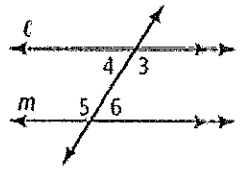
Geometry22 Name: Answers Per: ____ Date: ____

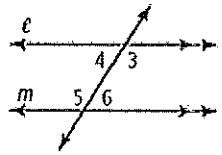
3-2 Properties of Parallel Lines *Target: To prove theorems about parallel lines.*

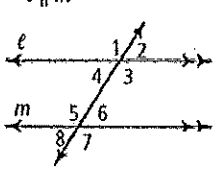
To use properties of parallel lines to find angle measures.

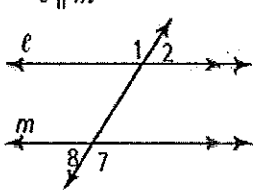
Postulate 3-1 Same-Side Interior Angles Postulate		
Postulate	**If…**	**Then…**
If a transversal intersects two parallel lines, then same-side interior angles are supplementary.	$\ell \parallel m$ 	$\angle 4$ and $\angle 5$ are supplementary $\angle 3$ and $\angle 6$ are supplementary

We can use this postulate to PROVE the other angle pair THEOREMS.

ALL of these theorems are saying:
IF the lines are PARALLEL, THEN the special angle relationships are true.

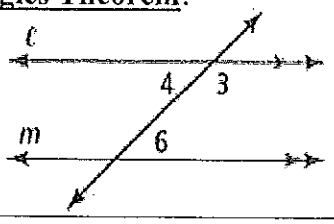
Theorem 3-1 Alternate Interior Angles Theorem		
Theorem	**If…**	**Then…**
If a transversal intersects two parallel lines, then alternate interior angles are congruent.	$\ell \parallel m$ 	$\angle 4 \cong \angle 6$ $\angle 3 \cong \angle 5$

Theorem 3-2 Corresponding Angles Theorem		
Theorem	**If…**	**Then…**
If a transversal intersects two parallel lines, then corresponding angles are congruent.	$\ell \parallel m$ 	$\angle 1 \cong \angle 5$ $\angle 2 \cong \angle 6$ $\angle 3 \cong \angle 7$ $\angle 4 \cong \angle 8$

Theorem 3-3 Alternate Exterior Angles Theorem		
Theorem	**If…**	**Then…**
If a transversal intersects two parallel lines, then alternate exterior angles are congruent.	$\ell \parallel m$ 	$\angle 1 \cong \angle 7$ $\angle 2 \cong \angle 8$

Use the diagram below to write a 2 column proof of the **Alternate Interior Angles Theorem**:

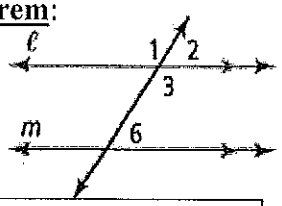
Given: $l \parallel m$ Prove: $\angle 4 \cong \angle 6$



STATEMENTS	REASONS
1. $l \parallel m$	1. Given
2. $\angle 3$ and $\angle 6$ are same-side interior angles	2. Defn. of Same Side Int. $\angle$'s
4. $\angle 3$ and $\angle 6$ are supplementary angles	4. Same side Int. $\angle$ Postulate
5. $m\angle 3 + m\angle 6 = 180$	5. Definition of Supplementary Angles
6. $\angle 4$ and $\angle 3$ form a linear pair	6. Defn. of Lin. Pr.
7. $\angle 4$ and $\angle 3$ are supplementary	7. Linear Pair Postulate
8. $m\angle 4 + m\angle 3 = 180$	8. Defn. of Supplementary
9. $m\angle 4 + m\angle 3 = m\angle 3 + m\angle 6$	9. Substitution
10. $m\angle 4 = m\angle 6$	10. Subtraction Property of Equality
11. $\angle 4 \cong \angle 6$	11. Defn. $\cong$

Use the diagram below to write a 2 column proof of the **Corresponding Angles Theorem**:

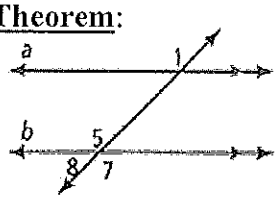
Given: $l \parallel m$ Prove: $\angle 6 \cong \angle 2$



STATEMENTS	REASONS
1. $l \parallel m$	1. Given
2. $\angle 3$ and $\angle 6$ are same-side interior angles	2. Defn. SSI $\angle$'s
3. $\angle 3$ and $\angle 6$ are supplementary angles	3. SSI $\angle$'s Post.
4. $\angle 2$ and $\angle 3$ form a linear pair	4. Defn. Lin. pr.
5. $\angle 2$ and $\angle 3$ are supplementary	5. Linear Pair Postulate
6. $\angle 6 \cong \angle 2$	6. Congruent Supplements Theorem

Use the diagram below to write a 2 column proof of the **Alternate Exterior Angles Theorem**:

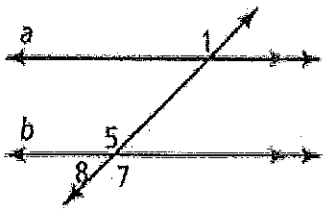
Given: $a \parallel b$ Prove: $\angle 1 \cong \angle 7$



STATEMENTS	REASONS
1. $a \parallel b$	1. Given
2. $\angle 1$ and $\angle 5$ are corresponding angles	2. Defn. Corresp. $\measuredangle$'s
3. $\angle 1 \cong \angle 5$	3. Corresp $\measuredangle$ Thm
4. $\angle 5$ and $\angle 7$ are vertical angles	4. Defn. Vert. $\measuredangle$'s
5. $\angle 5 \cong \angle 7$	5. Vertical Angles Theorem
6. $\angle 1 \cong \angle 7$	6. Transitive Property of Congruence

Now we can use these theorems as REASONS in proofs dealing with parallel lines…

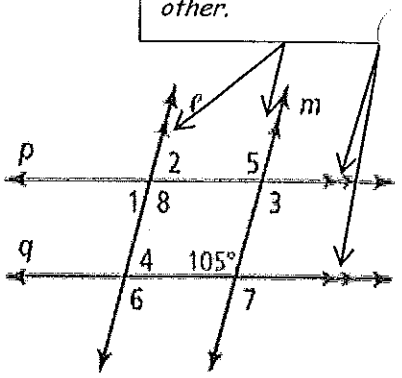
Given: $a \parallel b$ Prove: $\angle 1$ and $\angle 8$ are supplementary



STATEMENTS	REASONS
1. $a \parallel b$	1. Given
2. $\angle 1$ and $\angle 5$ are corresp. $\measuredangle$'s	2. Definition of corresponding angles
3. $\angle 1 \cong \angle 5$	3. Corresponding Angles Theorem
4. $m\angle 1 = m\angle 5$	4. Defn. of congruent
5. $\angle 5$ and $\angle 8$ form a linear pair	5. Defn. Lin. Pr.
6. $\angle 5$ & $\angle 8$ are supplem.	6. Lin. Pr. Post.
7. $m\angle 5 + m\angle 8 = 180$	7. Definition of supplementary angles
8. $m\angle 1 + m\angle 8 = 180$	8. Substitution
9. $\angle 1$ and $\angle 8$ are supplem.	9. Defn. Supplem.

…Or to find the missing angle measures in a diagram…

Notice: *these arrows mean the 2 lines are parallel to each other.*



Find the measure of each numbered angle. Justify each answer with a theorem or postulate.

m∠7 = 105° because of Vertical ∡s theorem

m∠6 = 105° because it is Alt. int. ∡ angle to ∠7

m∠8 = 105° because it is Corresponding angle to ∠6

m∠4 = 75° because it is Same side interior angle to ∠8

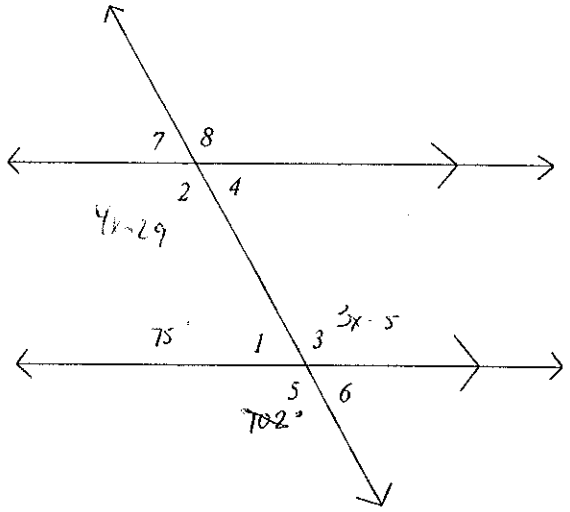
m∠5 = 105° because it is alt. interior angle to ∠8

m∠3 = 105° because it is Vertical ∡ angle to ∠5

m∠2 = 75° because it is Same side interior angle to ∠5

m∠1 = 75° because it is Vertical angle to ∠2

Directions: Refer to the figure to the right and answer the following questions:



1) If $m\angle 5 = 102°$, find $m\angle 8$.

102° (alt. ext ∡s)

2) If $m\angle 1 = 75°$, find $m\angle 2$.

105° (SSI)

3) If $m\angle 1 = 75°$, find $m\angle 4$.

75° (alt. int. ∡'s)

4) If $m\angle 3 = (3x - 5)°$ and the $m\angle 2 = (4x - 29)°$, find x.

$3x - 5 = 4x - 29$

$+29 \quad -3x$

$x = 24$ (24 = X)

5) If $m\angle 1 = (3x + 10)°$ and the $m\angle 2 = (4x - 5)°$, find x.

$3x + 10 + 4x - 5 = 180$

$7x + 5 = 180$

$-5 \quad -5$

$\frac{7x}{7} = \frac{175}{7}$ $\quad x = 15$

3.3 Converses of Parallel Lines Theorems Name ANSWERS date____

Fill in the blanks to complete the Parallel Line Theorems from 3.2; (mark diagram for each type of angle)

❖ **Same Side Interior Angles Theorem:**

If 2 lines are PARALLEL (and cut by a transversal), then Same Side Interior Angles are supplementary

❖ Write the **CONVERSE of the Same Side Interior Angles Theorem:**

If SSI ∠'s are supplem., then lines ||.

then the 2 lines are parallel

▪ **Alternate Interior Angles Theorem:**

If 2 lines are PARALLEL (and cut by a transversal), then Alternate Interior Angles are congruent.

▪ Write the **CONVERSE of the Alternate Interior Angles Theorem:**

If Alt. Int ∠'s ≅

then lines ||.

➢ **Alternate Exterior Angles Theorem:**

If 2 lines are PARALLEL (and cut by a transversal), then Alternate Exterior Angles are congruent.

➢ Write the **CONVERSE of the Alternate Exterior Angles Theorem:**

If Alt. Ext. ∠'s ≅

then lines ||.

• **Corresponding Angles Theorem:**

If 2 lines are PARALLEL (and cut by a transversal), then Corresponding Angles are congruent.

• Write the **CONVERSE of the Corresponding Angles Theorem:**

If Corresp. ∠'s ≅

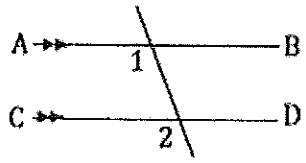
then lines ||

Name_____ Period____ Date_____

Geometry 22: Practice with Proving Lines Parallel (3.3)

For each of the following statements, write **yes** or **no** based on the given information. **THEN,** if no, explain why, if yes state the theorem or postulate that supports your answer.

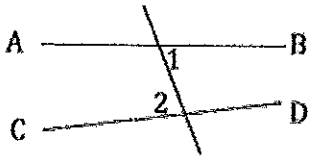
1. Is $\angle 1 \cong \angle 2$?



Yes or No

Reasoning: Corres. $\angle$s Thm

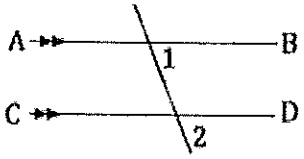
2. Is $\angle 1 \cong \angle 2$?



Yes or No

Reasoning: Lines NOT parallel

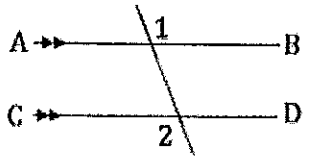
3. Is $\angle 1 \cong \angle 2$?



Yes or No

Reasoning: Corresp. $\angle$s Thm

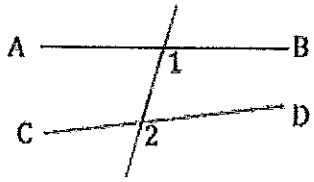
4. Is $\angle 1 \cong \angle 2$?



Yes or No

Reasoning: Alt. Int. $\angle$s Thm

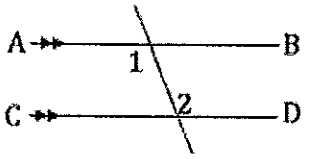
5. Is $\angle 1 \cong \angle 2$?



Yes or No

Reasoning: Lines NOT ~~#~~ parallel

6. Is $\angle 1 \cong \angle 2$?

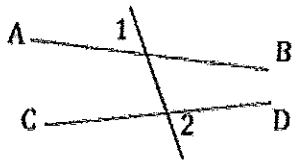


Yes or No

Reasoning: Alt Int. $\angle$s Thm

For each of the following statements, write **yes** or **no** based on the given information. **THEN,** if no, explain why, if yes state the theorem or postulate that supports your answer.

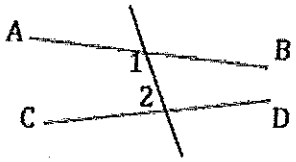
7. Is $\angle 1 \cong \angle 2$?



Yes or (No)

Reasoning: lines NOT parallel

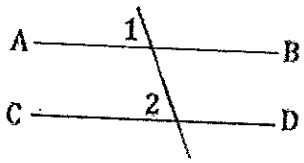
8. Is $m\angle 1 + m\angle 2 = 180°$?



