = c^2$
 $x^2 + 8^2 = 10^2$
 $x^2 + 64 = 100$
 $\quad -64 \quad -64$
 $\quad\quad\quad x^2 = 36$
 $x = \sqrt{36} = 6$

Altitude $x = 6$ units

$\triangle RST$ is isosceles. M is the midpoint of \overline{RT} .
 Find the length of altitude \overline{MS} .



$a^2 + b^2 = c^2$
 $x^2 + 9^2 = 15^2$
 $x^2 + 81 = 225$
 $x^2 = 144$
 $x = \sqrt{144} = 12$

Altitude $\overline{MS} = 12$ units