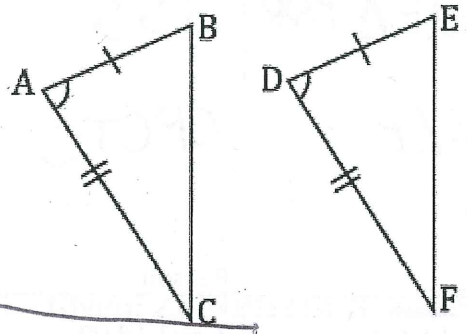
More Proofs Involving Congruent Triangles and Congruent Parts September 23 2014 (Tuesday)

In geometry, "Corresponding parts of congruent triangles are congruent" (**CPCTC**) is the abbreviation of a theorem regarding congruent triangles. **CPCTC** states that if two or more triangles are proven congruent by any method, then all of their corresponding angles and sides are congruent as well.

Ex. 1.

Given: $\overline{AB} \cong \overline{DE}$, $\angle A \cong \angle D$, and $\overline{AC} \cong \overline{DF}$

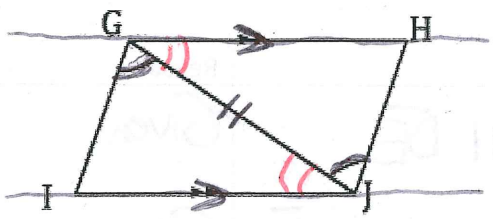


Prove: $\angle C \cong \angle F$

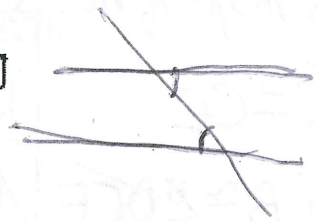
Statement	Reason
1) $\overline{AB} \cong \overline{DE}$	Given
2) $\angle A \cong \angle D$	Given
3) $\overline{AC} \cong \overline{DF}$	Given
4) $\triangle ABC \cong \triangle DEF$	SAS
5) $\angle C \cong \angle F$	CPCTC

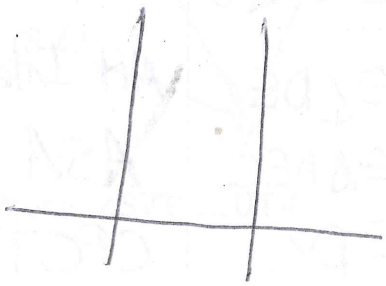
Ex. 2.

Given: $\overline{GH} \parallel \overline{IJ}$, $\angle IGJ \cong \angle HJG$



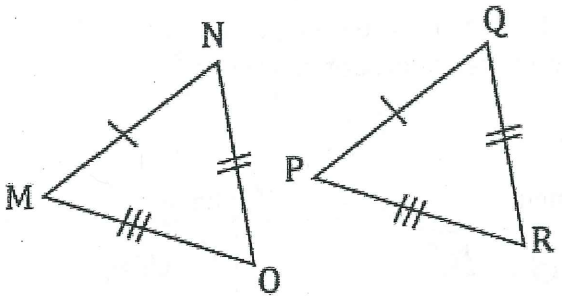
Prove: $\overline{IG} \cong \overline{HJ}$





Statement	Reason
1) $\overline{GH} \parallel \overline{IJ}$	Given
1 2) $\angle IGJ \cong \angle HJG$	Given
2 3) $\overline{GJ} \cong \overline{GJ}$	Reflexive property
3 4) $\angle HGJ \cong \angle IJG$	Alt. Interior angles $\cong$
5) $\triangle HGJ \cong \triangle IJG$	ASA
6) $\overline{IG} \cong \overline{HJ}$	CPCTC

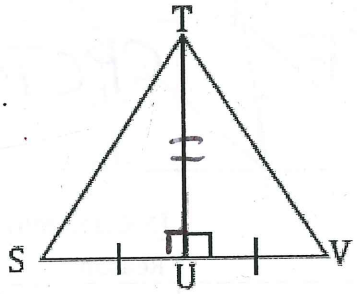
1. Given: $\overline{MN} \cong \overline{PQ}$, $\overline{NO} \cong \overline{QR}$, and $\overline{OM} \cong \overline{RP}$