Yes or (No)

Reasoning: lines not ||.

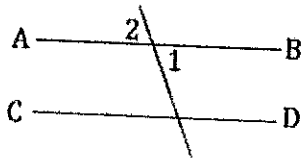
9. If $\angle 1 \cong \angle 2$, is $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$?



(Yes) or No

Reasoning: Converse of Corresp. ∠s Thm

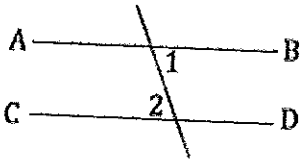
10. If $\angle 1 \cong \angle 2$, is $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$?



(Yes) or No

Reasoning: Vertical ∠s are ≅ but don't involve || lines

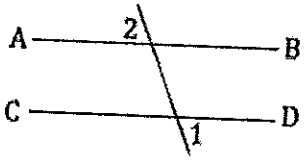
11. If $\angle 1 \cong \angle 2$, is $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$?



(Yes) or No

Reasoning: Converse of Alt. Int. ∠s Thm.

12. If $\angle 1 \cong \angle 2$, is $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$?

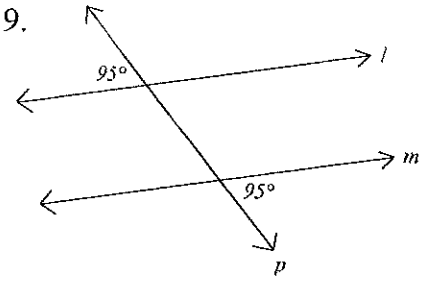


(Yes) or No

Reasoning: Converse of Alt. Ext. ∠s Thm

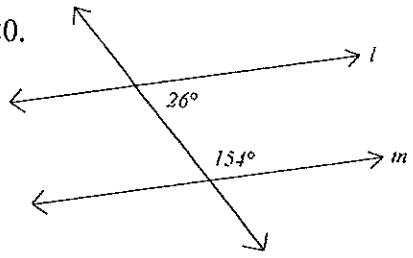
Determine whether or not *l* is parallel to *m* from the information given in the diagram. <u>If yes, state the theorem or postulate to support your answer.</u>

19.



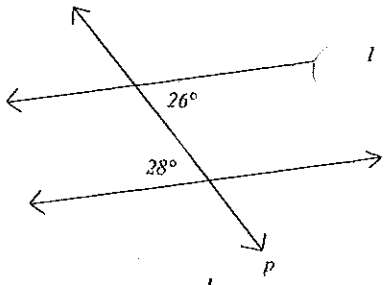
yes Conv. of alt. ext. ∠ thm

20.



yes conv. of SSI ∠ thm

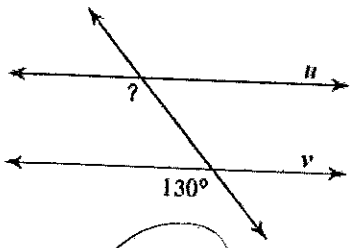
21.



~~yes~~ No. Alt. int ∠s not ≅

Find the measure of the indicated angle which would make line *u* parallel to line *v*. **<u>State the theorem or postulate to support your answer.</u>**

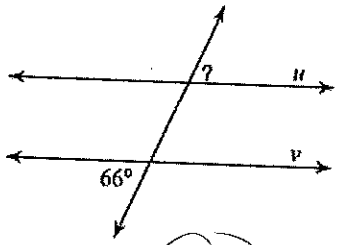
22.



130°

Conv. of corresp. ∠ thm.

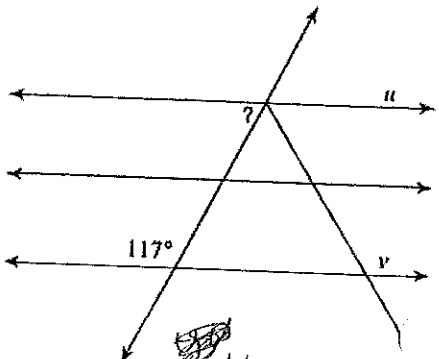
23.



66°

Conv. of Alt. ext ∠ thm

24.



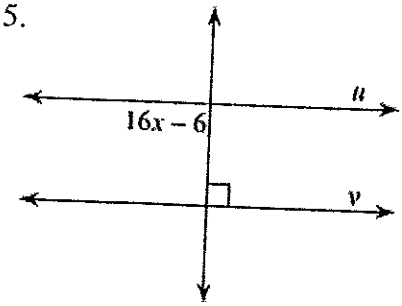
180 − 117 = 63°

u ∥ v

Conv. of SSI ∠ Thm

Find the value of x that would make line *u* parallel to line *v*. **<u>State the theorem or postulate to support your answer.</u>**

25.



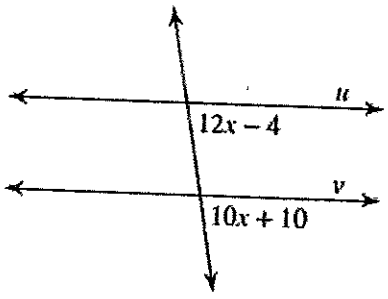
$16x - 6 = 90$

$16x = 96$

$x = 6$

Conv. of Alt. int ∠ Thm

26.



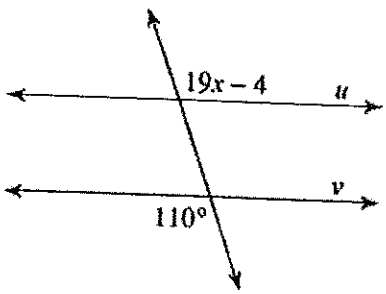
$12x - 4 = 10x + 10$

$2x = 14$

$x = 7$

Conv. of corresp. ∠ Thm

27.



$19x - 4 = 110$

$19x = 114$

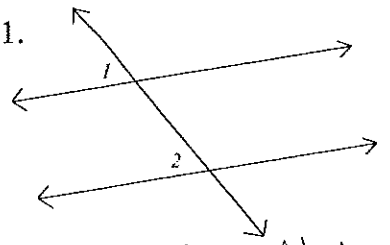
$x = 6$

Conv. of alt. ext. ∠ Thm

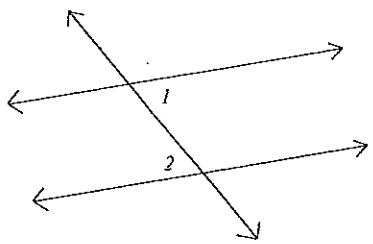
Name ANSWERS Period Date

Practice with Parallel Lines and Transversals (3-2)

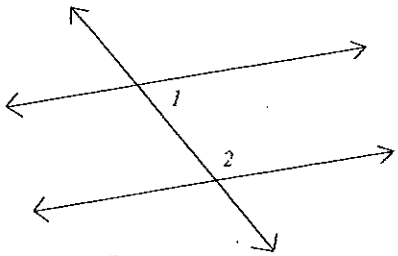
Identify the following pairs of angles as corresponding, alternate interior, alternate exterior, or same-side interior. If the lines are parallel, state whether the angles would be congruent or supplementary.

1. 

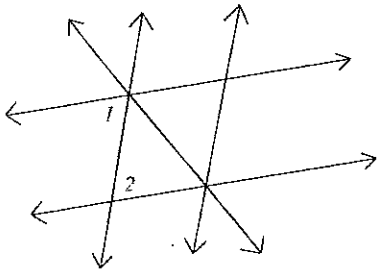
corresponding
congruent

2. 

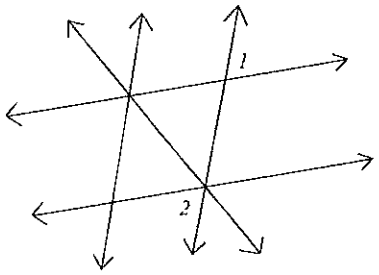
alt. int.
congruent

3. 

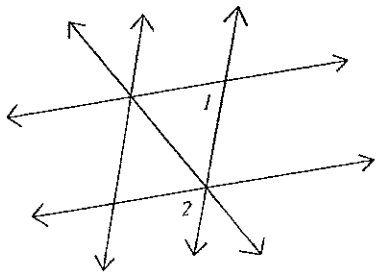
same side int.
supplem.

4. 

alt. int.
$\cong$

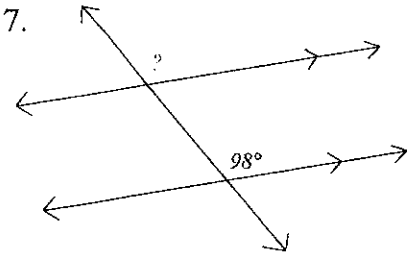
5. 

alt. exterior
$\cong$

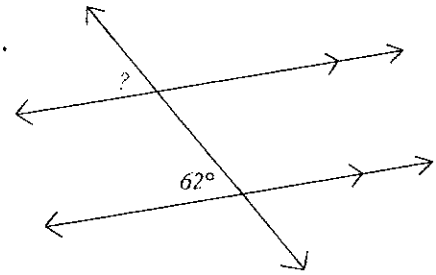
6. 

corresp. $\cong$

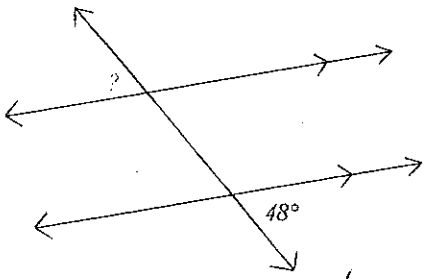
Find the value of the missing angle measure.

7. 

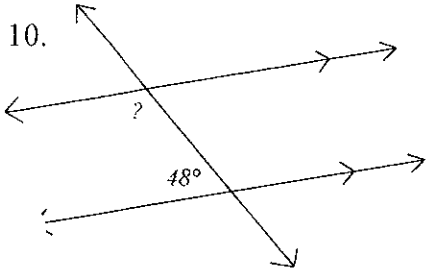
98° corresp.

8. 

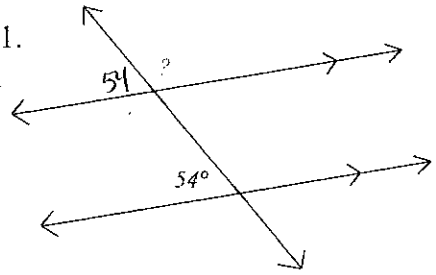
62° corresp.

9. 

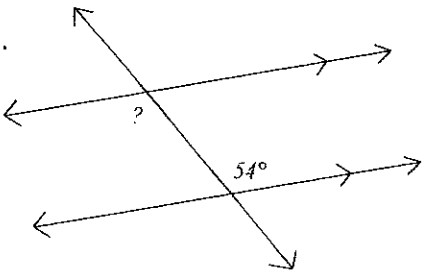
48° alt. ext.

10. 

$48 + x = 180$
-48
$x = 132°$
SSI

11. 

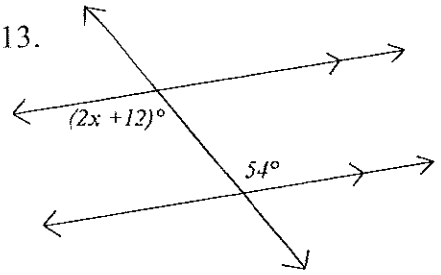
$180 - 54$
$126°$

12. 

54° alt. int.

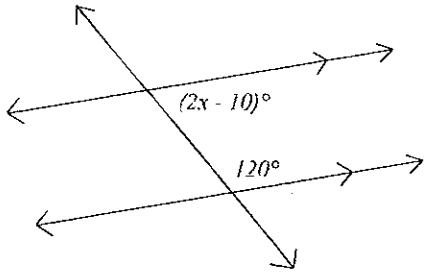
Solve for x.

13.



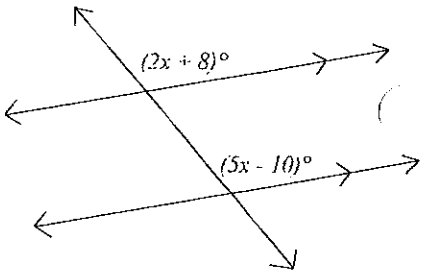
$2x+12 = 54$
-12
$2x = 42$
$x = 21$

14.



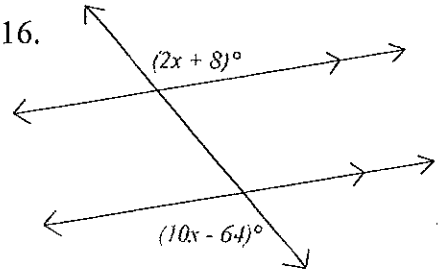
$2x-10+120 = 180$
$2x-10 = 60$
$2x = 70$
$x = 35$

15.



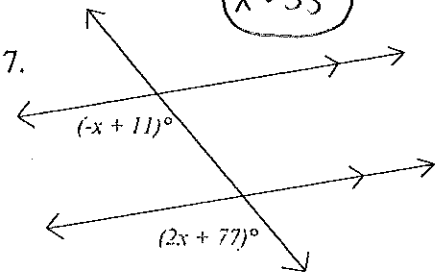
$2x+8 = 5x-10$
$18 = 3x$
$x = 6$

16.



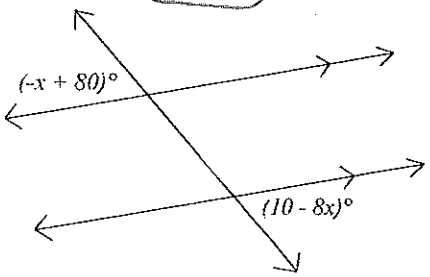
$2x+8 = 10x-64$
$72 = 8x$
$x = 9$

17.



