

Topic 2-3 "Parallel Lines and Triangle Angle Sums"

Goes with
Env 2-3

Zaa 9/29/17

Geometry Packet - Chapter 7

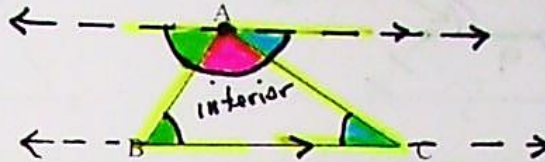
7.1 Triangle Application Theorems

★ **Triangle Sum Theorem:** the sum of the measures of the angles of a triangle is 180° .

Proof:

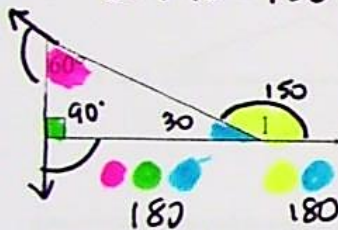
Given: $\triangle ABC$

Prove: $m\angle A + m\angle B + m\angle C = 180$

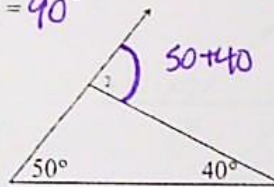


★ **Exterior Angle Theorem:** the measure of an exterior angle of a triangle is equal to the sum of the remote interior angles.

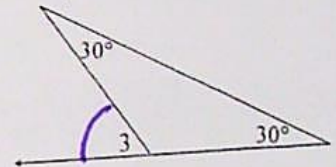
1. $m\angle 1 = 60 + 90 = 150^\circ$



2. $m\angle 2 = 90^\circ$

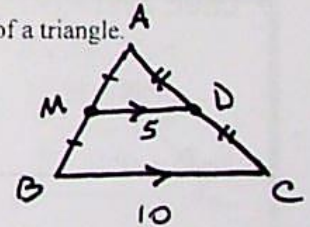


3. $m\angle 3 = 2(30) = 60^\circ$



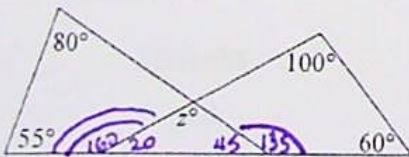
★ **Midline Theorem:** a midline is the segment joining the midpoints of any 2 sides of a triangle.

A midline has 2 characteristics: (1) it is parallel to the third side
(2) it is $\frac{1}{2}$ the length of the third side



Problems:

4. Find the value of z .

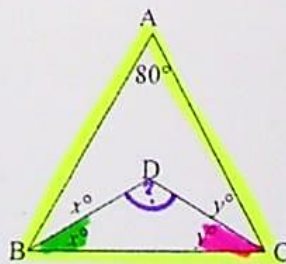


$$z = 180 - (20 + 45)$$

$$= 180 - 65$$

$$115^\circ$$

5. Find $m\angle BDC$



$$2x + 2y + 80 = 180$$

$$\underline{-80}$$

$$2x + 2y = 100$$

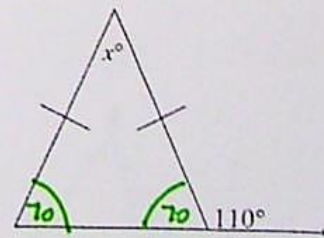
$$\underline{\div 2}$$

$$x + y = 50$$

$$-1$$

$m\angle BDC = 180 - 50$
 130°

6. Find the value of x .

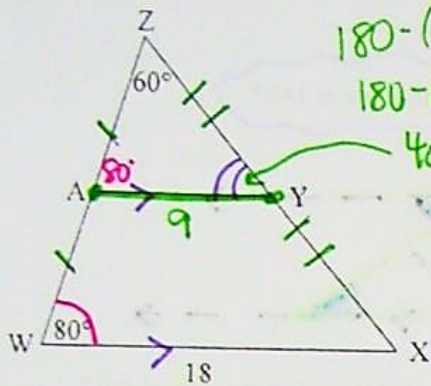


$$110 = 70 + x$$

$$x = 110 - 70$$

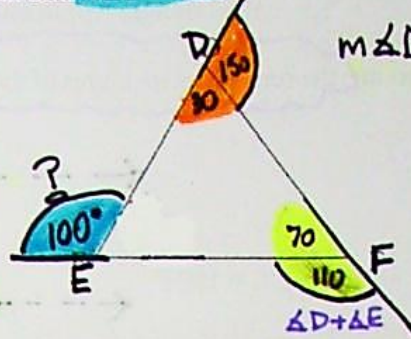
$$x = 40^\circ$$

7. Find AY; find $m\angle ZYA$



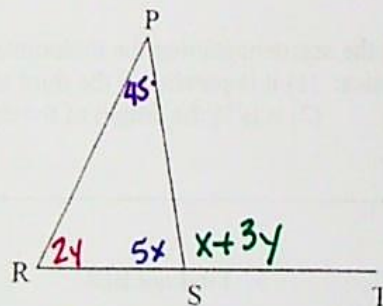
$180 - (60 + 80)$
 $180 - (140)$
 40°

8. If $m\angle D + m\angle E = 110$ and $m\angle E$ and $m\angle F = 150$, then find $m\angle D + m\angle F$.



$m\angle D + m\angle F = 30 + 70$
 $= 100^\circ$

9. Given: $\angle PST = (x + 3y)^\circ$
 $m\angle P = 45$; $\angle R = (2y)^\circ$
 $\angle PSR = (5x)^\circ$
 Find: $m\angle PST$



Answer the Question

$\angle PST = x + 3y$
 $x = 15$ and $y = 30$

$\angle PST = (15) + 3(30)$
 $15 + 90$
 105°

$2y + 5x + 45 = 180$
 $5x + 2y = 135$

$x + 3y + 5x = 180$

$6x + 3y = 180$

$2x + y = 60$

$y = 60 - 2x$

$5x + 2(60 - 2x) = 135$

$5x + 120 - 4x = 135$

$x = 135 - 120$

$x = 15$

$y = 60 - 2(15)$

$y = 60 - 30$

$y = 30$