Math 20-2
Objective: Solve Problems that involve properties of parallel lines and triangles.
Skill: Use reasoning to solve problems.

A. Solve at least on of the Sudoku.

6	2	5	1	4	3
3	4	1	6	5	2
2	5	3	4	1	6
1	6	4	2	3	5
5	1	2	3	6	4
4	3	6	5	2	1

		5	3	2	
5	4		6	1	3
		6	4	2	
	6				
		1	5		6

		4	6		
1					5
	5	6		2	4
		2	4		

					1
6		2	5		
4		1			
	6				
5		4			
				2	

B. Parallel Lines and Triangle Problems.

1. Given PQ is parallel to RS. Use parallel line and triangle properties to determine the following angle measures:
   a) $\angle PQS$ = 48 *alt int angles* Z
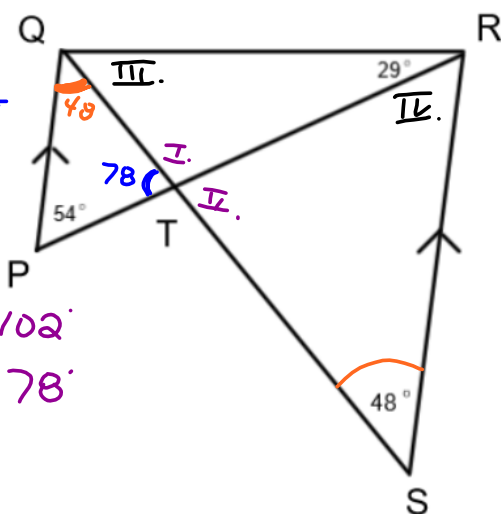   b) $\angle PTQ$ = 78
   c) The other four angles.

△PQT

180-48-54=T
T=78

I. 180-78=102°
II. 78, opp =78°

III = 180-29-102
III = 49°

IV. Z = 54°
△sum
180-48-78= 54°

2. Given AB is parallel to CD. Use parallel line and triangle properties to determine the following angle measures:
   a) $\angle CDE$ and $\angle CDB$
   b) All the other three angles.
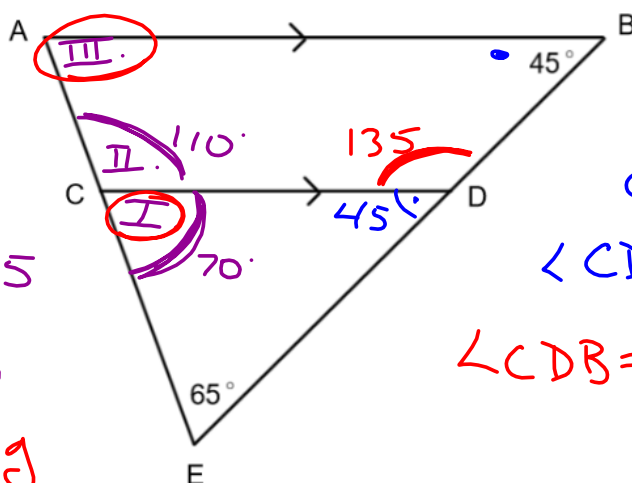
△ sum
I = 180-45-65
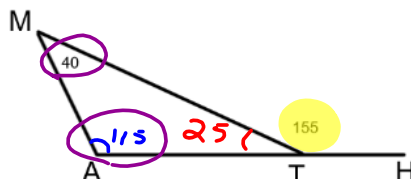II = 180-70=110
Corresponding
I, III = 70°

Corresponding angles
∠ CDE = 45°
∠ CDB = 180 - 45

C. Use angle sums to determine relationship between an exterior angle and angles in a triangle.

Example 1:
In the diagram, ∠ MTH is an exterior angle of △ MAT. Determine the measures of the unknown angles in △MAT. What two interior angles add to equal ∠ MTH ?

$$\begin{array}{r} 180 \\ -40 \\ -25 \\ \hline 115 \end{array}$$

$$\begin{array}{r} 180 \\ -155 \\ \hline 25 \end{array}$$

M $\cdot$ 40 $\cdot$ 115 $\cdot$ 25 $\cdot$ 155 $\cdot$ A T H
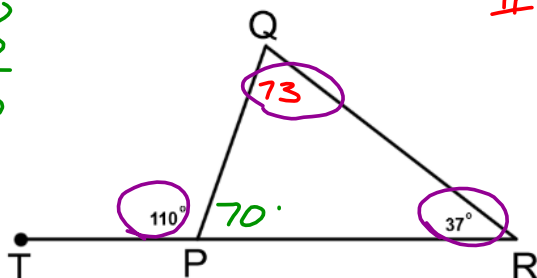
Example 2;

$$40 + 115 = 155$$

In the diagram, ∢TPQ = 110° and ∢QRP = 37°.
Why is , ∢TPQ considered an exterior angle of △PQR? **It is "outside" the △**
Determine the measures of the other unknown angles in △PQR.
What two interior angles add to equal , ∢TPQ?

II. "Q"

I.
$$\begin{array}{r} 180 \\ -110 \\ \hline 70 \end{array}$$

$$180 - 70 - 37 = 73$$

OR

$$Q = 110 - 37 = 73$$

Q $\cdot$ 73 $\cdot$ 110° $\cdot$ 70° $\cdot$ 37° $\cdot$ T P R

What two angles inside a triangle will always add to equal an exterior angle in a triangle?
Why?

Because straight lines and angle sum in △'s both equal 180.

Use triangle properties, parallel line properties and exterior angle properties to write equations and solve problems:

1. Write an equation and solve for x.

Isos △
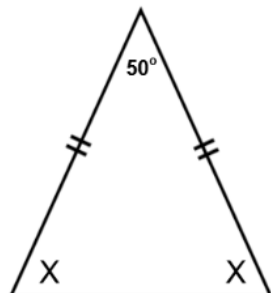
$$x + x + 50 = 180$$
$$2x + 50 = 180$$
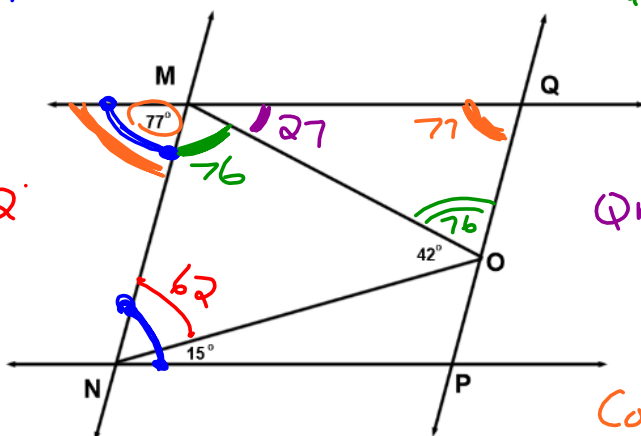$$-50 \quad -50$$
$$2x = 130 \div 2$$
$$x = 65$$

2. Given: $MN \parallel PQ$ and $MQ \parallel NP$.
   Determine the measures of $\angle MNP$, $\angle MNO$, $\angle NMO$, $\angle QMO$, $\angle MQO$ and $\angle QOM$.

∠MNP=77
"alt int"
$\mathbb{Z}$

77-15=62

180-62-42
=76

STRAIGHT LINES
QMO = 180-77-76
= 27

Corresponding Angles
∠MQO=77

∠QOM

180-27-77
=76