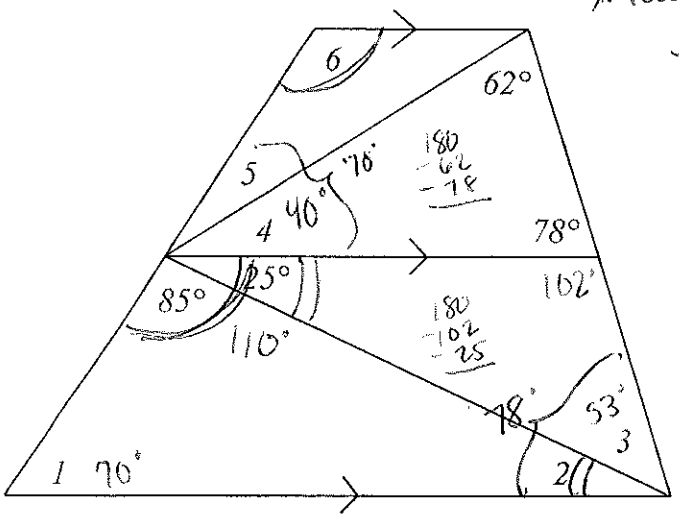
$-x+11 = 2x+77$
$-66 = 3x$
$x = -22$

18.



$-x+80 = 10-8x$
$7x = -70$
$x = -10$

19. Find the measure of each numbered angle in the figure below.



* need △ sum theorem!

$m\angle 1 =$ 70°

$m\angle 2 =$ 25°

$m\angle 3 =$ 53°

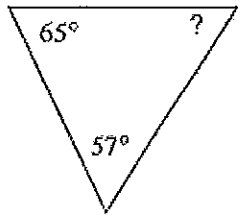
$m\angle 4 =$ 40°

$m\angle 5 =$ 30°

$m\angle 6 =$ 110°

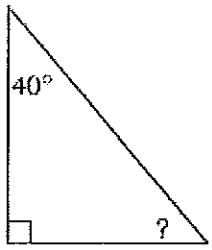
Geo22 – 3.5 Triangle Sum Theorem Practice name_____

1.



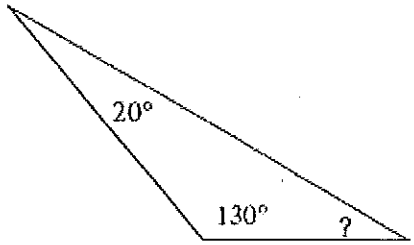
58°

2.



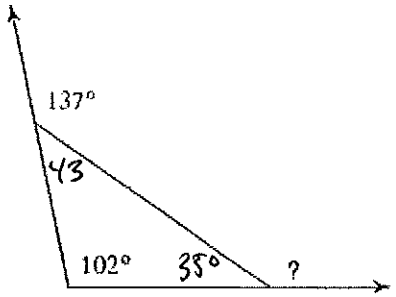
50°

3.



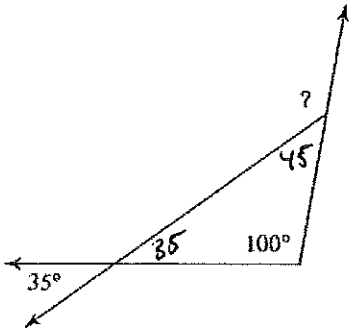
30°

4.



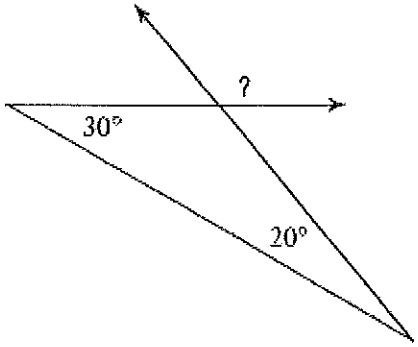
145°

5.



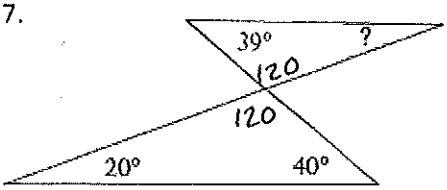
135°

6.



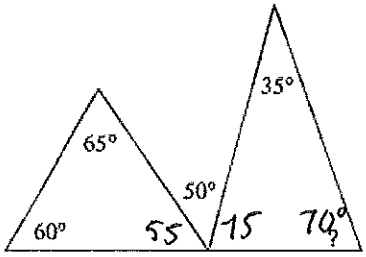
130°

7.



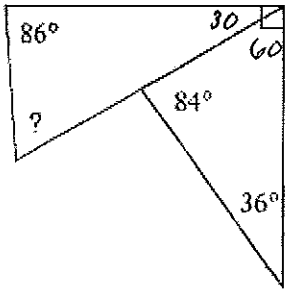
21°

8.



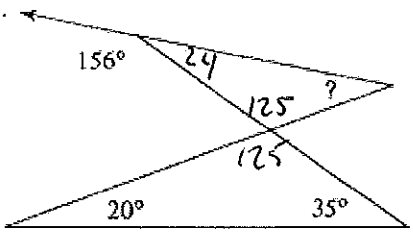
70°

9.



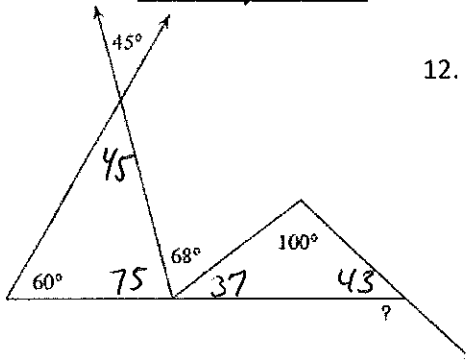
64°

10.



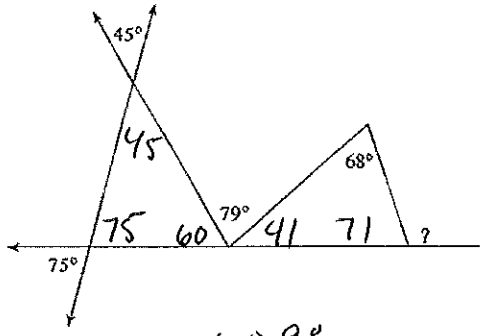
31°

11.



137°

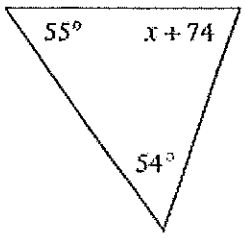
12.



109°

Solve for x:

13.

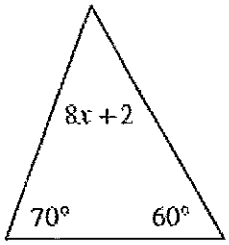


$55 + 54 + x + 74 = 180$

$x = -3$

impossible.

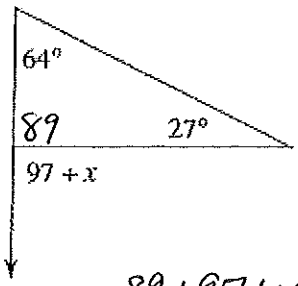
14.



$8x + 2 + 70 + 60 = 180$

$8x = 6$

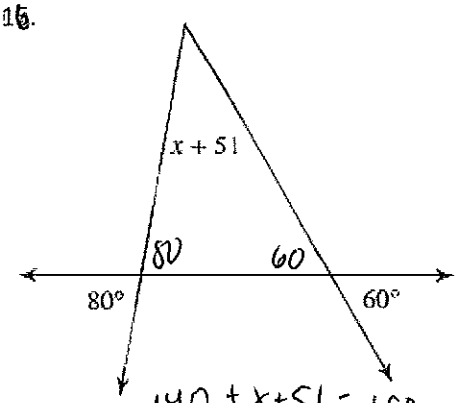
15.



$89 + 97 + x = 180$

$x = -6$

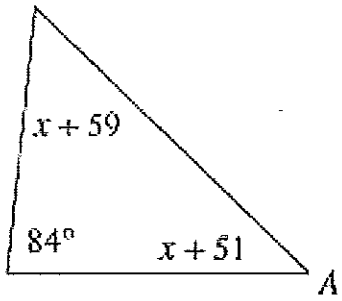
16.



$140 + x + 51 = 180$

$x = -11$

17.



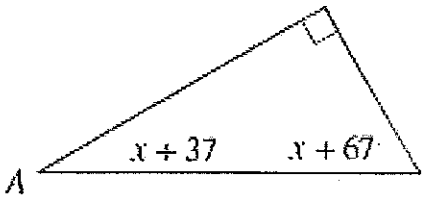
$2x + 84 + 110 = 180$

$x = -7$

70

6

18.

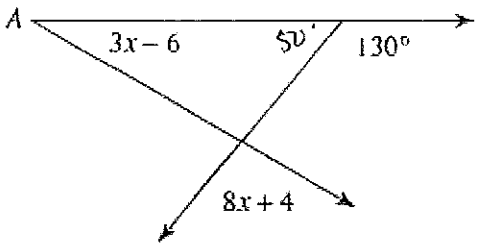


$2x + 104 = 90$

-14

$x = -7$

19.



$3x - 6 + 8x + 4 + 50 = 180$

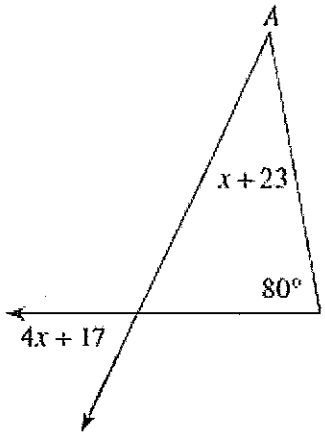
$11x - 2 = 130$

$x = 12$

132

12

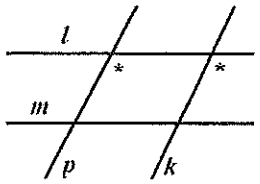
20.



$x = 12$

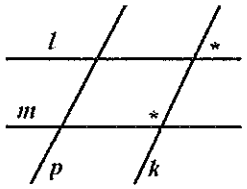
Geometry 22 **Practice With 3.1-3.3 including proofs** Name ANSWERS per ___ date ____

I. ***Identifying Angle Pairs*** – *Look at each diagram and find the 2 angles that are marked with an asterisk*. Then* ***a)*** *state what special type of angles they are or write 'no special relationship' if none exists. and* ***b)*** *tell which 2 lines, if any, would be parallel to each other if those 2 angles were congruent.*

1) 

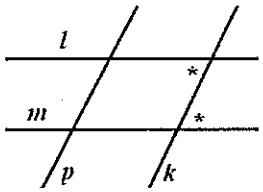
a) corresp. ∠s

b) p ∥ k

2) 

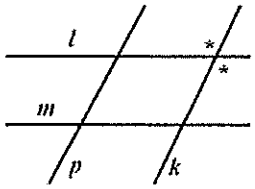
a) none

b) ____ ∥ ____

3) 

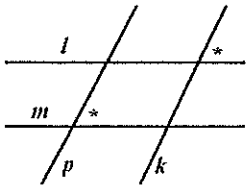
a) alt. int. ∠s

b) l ∥ m

4) 

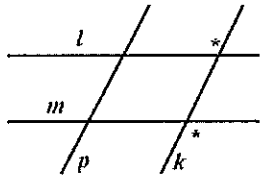
a) vertical ∠s

b) ____ ∦ ____

5) 

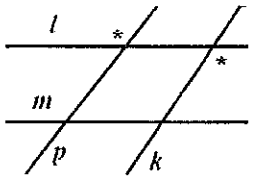
a) none

b) ____ ∦ ____

6) 

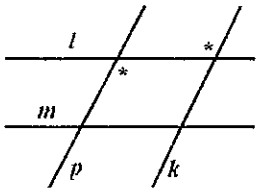
a) alt. ext. ∠s

b) l ∥ m

7) 

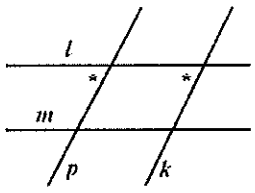
a) alt. ext. ∠s

b) p ∥ k

8) 

a) alt. int ∠s

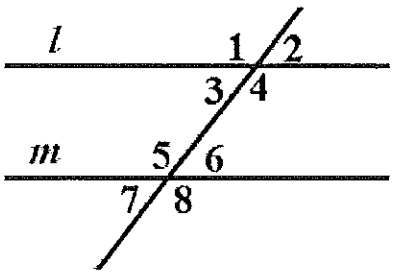
b) p ∥ k

9) 

a) corresponding ∠s

b) p ∥ k

II. ***Knowing When to use Which Theorem*** –*Provide the reason that justifies each statement.*

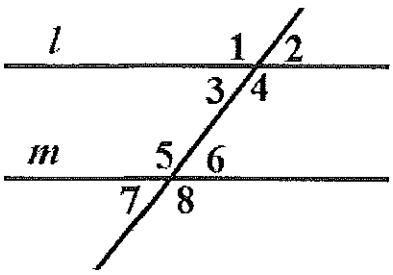


10)

1. $l \parallel m$	1. given
2. $\angle 4 \cong \angle 5$	2. alt. int. ∠s thm

11)

1. $\angle 2 \cong \angle 7$	1. given
2. $l \parallel m$	2. converse of alt. ext. ∠s thm



12)

1. $l \parallel m$	1. given
2. $\angle 3 \cong \angle 7$	2. corresp. $\angle$s thm

13)

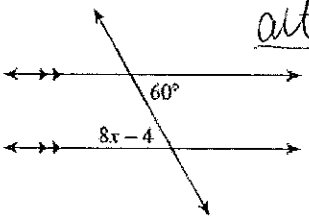
1. $l \parallel m$	1. given
2. $\angle 4$ and $\angle 6$ are supplementary	2. ~~[illegible]~~ SSI $\angle$s thm
3. $m\angle 4 + m\angle 6 = 180$	3. Def. supplem.