Prove: $\angle M \cong \angle P$

Statement	Reason
1) $\overline{MN} \cong \overline{PQ}$	Given
2) $\overline{NO} = \overline{QR}$	Given
3) $\overline{OM} \cong \overline{RP}$	Given
4) $\triangle MNO \cong \triangle PQR$	SSS
5) $\angle M \cong \angle P$	CPCTC

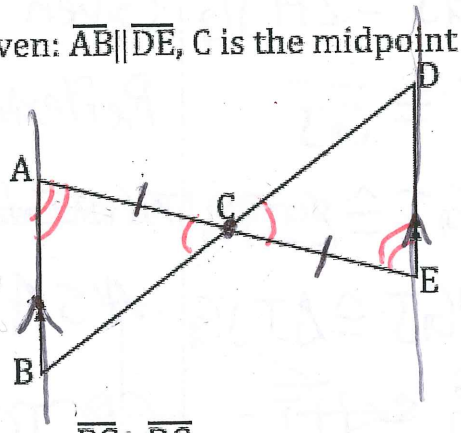
2. Given: $\overline{SU} \cong \overline{UV}$



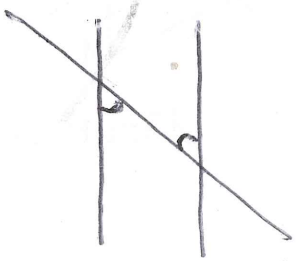
Prove: $\overline{ST} \cong \overline{VT}$

Statement	Reason
1) $\overline{SU} \cong \overline{UV}$	Given
2) $\overline{TU} \cong \overline{TU}$	Reflexive
3) $\triangle SUT \cong \triangle VUT$	SAS
4) $\overline{ST} \cong \overline{VT}$	CPCTC

3. Given: $\overline{AB} \parallel \overline{DE}$, C is the midpoint of $\overline{AE}$

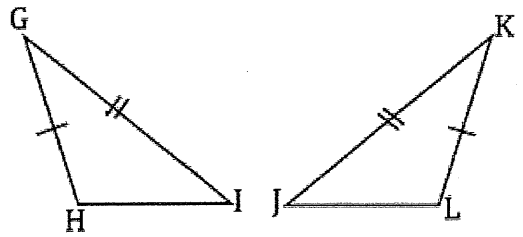


Prove: $\overline{BC} \cong \overline{DC}$



Statement	Reason
1) $\overline{AB} \parallel \overline{DE}$	Given
2) C is midpt. of $\overline{AE}$	Given
3) $\overline{AC} \cong \overline{CE}$	Definition of midpt.
4) $\angle ACB \cong \angle DCE$	Vertical angles $\cong$
5) $\angle CAB \cong \angle DEC$	Alt. Interior angles $\cong$
6) $\triangle CAB \cong \triangle DEC$	ASA
7) $\overline{BC} \cong DC$	CPCTC

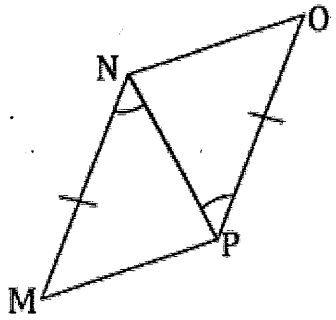
4. Given: $\overline{GH} \cong \overline{KL}$, $\angle G \cong \angle K$, and $\overline{GI} \cong \overline{KJ}$



Prove: $\overline{HI} \cong \overline{LJ}$

Statement	Reason
1)	
2)	
3)	
4)	
5)	