14)

1. $\angle 3$ and $\angle 5$ are supplementary	1. given
2. $l \parallel m$	2. Conv. of SSI $\angle$s thm
3. $\angle 1 \cong \angle 8$	3. alt. ext. $\angle$s thm

III. ***Solving for 'x'*** *– state what type of angles each pair is, then write an equation and solve for x;*

21)



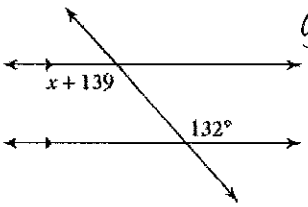
alt. int. $\angle$s

$8x - 4 = 60$

$8x = 64$

$x = 8$

22)

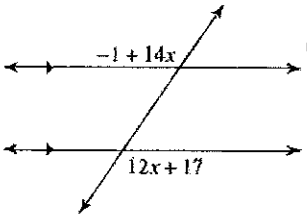


alt. int. $\angle$s

$x + 139 = 132$

$x = -7$

23)



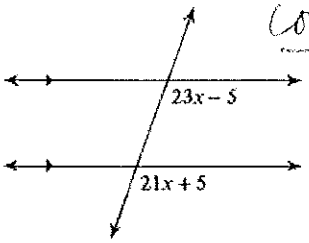
alt. ext. $\angle$s

$-1 + 14x = 12x + 17$

$2x = 18$

$x = 9$

24)



Corresp. $\angle$s

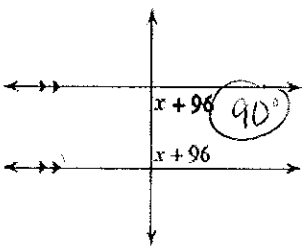
$23x - 5 = 21x + 5$

$2x = 10$

$x = 5$

Find the measure of the angle indicated in bold.

25)



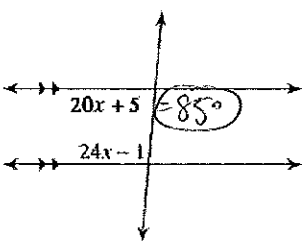
$x + 96 + x + 96 = 180$

$2x + 192 = 180$

$2x = -12$

$x = -6$

26)



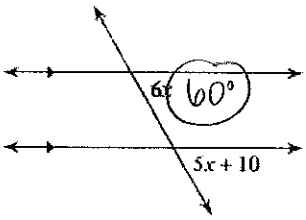
$24x - 1 + 20x + 5 = 180$

$44x + 4 = 180$

$44x = 176$

$x = 4$

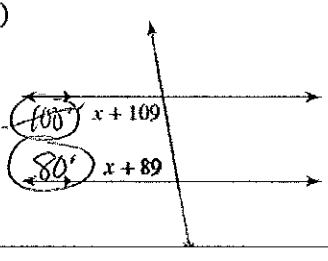
27)



$6x = 5x + 10$

$x = 10$

28)



$x + 109 + x + 89 = 180$

$2x + 198 = 180$

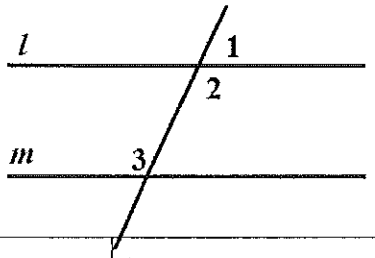
$2x = -18$

$x = -9$

IV. *Using Theorems in Proofs*

15) Given: m<1 = 75° ; $l \parallel m$

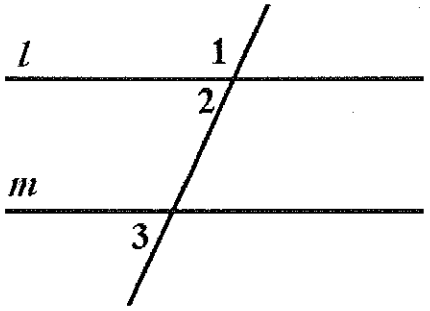
Prove: m< 3 = 105°



STATEMENTS	REASONS
1) m<1=75 $l \parallel m$	1) given
2) <1 and <2 are a linear pair	2) Defn. of lin. pr.
3) <1, <2 are supplementary	3) linear pair postulate
4) m<1 + m<2 = 180	4) Defn. supplem.
5) 75 + m<2 = 180	5) Substitution
6) m<2=105	6) subtraction
7) <2 and <3 are alt. int. ∠'s angles	7) Defn of alt int ∠s
8) <2 ≅ <3	8) alt. int. ∠ thm
9) m<2=m<3	9) Defn of congruent
10) m<3=105	10) Substitution

16) Given: <1 and <3 are supplementary

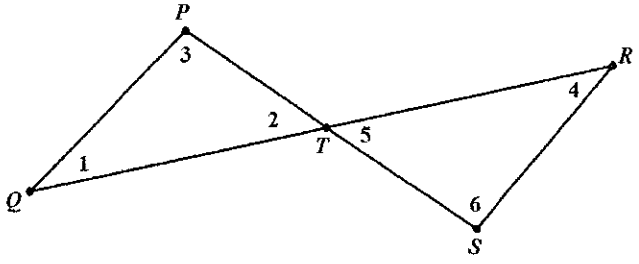
Prove: $l \parallel m$



STATEMENTS	REASONS
1) <1, <3 are supplem.	1) Given
2) m<1+m<3=180	2) definition of supplementary
3) <1 and <2 form a linear pair	3) defn. of linear pair
4) <1 and <2 are supplementary	4) linear pair postulate
5) m<1+m<2=180	5) defn. of supplementary
6) m<1 + m<3 = m<1 + m<2	6) Substitution
7) m<3=m<2	7) subtraction
8) <3≅<2	8) defn. of congruent
9) $l \parallel m$	9) converse of corresp. ∠ thm

17) Given : <1 ≅ <2 ; <5 ≅ <4

Prove: $\overline{PQ} \parallel \overline{RS}$



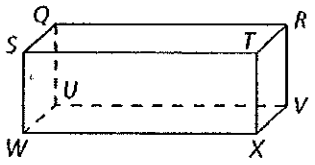
STATEMENTS	REASONS
1) <1 ≅ <2	1) given
2) <2 ≅ <5	2) vertical ∠ thm
3) <5 ≅ <4	3) given
4) <1 ≅ <4	4) Transitive property of congruence
5) $\overline{PQ} \parallel \overline{RS}$	5) converse of alt. int. ∠ thm

Name ANSWERS Period Date

Geometry 22: Practice with Lines Cut by a Transversal (3.1-3.3, 3.5)

Use the diagram to name each of the following.

1. a plane parallel to *plane SUQ* plane TRV
2. two lines that are parallel to $\overleftrightarrow{RV}$ $\overleftrightarrow{TX}$ $\overleftrightarrow{QR}$ $\overleftrightarrow{SW}$
3. three lines that are skew to $\overleftrightarrow{WX}$ $\overleftrightarrow{QU}$ $\overleftrightarrow{RV}$ $\overleftrightarrow{SQ}$
4. two lines that are parallel to plane *QUR* $\overleftrightarrow{ST}$ $\overleftrightarrow{WX}$



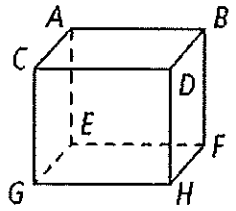
In the following exercises, describe the statement as *true* or *false*. If <u>false</u>, explain why, also state their intersection point(s) if possible.

5. $\overleftrightarrow{AE}$ and $\overleftrightarrow{BF}$ are skew lines. false they are ∥

6. plane *DBF* ∥ plane *ABD* False, intersect at $\overleftrightarrow{DB}$

7. $\overleftrightarrow{GH} \parallel \overleftrightarrow{EF}$ true

8. $\overleftrightarrow{FH} \parallel \overleftrightarrow{AC}$ true

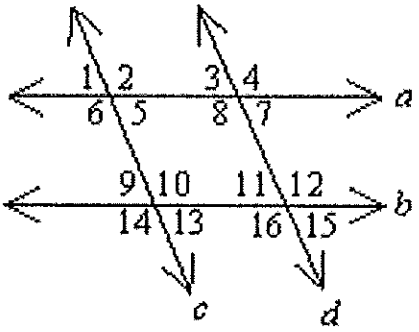


9. plane *EFH* ∥ $\overleftrightarrow{GC}$ false, intersect at point C

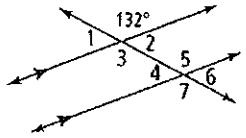
10. $\overleftrightarrow{FH}$ and $\overleftrightarrow{CD}$ are skew lines. true

Name the special pair of angles listed below.

11. ∠6 and ∠8 corresponding
12. ∠7 and ∠11 alt. interior ∡'s
13. ∠10 and ∠14 vertical ∡'s
14. ∠5 and ∠10 same side int. ∠'s
15. ∠2 and ∠5 linear pair



16. Identify all the numbered angles that are congruent to the given angle. State the theorem or postulate that supports your answer.



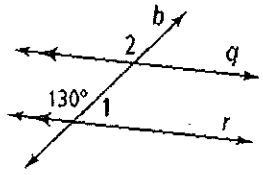
∠3 ~ Vertical ∡'s thm

∠5 ~ Corresponding ∡'s theorem

∠7 ~ alt. ext. ∡ thm.

Find $m\angle 1$ and $m\angle 2$. State the theorem or postulate that supports your answer.

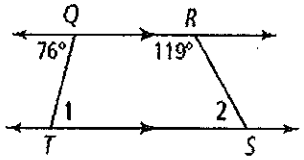
17.



$m\angle 1 = 50$ Uni. Pr.

$m\angle 2 = 130°$ corresp ∡'s.

18.

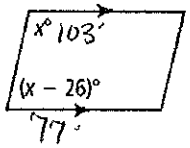


$m\angle 1 = 76°$ alt. int ∡'s

$m\angle 2 = 61°$ same side int. ∡'s

Find the value of *x* and *y*. Then find the measure of each labeled angle.

19.



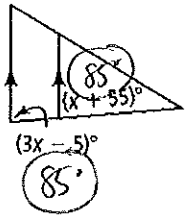
$x + x - 26 = 180$

$2x - 26 = 180$

$2x = 206$

$x = 103°$

20.



$3x - 5 = x + 55$

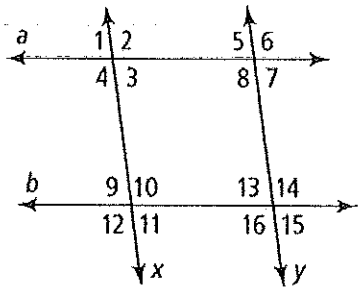
$2x = 60$

$x = 30$

21. Fill out the two-column proof.

Given: $a \parallel b, x \parallel y$

Prove: $\angle 4$ and $\angle 15$ are supplementary



STATEMENTS	REASONS
1. $a \parallel b, x \parallel y$	1. Given
2. $\angle 15$ and $\angle 9$ are alternate exterior angles	2. Defn. of alt. ext. $\angle$'s
3. $\angle 15 \cong \angle 9$	3. Alt. int $\angle$s thm
4. $m\angle 15 = m\angle 9$	4. Definition of angle congruence
5. $\angle 9$ and $\angle 4$ are same side interior angles	5. Defn. of same side int $\angle$'s
6. $\angle 9$ and $\angle 4$ are supplementary	6. SSI $\angle$'s thm
7. $m\angle 9 + m\angle 4 = 180°$	7. Defn. of supplem.
8. $m\angle 15 + m\angle 4 = 180°$	8. Substitution Property of Equality
9. $\angle 4$ and $\angle 15$ are supple.	9. Defn. supplementary

22. Error Analysis Which solution for the figure at the right is incorrect? Explain.

$2x - 40 = x + 10$

$x - 40 = 10$

$x = 50$

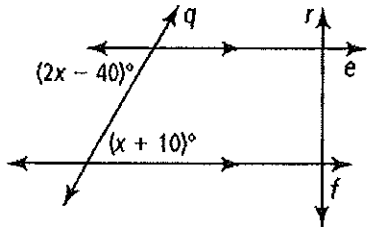
alt. ext. $\angle$'s are $\cong$

$2x - 40 + (x + 10) = 180$

$3x - 30 = 180$

$3x = 210$

$x = 70$



23. Factor the following polynomial. $5x^2 - 9x - 2$

$(5x+1)(x-2)$

$5x$	$5x^2$	$-10x$
1	$1x$	-2

$x \quad -2$

$-10x^2$, $+1x$, $-10x$, $-9x$

24. Given the following information, find the value of x.

$l \parallel m$

$m\angle 1 = x^2 - 7x$

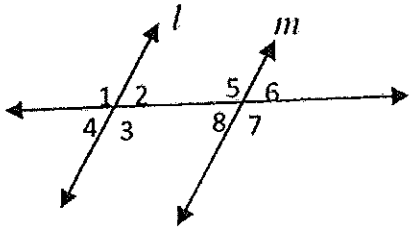
$m\angle 7 = -x + 7$

$x^2 - 7x = -x + 7$

$x^2 + -6x - 7 = 0$

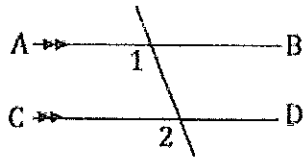
$(x+1)(x-7) = 0$

$x = -1, 7$



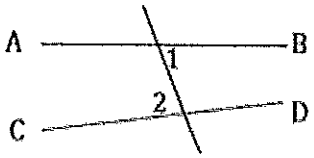
For each of the following statements, write **yes** or **no** based on the given information. **THEN,** if no, explain why, if yes state the theorem or postulate that supports your answer.

25. Is $\angle 1 \cong \angle 2$? (Yes) or No



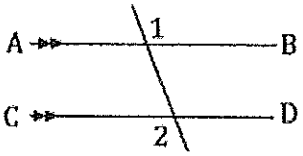
Reasoning: Corresp ∠s Thm

26. Is $\angle 1 \cong \angle 2$? Yes or (No)



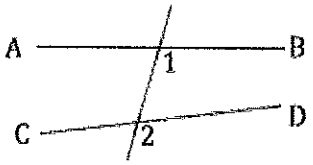
Reasoning: lines are NOT parallel

27. Is $\angle 1 \cong \angle 2$? (Yes) or No



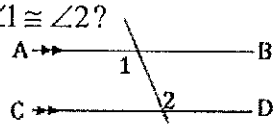
Reasoning: Alt. ext ∠s thm.

28. Is $\angle 1 \cong \angle 2$? Yes or (No)



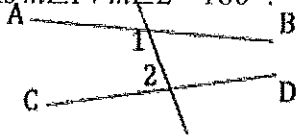
Reasoning: lines are NOT parallel

29. Is $\angle 1 \cong \angle 2$? (Yes) or No



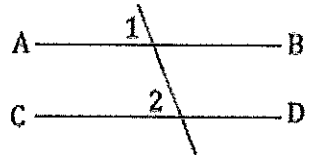
Reasoning: alt. int ∠s thm.

30. Is $m\angle 1 + m\angle 2 = 180°$? Yes or (No)



Reasoning: lines NOT ∥.

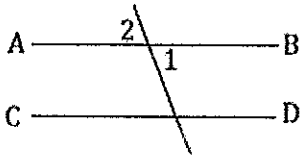
31. If $\angle 1 \cong \angle 2$, is $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$? (Yes) or No



Reasoning: Converse of Corresp. ∠s thm.

32. If $\angle 1 \cong \angle 2$, is $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$? Yes or (No)

Reasoning: Vertical ∠s don't determine ∥ lines



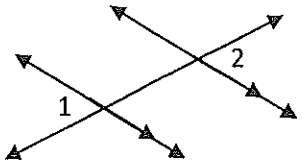
33. In the problems below, find the value of *x*.

a. $m\angle 1 = (3x-17)°$, $m\angle 2 = (x+1)°$

$3x-17 = x+1$

$2x = 18$

$x = 9$



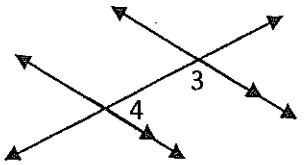
b. $m\angle 3 = (20x+11)°$, $m\angle 4 = (8x+1)°$

$20x+11+8x+1 = 180$

$28x+12 = 180$

$28x = 168$

$x = 6$



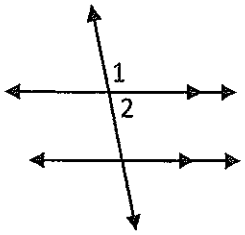
c. $m\angle 1 = (95+7x)°$, $m\angle 2 = (55-x)°$

$95+7x+55-x = 180$

$150+6x = 180$

$6x = 30$

$x = 5$

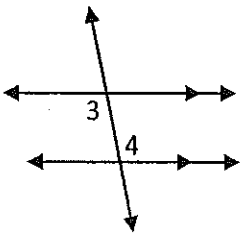


d. $m\angle 3 = (5x+12)°$, $m\angle 4 = (7x-16)°$

$5x+12 = 7x-16$

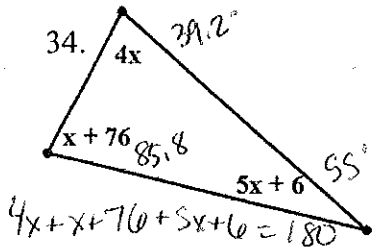
$28 = 2x$

$x = 14$



Find the missing angle measures;

34.



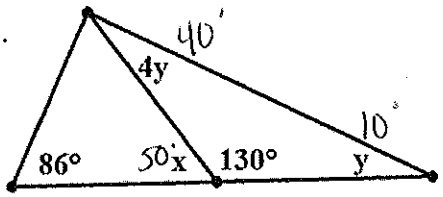
$4x+x+76+5x+6 = 180$

$10x+82 = 180$

$10x = 98$

$x = 9.8$

35.

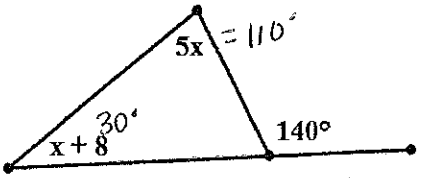


$4y+y = 50$

$5y = 50$

$y = 10$

36.



$140 = 5x+x+8$

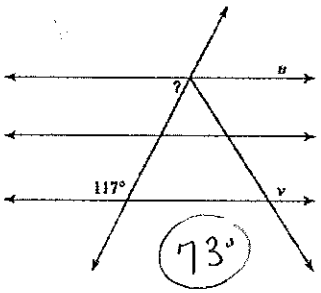
$140 = 6x+8$

$132 = 6x$

$x = 22$

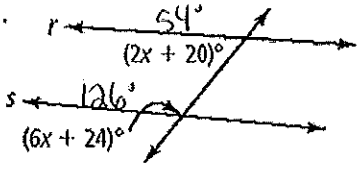
Find the value of x that would the given lines parallel.**State the theorem or postulate to support your answer.**

37.



73°

38.



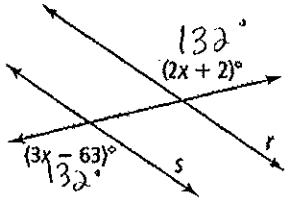
$2x+20+6x+24 = 180$

$8x+44 = 180$

$8x = 136$

$x = 17$

39.



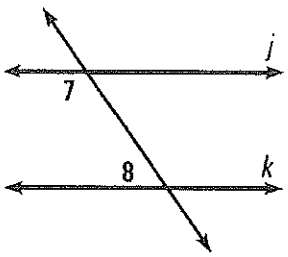
$2x+2 = 3x-63$

$65 = x$

Geometry 21 **More Practice with Parallel Line Proofs** Name_____ Per____

1) **GIVEN** ▶ $m\angle 7 = 125°, m\angle 8 = 55°$

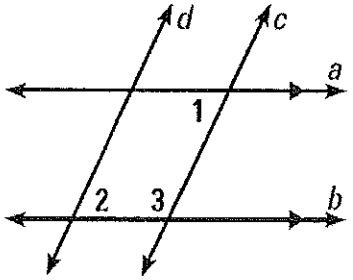
PROVE ▶ $j \parallel k$



S	R
1) $m\angle 7 = 125, m\angle 8 = 55$	1) Given
2) $125 + 55 = 180$	2) Math
3) $m\angle 7 + m\angle 8 = 180$	3) Substitution
4) $\angle 7$ and $\angle 8$ supplem.	4) Defn. supplem.
5) ~~$\angle 7 \cong \angle 8$~~ $j \parallel k$	5) Converse of same side int ∠ thm

2) **GIVEN** ▶ $a \parallel b, \angle 1 \cong \angle 2$

PROVE ▶ $c \parallel d$

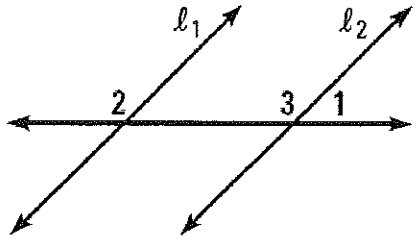


S	R
1) $a \parallel b$; $\angle 1 \cong \angle 2$	1) Given
2) $\angle 1$ & $\angle 3$ supple.	2) SSI ∠ thm
3) $m\angle 1 + m\angle 3 = 180$	3) Defn. supplem.
4) $m\angle 1 = m\angle 2$	4) Defn. $\cong$
5) $m\angle 2 + m\angle 3 = 180$	5) Substitution
6) $\angle 2$ and $\angle 3$ suppl	6) Defn. supplem.
7) $c \parallel d$	7) Converse of SSI ∠ thm

3) **PROOF** Complete the proof.

GIVEN ▶ $\angle 1$ and $\angle 2$ are supplementary.

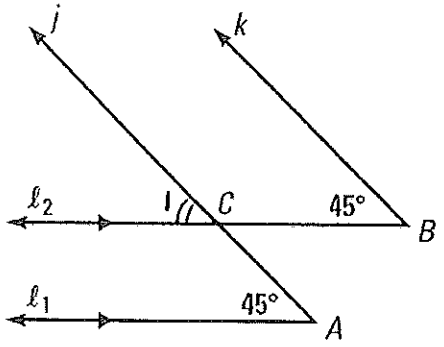
PROVE ▶ $\ell_1 \parallel \ell_2$



S	R
1) $\angle 1$ and $\angle 2$ supplem.	1) given
2) $\angle 1$ and $\angle 3$ are supplem.	2) Lin. Pr. Post.
3) $\angle 2 \cong \angle 3$	3) Congruent Supplem. Thm
4) $\ell_1 \parallel \ell_2$	4) Conv. of Corresp. ∠ thm

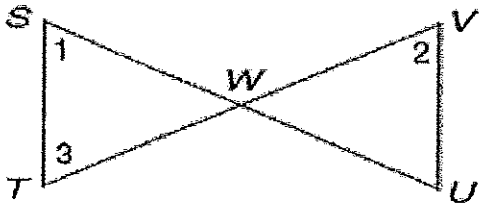
4) **GIVEN** ▶ $\ell_1 \parallel \ell_2, m\angle A = m\angle B = 45°$

PROVE ▶ $j \parallel k$



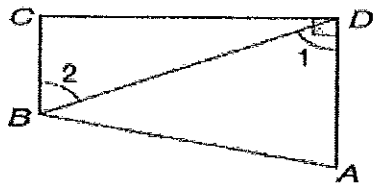
S	R
(1) $\ell_1 \parallel \ell_2$; $m\angle A = m\angle B = 45$	(1) Given
(2) $\angle 1 \cong \angle A$	(2) corresp. $\measuredangle$ thm
(3) $\angle A \cong \angle B$	(3) Defn. $\cong$
(4) $\angle 1 \cong \angle B$	(4) Transitive
(5) $j \parallel k$	(5) Conv. of corresp. $\measuredangle$ thm

5) **Given:** $\angle 2 \cong \angle 1$
$\angle 1 \cong \angle 3$
Prove: $\overline{ST} \parallel \overline{UV}$



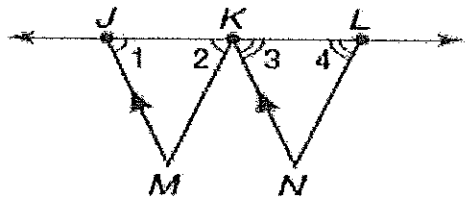
S	R
(1) $\angle 2 \cong \angle 1$ $\angle 1 \cong \angle 3$	(1) given
(2) $\angle 2 \cong \angle 3$	(2) transitive P.O.C.
(3) $\overline{ST} \parallel \overline{UV}$	(3) Conv. of alt. int. $\measuredangle$ thm

6) **Given:** $\overline{AD} \perp \overline{CD}$
$\angle 1 \cong \angle 2$
Prove: $\overline{BC} \perp \overline{CD}$



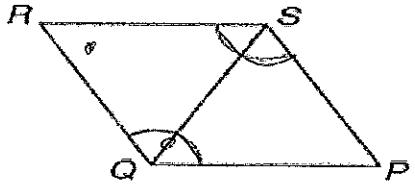
S	R
(1) $\overline{AD} \perp \overline{CD}$; $\angle 1 \cong \angle 2$	(1) given
(2) $\overline{AD} \parallel \overline{CB}$	(2) Conv. of alt. int. $\measuredangle$ thm
(3) $\overline{BC} \perp \overline{CD}$	(3) If a line is $\perp$ to one of 2 $\parallel$ lines, then $\perp$ to other line.

7) **Given:** $\overline{JM} \parallel \overline{KN}$
$\angle 1 \cong \angle 2$
$\angle 3 \cong \angle 4$
Prove: $\overline{KM} \parallel \overline{LN}$



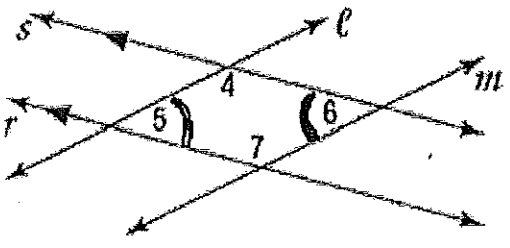
S	R
① $\overline{JM} \parallel \overline{KN}$; $\angle 1 \cong \angle 2$	① given
② $\angle 2 \cong \angle 1$	② Symmetric
③ $\angle 1 \cong \angle 3$	③ Corresp. $\measuredangle$ thm
④ $\angle 3 \cong \angle 4$	④ given
⑤ $\angle 2 \cong \angle 4$	⑤ Transitive P.O.C.
⑥ $\overline{KM} \parallel \overline{LN}$	⑥ Conv. of Corresp. $\measuredangle$ thm

8) **Given:** $\angle RSP \cong \angle PQR$
$\angle QRS$ and $\angle PQR$ are supplementary.
Prove: $\overline{PS} \parallel \overline{QR}$



S	R
① $\angle RSP \cong \angle PQR$	① Given
② $\angle QRS$; $\angle PQR$ supp.	② Given
~~③ $\overline{QR} \parallel \overline{PS}$~~	~~③ Conv. SSI $\measuredangle$ thm~~
③ $m\angle QRS + m\angle PQR = 180$	③ Defn. supp.
④ $m\angle RSP = m\angle PQR$	④ Defn. $\cong$ (from given)
⑤ $m\angle QRS + m\angle RSP = 180$	⑤ Substitution
⑥ $\angle QRS$; $\angle RSP$ supp.	⑥ Defn supp.
⑦ $\overline{PS} \parallel \overline{QR}$	⑦ Conv. of SSI $\measuredangle$ thm

9) **Given:** $r \parallel s$
$\angle 5 \cong \angle 6$
Prove: $\ell \parallel m$



S	R
① $r \parallel s$, $\angle 5 \cong \angle 6$	① given
② $\angle 4$; $\angle 5$ suppl.	② SSI $\measuredangle$ thm
~~③ $\angle 6$; $\angle 5$ suppl.~~	
③ $m\angle 4 + m\angle 5 = 180$	③ Defn. suppl.
④ $m\angle 5 = m\angle 6$	④ Defn. $\cong$
⑤ $m\angle 4 + m\angle 6 = 180$	⑤ Substitution
⑥ $\angle 4$; $\angle 6$ suppl.	⑥ Defn. Suppl.
⑦ $\ell \parallel m$	⑦ Conv. of SSI $\measuredangle$ thm

Name ANSWERS Period Date

Geometry 21: Review chapter 3 – parallel lines

Use the picture below to answer 1 – 5 as true or false, given $\overline{HA} \parallel \overline{JD}$; $\overline{HB} \parallel \overline{ID}$. If true, state the postulate or theorem to support your answer.