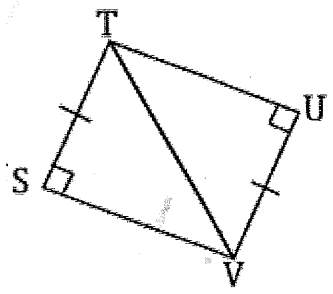
5. Given: $\angle MNP \cong \angle OPN$, and $\overline{MN} \cong \overline{OP}$



Prove: $\overline{MP} \cong \overline{NO}$

Statement	Reason
1)	
2)	
3)	
4)	
5)	

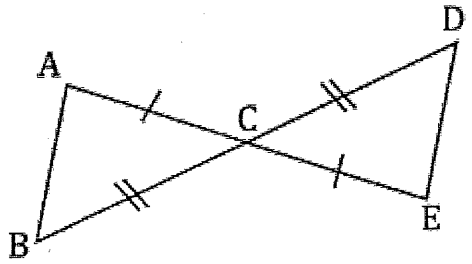
6. Given: $\overline{ST} \cong \overline{VU}$



Prove: $\angle SVT \cong \angle UTV$

Statement	Reason
1)	
2)	
3)	
4)	

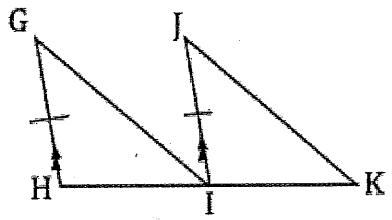
7. Given: $\overline{AC} \cong \overline{CE}$, $\overline{DC} \cong \overline{BC}$



Prove: $\angle B \cong \angle D$

Statement	Reason
1)	
2)	
3)	
4)	
5)	

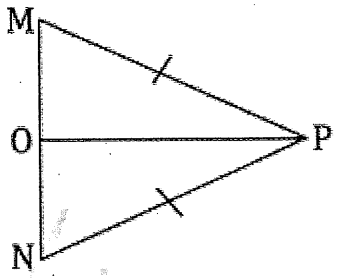
8. Given: $\overline{GH} \parallel \overline{JI}$, I is the midpoint of HK and $\overline{GH} \cong \overline{JI}$



Prove: $\angle G \cong \angle J$

Statement	Reason
1)	
2)	
3)	
4)	
5)	
6)	
7)	

9. Given: $\overline{MP} \cong \overline{NP}$, $\overline{MN} \perp \overline{OP}$



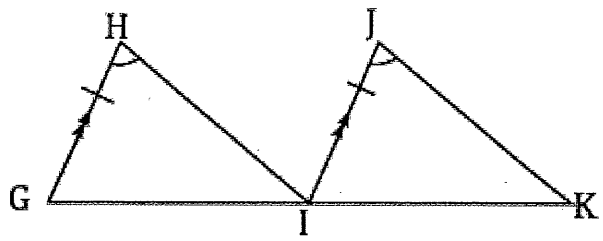
Prove: $\overline{MO} \cong \overline{ON}$

Statement	Reason
1)	
2)	
3)	
4)	
5)	

Triangle Proofs and Test Review Worksheet #1 September 24, 2014 (Wednesday)

1.

Given: GH||IJ , ∠H≅∠J and GH≅IJ

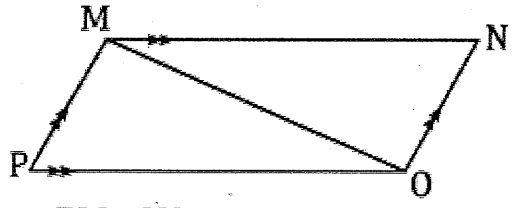


Prove: ∠GIH≅∠IKJ

Statements	Reasons
1.	1. Given
2. ∠H≅∠J	2.
3.	3.
4.	4. ~~Alternate Interior~~ Corresponding angles ≅
5.	5.
6.	6. CPCTC

2.