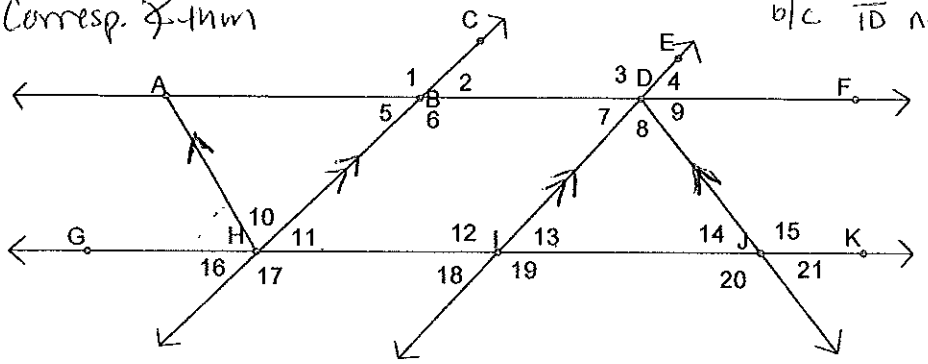
1. $\angle 11 \cong \angle 5$ False not necessarily b/c we don't know if $\overline{AF} \parallel \overline{GK}$

2. $\angle 16 \cong \angle 2$ False not necessarily

3. $\angle 9 \cong \angle 6$ ~~Also~~ False Not related

4. $\angle 11 \cong \angle 13$ True Corresp. $\angle$ thm

5. $\angle 21 \cong \angle 19$ False ~~Alt. related~~ b/c $\overline{ID}$ not $\parallel$ to $\overline{JD}$



Use the picture above for 6 – 10 to determine which lines, rays or segments must be parallel to make the statement true. If true, state the postulate or theorem to support your answer.

6. $\angle 13 \cong \angle 7$ $\overline{AF} \parallel \overline{GK}$ Conv. of alt. int. $\angle$ thm

7. $\angle GHA \cong \angle 14$ $\overline{AH} \parallel \overline{DJ}$ Conv. of corresp. $\angle$ thm

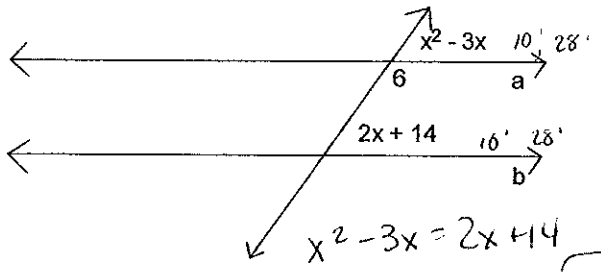
8. $\angle 7 \cong \angle 5$ $\overline{CH} \parallel \overline{DI}$ Conv. of corresp $\angle$ thm

9. $\angle 6 \cong \angle 3$ $\overline{CH} \parallel \overline{DI}$ Conv of alt. int. $\angle$ thm

10. $\angle 19 \cong \angle 3$ $\overline{AF} \parallel \overline{GK}$ Conv. of alt. ext. $\angle$ thm

In 11 and 12, find $m\angle 6$ given $a \parallel b$.

11.



$x^2 - 3x = 2x + 14$

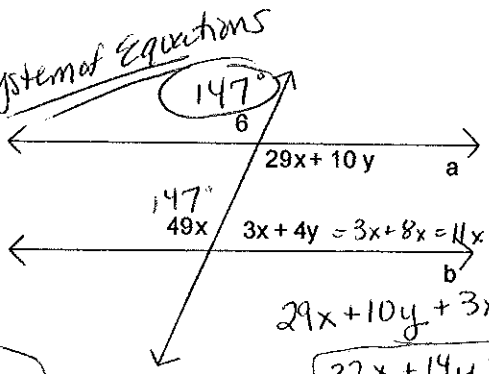
$x^2 - 5x - 14 = 0$

$(x + 2)(x - 7) = 0$

$x = -2, 7$

$m\angle 6 = 170°$ or $152°$

12. * Systems of Equations



$49 + 11x = 180$

$60x = 180$

$x = 3$

$9 + 4y = 33$

$4y = 24$

$y = 6$

$29x + 10y + 3x + 4y = 180$

$32x + 14y = 180$

$49x + 3x + 4y = 180$

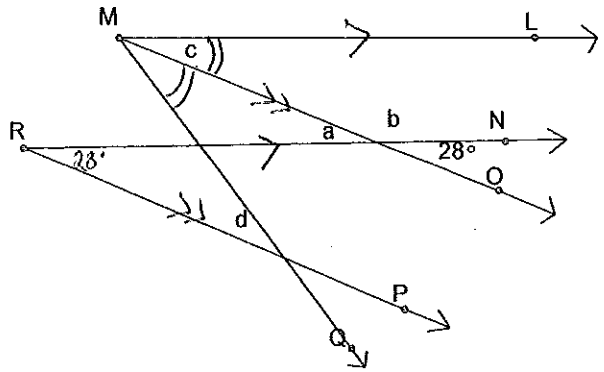
$52x + 4y = 180$

$32x + 14y = 52x + 4y$

$\frac{10y}{10} = \frac{20x}{10}$

$y = 2x$

13. Find the measure of each lettered angle. List your answer to the side of the diagram.
$\overline{ML} \parallel \overline{RN}; \overline{MO} \parallel \overline{RP}; \overline{MO}$ bisects $\angle LMO$



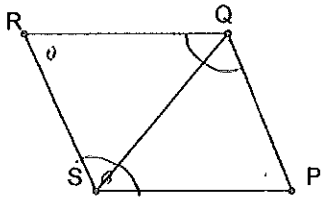
$a = 28°$

$b = 152°$

$c = 28°$ (alt. int. to a)

$d = 28°$ (alt. int to $\cong$ of c)

17. Write a two column proof.

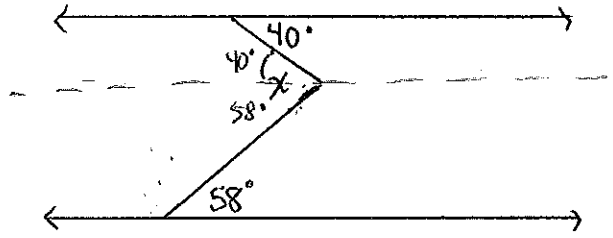


Given : $\angle RQP \cong \angle PSR$; $\angle SRQ$ *and* $\angle PSR$ *are* sup*plementary*

Prove: $\overline{QP} \parallel \overline{RS}$

S	P
(1) Given	(1) Given
(2) $m\angle SRQ + m\angle PSR = 180$	(2) Defn. supplem.
(3) $m\angle RQP = m\angle PSR$	(3) Defn. $\cong$
(4) $m\angle SRQ + m\angle RQP = 180$	(4) Substitution
(5) $\angle SRQ$; $\angle RQP$ are suppl.	(5) Defn. suppl.
(6) $\overline{QP} \parallel \overline{RS}$	(6) Conv. of SSI $\measuredangle$-thm

18.)

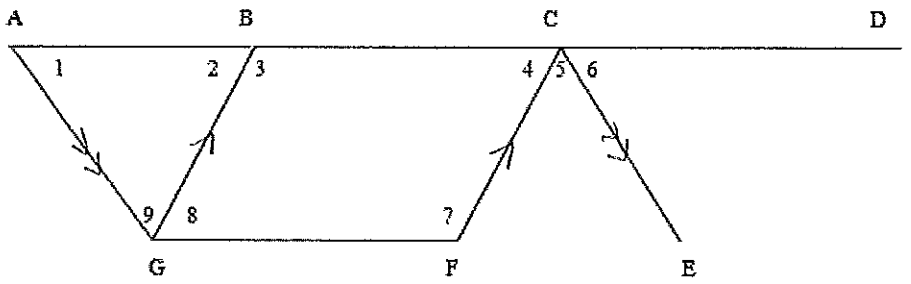


$x = ?$

98°

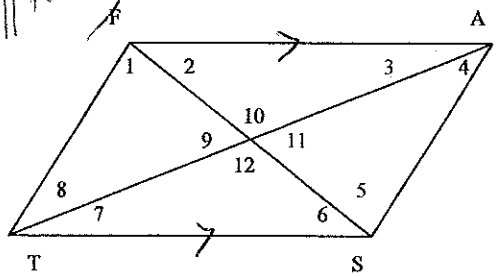
Worksheet on Parallel Lines

Use the figure below. Determine if each statement is True or False. Given only $\overline{BG} \| \overline{CF}$ and $\overline{AG} \| \overline{CE}$



1. $\angle 1 \cong \angle 5$ False
2. $\angle 8 \cong \angle 2$ False b/c we don't know if $\overline{AD} \| \overline{GF}$
3. $\angle 3 \cong \angle FCD$ True Corresp. $\angle$ Thm
4. $m\angle 2 + m\angle 4 = 180°$ False $\angle 2 \cong \angle 4$ corresp. $\angle$ thm
5. $\angle 2 \cong \angle 4$ True Corresp $\angle$ thm
6. $\angle 9 \cong \angle 3$ False $\overline{AG}$ not $\|$ to $\overline{AD}$
7. $\angle 1$ and $\angle BCE$ are supplementary True SSI $\angle$ thm
8. $\angle 8$ and $\angle 3$ are supplementary False b/c we don't know if $\overline{AD} \| \overline{GF}$
9. $\angle 7 \cong \angle 5$ False $\overline{CE}$ not $\|$ to $\overline{GF}$
10. $\angle 4 \cong \angle 6$ False
11. $\angle 1 \cong \angle 6$ True corresp. $\angle$ thm

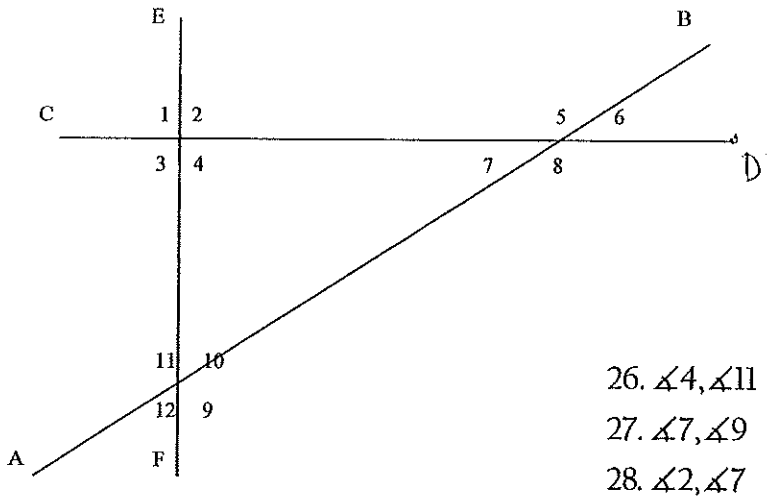
Given the diagram with $\overline{FA} \| \overline{TS}$. Answer true or false.



"Falses" are b/c $\overline{FT}$ not $\|$ to $\overline{AS}$

17. $\angle 2 \cong \angle 6$ T
18. $\angle 8 \cong \angle 4$ F
19. $\angle 3 \cong \angle 11$ F
20. $\angle 1 \cong \angle 5$ F
21. $\angle 3 \cong \angle 7$ T
22. $\angle 2 \cong \angle 9$ F
23. $\angle 2 \cong \angle 11$ F
24. $\angle FAS$ and $\angle AST$ are supplementary T
25. $\angle TFA$ and $\angle FAS$ are supplementary F

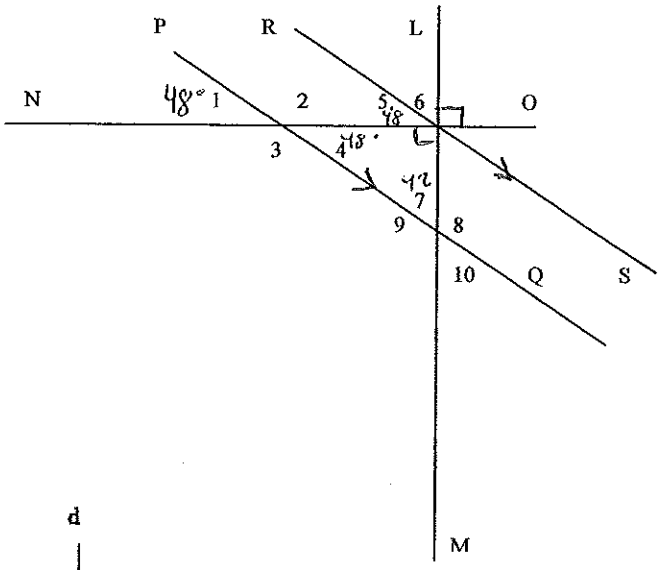
Use the diagram, name the transversals for alternate interior angles.



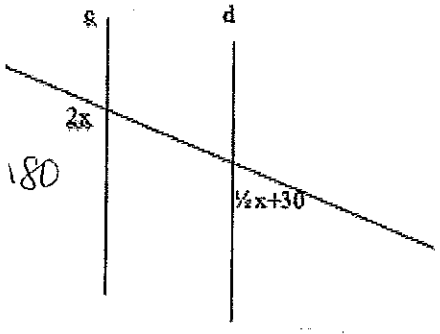
26. $\angle 4, \angle 11$ transversal $\overline{EF}$
27. $\angle 7, \angle 9$ transversal $\overline{BF}$
28. $\angle 2, \angle 7$ transversal $\overline{CD}$

Use the information to find the measure of the labeled angles. $\overline{PQ} \parallel \overline{RS}, \overline{LM} \perp \overline{NO}, m\angle 1 = 48$

29. $m\angle 2$ 132°
30. $m\angle 3$ 48°
31. $m\angle 4$ 48°
32. $m\angle 5$ 48°
33. $m\angle 6$ 42°
34. $m\angle 7$ 42°
35. $m\angle 8$ 138°
36. $m\angle 9$ 138°
37. $m\angle 10$ 42°



38. Use the diagram $c \parallel d$. Find $m\angle 2$

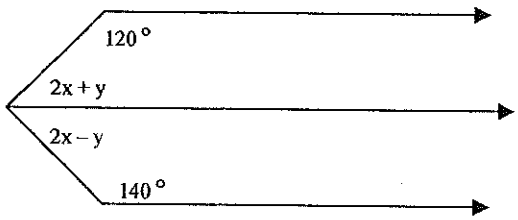


$2x + \frac{1}{2}x + 30 = 180$

$2\frac{1}{2}x = 150$

$x = 60°$

39. Find the values of x and y in the diagram. Horizontal lines are parallel to each other.



$2x + y + 120 = 180$

$+ \quad 2x - y + 140 = 180$

$4x + 260 = 360$

$4x = 100$

$x = 25$

$2x + y = 60$

$2(25) + y = 60$

$50 + y = 60$

$y = 10$

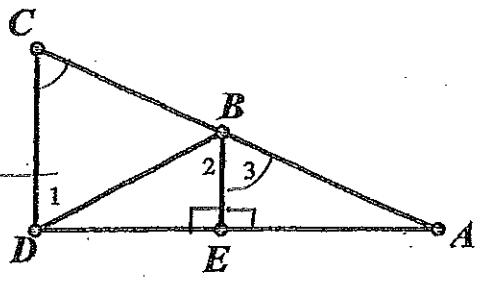
(OR $2x - y = 40$

$2(25) - y = 40$

$50 - y = 40$ $y = 10$)

3. Given: $\angle C \cong \angle 3$, $\overline{BE} \perp \overline{DA}$

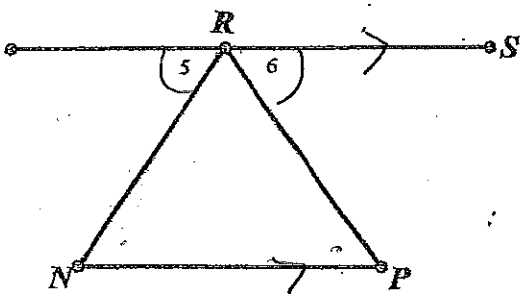
Prove: $\overline{CD} \perp \overline{DA}$



S	R
(1) $\angle C \cong \angle 3$	(1) Given
(2) $\overline{CD} \parallel \overline{BE}$	(2) Converse of corresp. $\angle$ thm
(3) $\overline{BE} \perp \overline{DA}$	(3) Given
(4) $\overline{CD} \perp \overline{DA}$	(4) If a line is $\perp$ to one of 2 $\parallel$ lines, then $\perp$ to other

8. Given: $\angle 5 \cong \angle 6$; $\overline{RS} \parallel \overline{NP}$

Prove: $\angle RNP \cong \angle RPN$



S	R
(1) $\angle 5 \cong \angle 6$, $\overline{RS} \parallel \overline{NP}$	(1) Given
(2) $\angle 5 \cong \angle RNP$; $\angle 6 \cong \angle RPN$	(2) alt. int. $\angle$ thm.
(3) $\angle RNP \cong \angle RPN$	(3) Transitive

$\angle RNP \cong \angle 5$

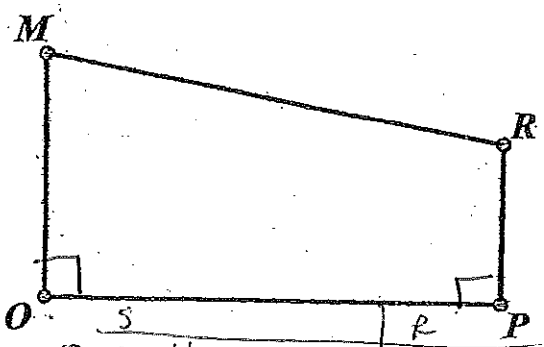
$\angle 5 \cong \angle 6$

$\angle 6 \cong \angle RPN$

Given: $\angle MOP$ is a right angle

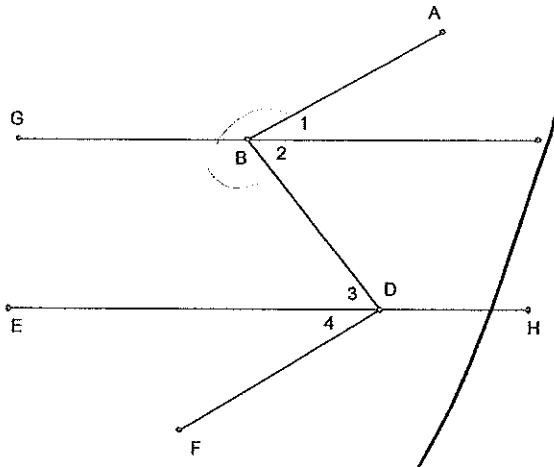
10. $\overline{OP} \perp \overline{RP}$

Prove: $\overline{MO} \parallel \overline{RP}$



S	R
(1) $\angle MOP$ is a rt. $\angle$; $\overline{OP} \perp \overline{RP}$	(1) Given
(2) $m\angle RPO$ is a rt. $\angle$	(2) Defn. $\perp$
(3) $m\angle MOP = 90$, $m\angle RPO = 90$	(3) Defn. rt. $\angle$
(4) $90 + 90 = 180$	(4) Mean
(5) $m\angle MOP + m\angle RPO = 180$	(5) Substitution
(6) $\angle MOP$ and $\angle RPO$ are supp.	(6) Defn. supp
(7) $\overline{MO} \parallel \overline{RP}$	(7) Conv. of SSI $\angle$ thm

PROOFS - (more than 4 steps each)



1) Given: m<1 = m <4; BC || ED
Prove: $\overline{AB} \parallel \overline{DF}$

1

S	R
① m<1 = m<4; $\overline{BC} \parallel \overline{ED}$	① given
② m<1 + m<2 = m<ABD m<3 + m<4 = m<BDF	② angle add. post.
③ m<4 + m<2 = m<ABD	③ substitution
④ <2 ≅ <3	④ alt. int ∠ thm
⑤ m<2 = m<3	⑤ Defn. ≅
⑥ m<4 + m<3 = m<ABD	⑥ substitution
⑦ m<BDF = m<ABD	⑦ substitution
⑧ <BDF ≅ <ABD	⑧ Defn. ≅
⑨ $\overline{AB} \parallel \overline{DF}$	⑨ Conv. of alt. int ∠ thm

2) given: m<ABD = m<FDB; m<1 = m<4
Prove: $\overline{BC} \parallel \overline{ED}$

2

S	R
① m<1 = m<4; m<ABD = m<FDB	① given
② m<1 + m<2 = m<ABD m<3 + m<4 = m<FDB	② angle add. post.
③ m<1 + m<2 = m<3 + m<4	③ substitution
④ m<4 + m<2 = m<3 + m<4	④ substitution
⑤ m<2 = m<3	⑤ Subtraction
⑥ <2 ≅ <3	⑥ Defn. ≅
⑦ $\overline{BC} \parallel \overline{ED}$	⑦ Conv. of alt. int ∠ thm

3) Given: <3 is supple. To <ABG; <ABG congr. to <DBG
Prove: $\overline{BC} \parallel \overline{ED}$

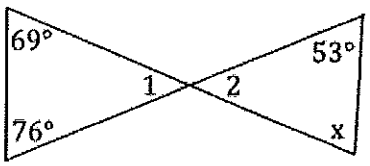
3

S	R
① <3 suppl. to <ABG <ABG ≅ <DBG	① given
② m<3 + m<ABG = 180	② Defn. suppl.
③ m<ABG = m<DBG	③ Defn. ≅
④ m<3 + m<DBG = 180	④ substitution
⑤ <3 and <DBG are supple.	⑤ Defn. supplem.
⑥ $\overline{BC} \parallel \overline{ED}$	⑥ Conv. of SSI ∠ thm

Geometry 21 **Solving More Complex Problems (3.1-3.5)** Name ANSWERS date ____ per ___

In each diagram, solve for the angle labeled "x". Show all work. List the angles that you used to help solve.

1.



69 + 76 + m<1 = 180 (Δ sum)

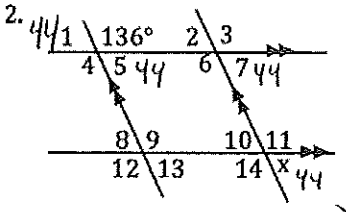
35

m<1=m<2 (Vert. <'s)

53 + 35 + x = 180 (Δ sum)

x = 92

2.

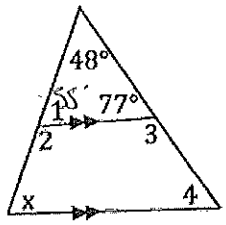


m<5 = 44 (Alt. Int.)

m<7 = 44 (Corresp.)

x = 44 (corresp.)

3.

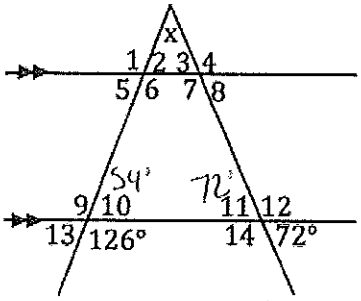


48 + 77 + m<1 = 180

m<1 = 55° Δ sum

x = 55° (corresp.)

4.



m<11 = 72° (VAT)

m<10 = 54° (L.P.P)

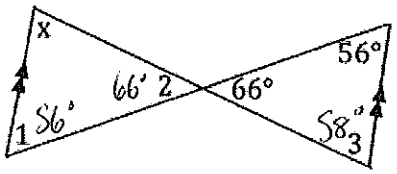
m<2 = 54° (Corresp. to <10)

m<3 = 72° (Corresp. to <11)

x + 54 + 72 = 180 Δ Sum

x = 54°

5.



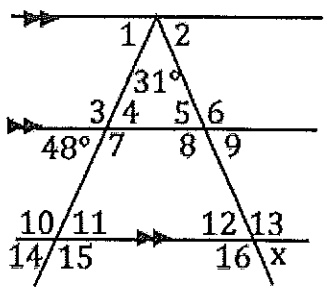
m<2 = 66° (VAT)

m<1 = 56 (Alt. Int. ∡)

x + 66 + 56 = 180 (Δ Sum)

x = 58°

5.



m<4 = 48° (VAT)

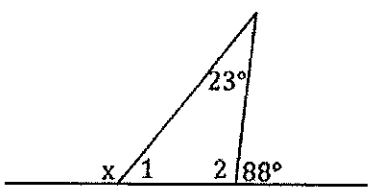
m<5 + 48 + 31 = 180 (Δ sum)

m<5 = 101

m<12 = 101° (Corresp.)

x = 101° (VAT)

7.



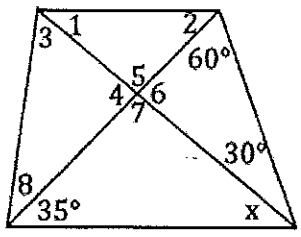
m<1 + 23 = 88 (ext. ∡ thm)

m<1 = 65°

65 + x = 180 (L.P.P.)

x = 115°

8.



60 + 30 + m<6 = 180 (Δ sum)

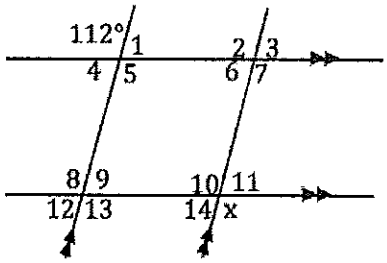
m<6 = 90°

m<7 = 90° (L P P)

90 + 35 + x = 180 (Δ sum)

x = 55°

9.

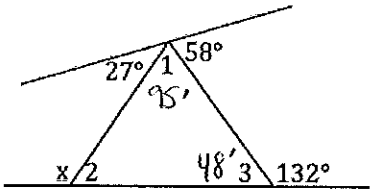


m<5 = 112° (VAT)

m<7 = 112° (Corresp. to <5)

x = 112° (Corresp. to <7)

10.



$27+58+m\angle 1=180$ (straight $\angle$)

$m\angle 1=95°$

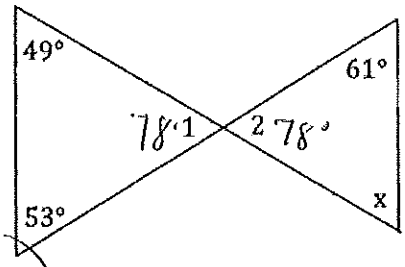
$x+m\angle 3+132=180$ ($\angle$ P.P.)

$m\angle 3=48°$

$X=95+48$ (ext. $\angle$ thm)

$X=143°$

11.



$49+53+m\angle 1=180$ (Δ sum)

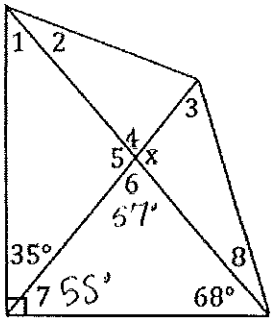
$m\angle 1=78°$

$m\angle 2=78°$ (VAT)

$X+61+78=180$ (Δ sum)

$X=41°$

12.