Given: PM||NO, MN||PO,

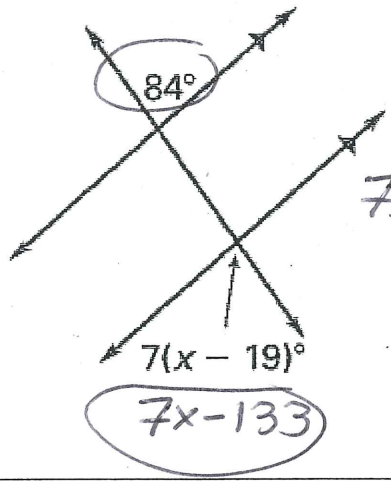


Prove: PM≅ON

Statements	Reasons
1. PM||ON	1.
2.	2. Given
3. ∠PMO≅∠NOP	3.
4.	4. Alternate Interior
5. $\overline{MO}\cong\overline{MO}$	5.
6.	6. ASA
7.	7.

Find the values of x:

3. Alt. exterior

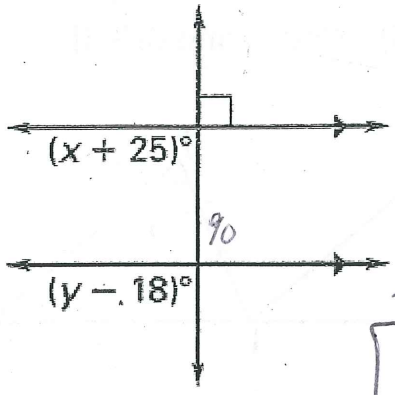


$7x - 133 = 84$
$+133 \quad 133$

$\frac{7x}{7} = \frac{217}{7}$

$\boxed{x = 31}$

4.



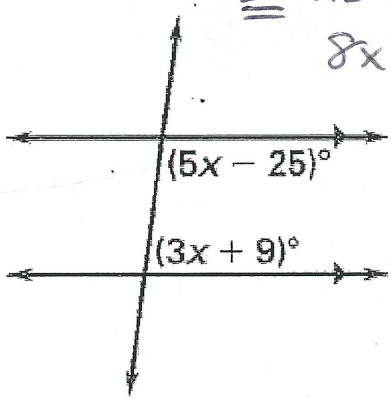
$x + 25 = 90$
$-25 \quad -25$

$\boxed{x = 65}$

$90 = y - 18$
$+18 \quad +18$

$\boxed{108 = y}$

5.



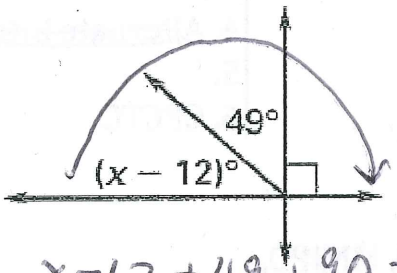
$5x - 25 + 3x + 9 = 180$

$8x - 16 = 180$
$+16 \quad +16$

$\frac{8x}{8} = \frac{196}{8}$

$\boxed{x = 24.5}$

6.



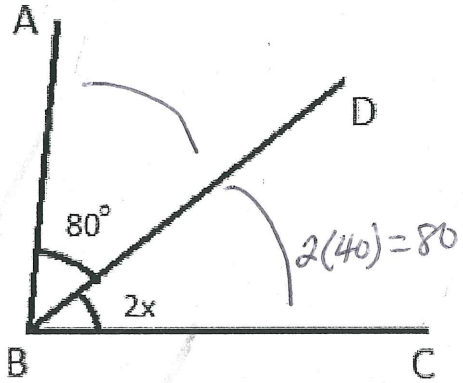
$x - 12 + 49 + 90 = 180$

$x + 127 = 180$
$-127 \quad -127$

$\boxed{x = 53}$

7. Find the below information

Find the value of x, if $\overline{BD}$ is the angle bisector of ∠ABC.



$\frac{2x}{2} = \frac{80}{2}$

$x = 40$

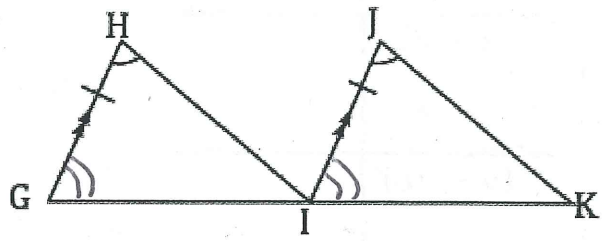
x 40 ∠DBC 80 ∠ABC 160°

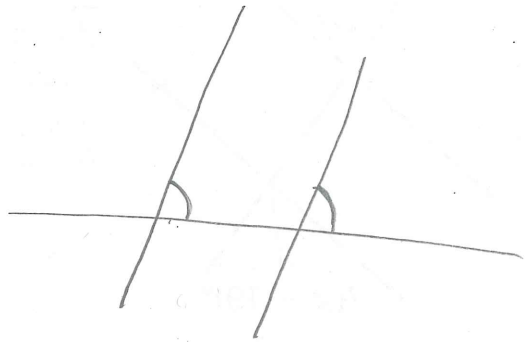
Triangle Proofs and Test Review Worksheet #1 September 24, 2014 (Wednesday)

Key

1.

Given: GH||IJ , ∠H≅∠J and GH≅IJ



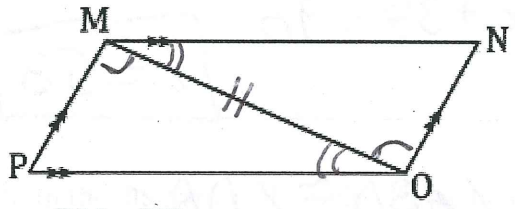


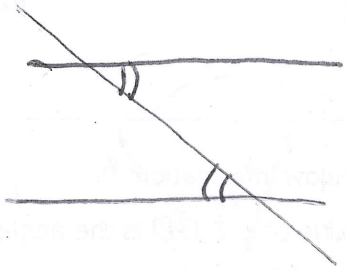
Prove: ∠GIH≅∠IKJ

Statements	Reasons
1. GH ∥ IJ	1. Given
2. ∠H≅∠J	2. Given
3. GH ≅ IJ	3. Given
4. ∠HGI ≅ ∠JIK	4. Corresponding angles congruent
5. ΔGHI ≅ ΔIJK	5. ASA
6. ∠GIH ≅ ∠IKJ	6. CPCTC

2.

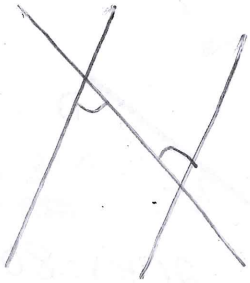
Given: PM||NO, MN||PO,





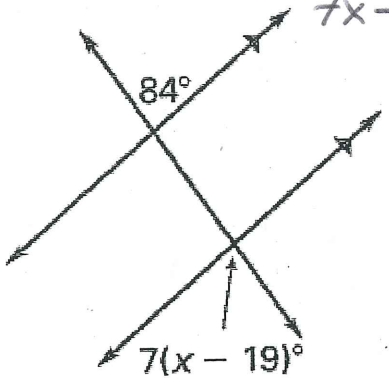
Prove: PM≅ON

Statements	Reasons
1. PM||ON	1. Given
2. MN ∥ PO	2. Given
3. ∠PMO≅∠NOPM	3. Alternate Interior
4. ∠OMN ≅ ∠POM	4. Alternate Interior
5. $\overline{MO}$≅$\overline{MO}$	5. Reflexive property
6. ΔPMO ≅ ΔNOP	6. ASA
7. $\overline{PM}$ ≅ $\overline{ON}$	7. CPCTC



Find the values of x:

3.



$7(x-19)=84$

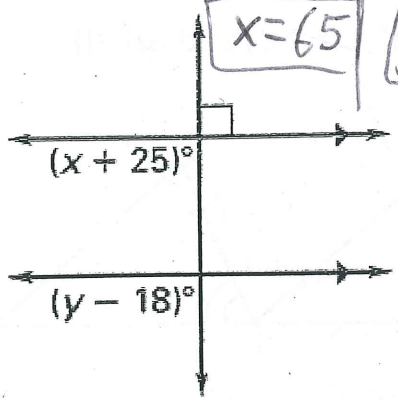
$7x-133=84$

$7x=217$

$\boxed{x=31}$

$7(31-19)=84°$

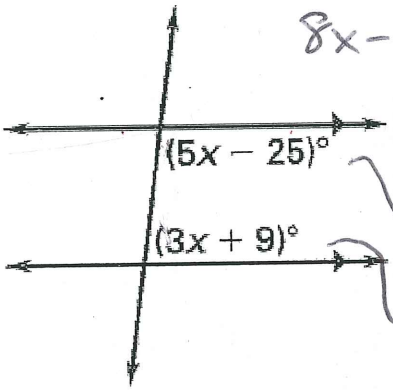
4.



$x+25=90$ | $y-18=90$

$\boxed{x=65}$ $\boxed{y=108}$

5.



$5x-25+3x+9=180$

$8x-16=180$

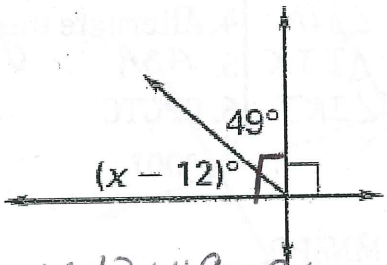
$8x=196$

$\boxed{x=24.5}$

$97.5°$

$82.5°$

6.



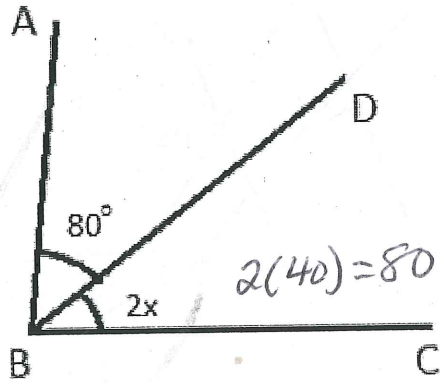
$x-12+49=90$

$x+37=90$

$\boxed{x=53}$

7. Find the below information

Find the value of x, if $\overline{BD}$ is the angle bisector of ∠ABC.



$2(40)=80$

$\angle ABD \cong \angle DBC$

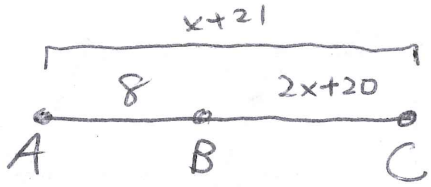
$80=2x$

$40=x$

x $=40$ ∠DBC 80 ∠ABC $80+80=160°$

8.

Points A, B, and C are collinear. Point B is between A and C. Solve for x. AB = 8, AC = x + 21, and BC = 2x + 20



x = -7

$AB+BC=AC$

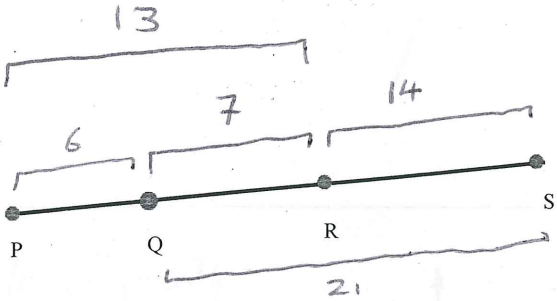
$8+2x+20=x+21$

$2x+28=x+21$

$x=21-28$

$\boxed{x=-7}$

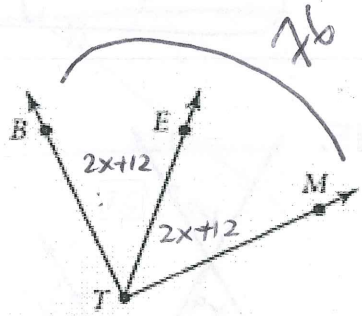
9. In the diagram of collinear points, QS = 21, QR = 7, and PR = 13. Find the length of PQ, RS, and PS.



PQ = 6 RS = 14 PS = 27

10. In the diagram to the right, $\overrightarrow{TE}$ is an angle bisector of ∠BTM.

Find the below if m ∠ ETM= $(2x + 12)^0$, and m ∠ BTM = 76^0.



x = 13 m ∠ ETM = 38° m∠BTE m ∠ ~~BTE~~ = 38°

$2x+12+2x+12=76$

$4x+24=76$

$4x=52$

$x=13$

$2x+12$

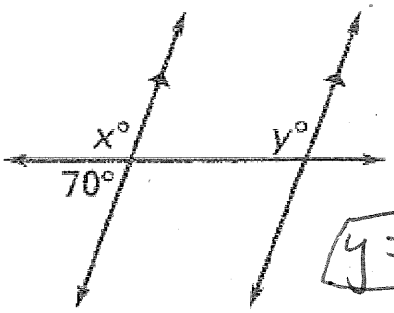
$2(13)+12$

$26+12=38$

Find x and y

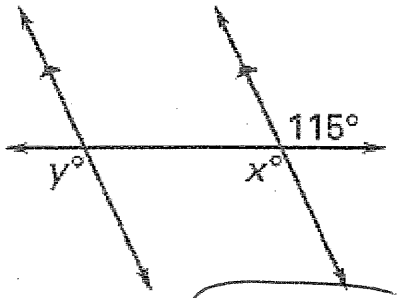
$x+70=180$

11. $\boxed{x=110}$



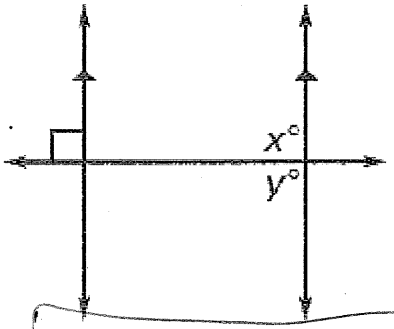
$\boxed{y=110}$

12.



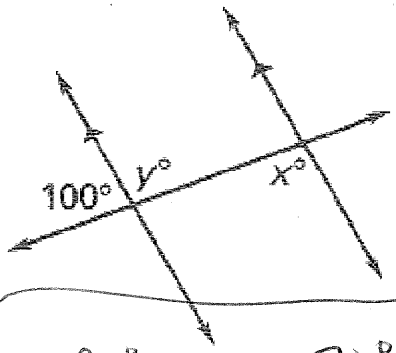
$\boxed{x=115^\circ \quad y=115^\circ}$

13.



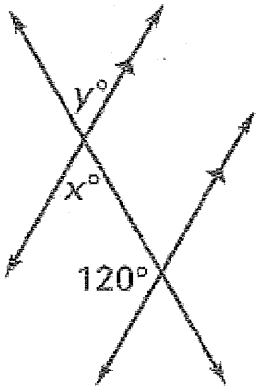
$\boxed{x=90^\circ \quad y=90^\circ}$

14.



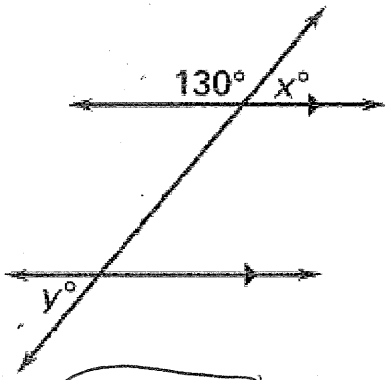
$\boxed{y=80^\circ \quad x=80^\circ}$

15.



$\boxed{x=60^\circ \quad y=60^\circ}$

16.



$\boxed{x=50^\circ}$

$\boxed{y=50^\circ}$