$35+m\angle 7=90°$

$m\angle 7=55°$

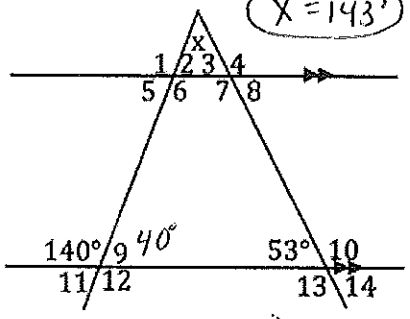
$m\angle 6+55+68=180$ (Δ Sum)

$m\angle 6=57°$

$x+57=180$ (LPP)

$X=123°$

13.



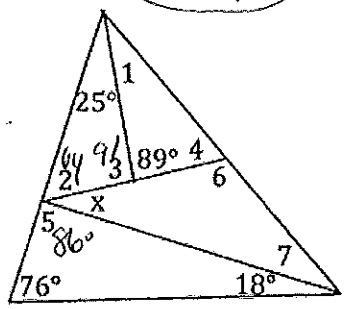
$m\angle 9+140=180$ (LPP)

$m\angle 9=40°$

$40+53+x=180$ (Δ sum)

$X=87°$

14.



$m\angle 5+76+18=180$ (Δ sum)

$m\angle 5=86°$

$m\angle 3+89=180$ (LPP)

$m\angle 3=91°$

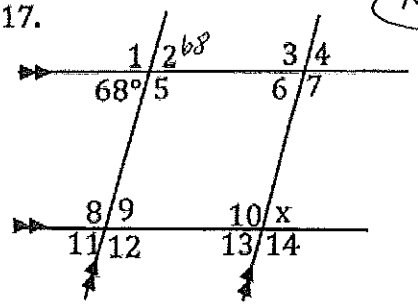
$m\angle 2+91+25=180$ (Δ sum)

$m\angle 2=64$

$64+86+x=180$ (straight $\angle$)

$x=30°$

17.

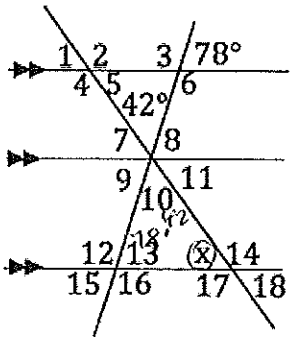


$m\angle 2=68°$ (VAT)

$m\angle 4=68°$ (corresp. to $\angle 2$)

$x=68°$ (corresp. to $\angle 4$)

19.



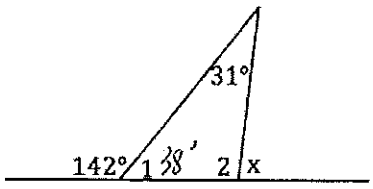
$m\angle 13=78°$ (corresp. $\angle$s)

$m\angle 10=42°$ (VAT)

$x+78+42=180$ (Δ sum)

$X=60°$

20.



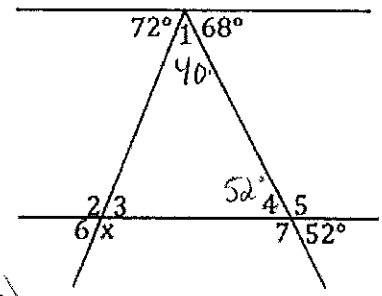
$m\angle 1+142=180$ (LPP)

$m\angle 1=38°$

$X=31+38$ (ext. $\angle$ thm)

$X=69°$

28.



$72+68+m\angle 1=180$ (straight $\angle$)

$m\angle 1=40°$

$m\angle 4=52°$ (VAT)

$x=40+52$ (ext. $\angle$ thm)

$x=92°$

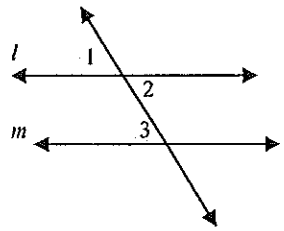
G21

Parallel Lines Proof Worksheet

Name ANSWERS (Do NOT write your proofs in this format!)

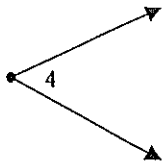
Write a 2 column or flow proof on your own paper.

1. Given: $l \parallel m$; $\angle 2 \cong \angle 4$
   Prove: $\angle 4 \cong \angle 3$



$l \parallel m$	Given
$\angle 4 \cong \angle 2$	Symmetric
$\angle 2 \cong \angle 3$	alt. int. $\angle$s Thm
$\angle 4 \cong \angle 3$	Trans.

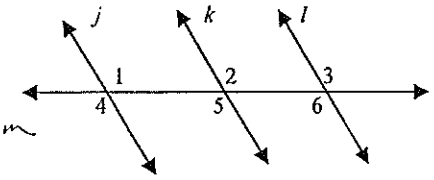
2. Given: $l \parallel m$; $\angle 1 \cong \angle 4$
   Prove: $\angle 3 \cong \angle 4$



$l \parallel m$	Given
$\angle 3 \cong \angle 1$	Corresp. $\angle$s Post.
$\angle 1 \cong \angle 4$	Given
$\angle 3 \cong \angle 4$	Transitive

---

3. Given: $j \parallel k, k \parallel l$
   Prove: $\angle 1 \cong \angle 3$



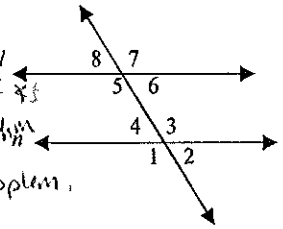
$j \parallel k, k \parallel l$	Given
$\angle 1 \cong \angle 2$	corresp $\angle$s Thm
$\angle 2 \cong \angle 3$	Corresp. $\angle$s Thm
$\angle 1 \cong \angle 3$	Trans.

4. Given: $j \parallel k, k \parallel l$
   Prove: $\angle 1 \cong \angle 6$

$j \parallel k$; $k \parallel l$	Given
$\angle 1 \cong \angle 2$	Corresp $\angle$s Post
$\angle 2 \cong \angle 6$	alt. int. $\angle$s Thm
$\angle 1 \cong \angle 6$	Transitive

---

5. Given: $l \parallel n$
   Prove: $m\angle 3 + m\angle 6 = 180°$



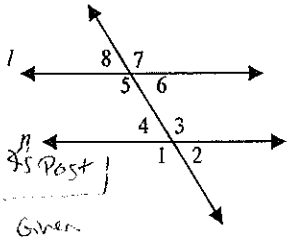
$l \parallel n$	Given
$\angle 3$ & $\angle 6$ are SSI $\angle$s	Defn. SSI $\angle$s
$\angle 3$ & $\angle 6$ are supplem.	SSI $\angle$s Thm
$m\angle 3 + m\angle 6 = 180$	Defn. supplem.

6. Given: $l \parallel n$
   Prove: $m\angle 2 + m\angle 7 = 180°$

$l \parallel n$	Given
$\angle 6$ & $\angle 7$ supplem.	LPP
$m\angle 6 + m\angle 7 = 180$	Defn. Supp.
$\angle 2 \cong \angle 6$	corresp. $\angle$s Post.
$m\angle 2 = m\angle 6$	Defn. $\cong$
$m\angle 2 + m\angle 7 = 180$	Substitution

3.4

7. Given: $m\angle 1 = 101°$, $m\angle 5 = 101°$
   Prove: $l \parallel n$



$m\angle 1 = 101$; $m\angle 5 = 101$	Given
$m\angle 1 = m\angle 5$	Substit.
$\angle 1 \cong \angle 5$	Defn. $\cong$
$l \parallel n$	Conv. of Corresp. $\angle$s Post!

8. Given: $m\angle 3 = 105°$, $m\angle 6 = 75°$
   Prove: $l \parallel n$

Use for #7 – #10

$m\angle 3 = 105$, $m\angle 6 = 75$	Given
$m\angle 3 + m\angle 6 = 105 + 75$	Add. POE
$m\angle 3 + m\angle 6 = 180$	Simplify
$\angle 3$ & $\angle 6$ are supple.	defn supp.
$l \parallel n$	Converse of SSI thm.

9. Given: $\angle 8 \cong \angle 2$
   Prove: $l \parallel n$

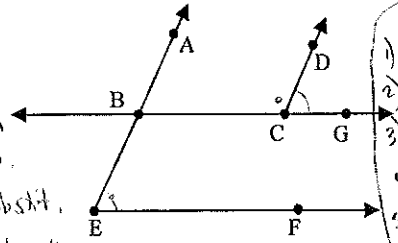
$\angle 8 \cong \angle 2$	Given
$l \parallel n$	Conv. of alt. ext $\angle$s Thm

10. Given: $\angle 7$ is supplementary to $\angle 2$
    Prove: $l \parallel n$

1) $\angle 7$ is supp to $\angle 2$	1) Given
2) $\angle 7$ supp. to $\angle 6$	2) LPP
3) $m\angle 7 + m\angle 2 = 180$	3) Defn. of supp.
$m\angle 7 + m\angle 6 = 180$	

---

11. Given: $m\angle BCD + m\angle BEF = 180°$, $\overline{AB} \parallel \overline{DC}$
    Prove: $\overline{BC} \parallel \overline{EF}$



1) $m\angle BCD + m\angle BEF = 180$, $\overline{AB} \parallel \overline{DC}$	1) Given
2) $\angle BCD$ and $\angle ABC$ supplem.	2) SSI $\angle$s Thm
3) $m\angle BCD + m\angle ABC = 180$	3) Defn. Supp.
4) $m\angle BCD + m\angle BEF = m\angle BCD + m\angle ABC$	4) Substit.
5) $m\angle BEF = m\angle ABC$	5) Subtraction
6) $\angle BEF \cong \angle ABC$	6) Defn. $\cong$
7) $\overline{BC} \parallel \overline{EF}$	7) Conv. of Corresp. $\angle$s Post.

12. Given: $\overline{BC} \parallel \overline{EF}$, $\angle BEF \cong \angle DCG$
    Prove: $\overline{AB} \parallel \overline{DC}$

1) $\overline{BC} \parallel \overline{EF}$	1) Given
2) $\angle ABC \cong \angle BEF$	2) Corresp. $\angle$s Post.
3) $\angle BEF \cong \angle DCG$	3) Given
4) $\angle ABC \cong \angle DCG$	4) Transitive
5) $\overline{AB} \parallel \overline{DC}$	5) Conv. of Corresp. $\angle$s Post.

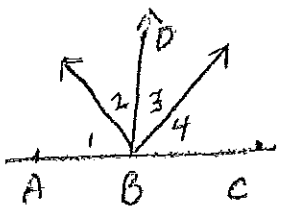
4) $m\angle 7 + m\angle 2 = m\angle 7 + m\angle 6$ — 4) Subst.
5) $m\angle 2 = m\angle 6$ — 5) Subtraction
6) $\angle 2 \cong \angle 6$ — 6) Defn. $\cong$
7) $l \parallel n$ — 7) Conv. of Corresp. $\angle$s Thm

Parallel Proofs Practice: Do these on a separate sheet of paper.

3.3 (1)

Given: $\overline{AC} \perp \overline{BD}$
$\angle 1 \cong \angle 4$

Prove: $\angle 2 \cong \angle 3$

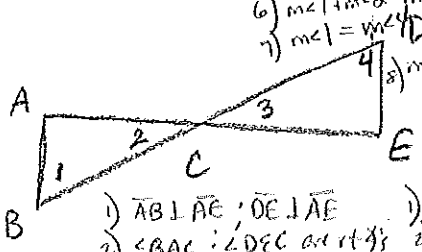


1) $\overline{AC} \perp \overline{BD}$; $\angle 1 \cong \angle 4$	1) Given
2) $\angle ABD$ & $\angle CBD$ are rt $\angle$s	2) Defn. $\perp$
3) $m\angle ABD = 90$, $m\angle CBD = 90$	3) Defn. rt. $\angle$
4) $m\angle 1 + m\angle 2 = m\angle ABD$, $m\angle 3 + m\angle 4 = m\angle CBD$	4) angle add. post.
5) $m\angle ABD = m\angle CBD$	5) Substit.
6) $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$	6) Substitution
7) $m\angle 1 = m\angle 4$	7) Defn. $\cong$
8) $m\angle 2 = m\angle 3$	8) Subtraction
9) $\angle 2 \cong \angle 3$	9) Defn. $\cong$

(2)

Given: $\overline{AB} \perp \overline{AE}$
$\overline{DE} \perp \overline{AE}$

Prove: $\angle 1 \cong \angle 4$

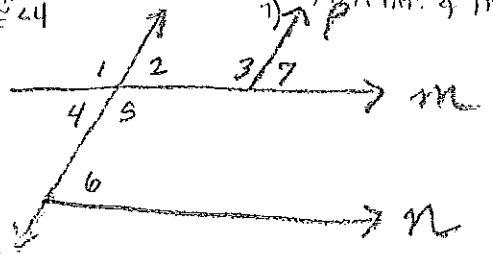


1) $\overline{AB} \perp \overline{AE}$; $\overline{DE} \perp \overline{AE}$	1) Given
2) $\angle BAC$ & $\angle DEC$ are rt $\angle$s	2) Defn. $\perp$
3) $m\angle BAC = 90$, $m\angle DEC = 90$	3) Defn. rt. $\angle$
4) $m\angle BAC = m\angle DEC$	4) Substitution
5) $\angle BAC \cong \angle DEC$	5) Defn. $\cong$
6) $\overline{AB} \parallel \overline{DE}$	6) Converse of AIA thm
7) $\angle 1 \cong \angle 4$	7) Alt. int. $\angle$ Thm.

3.4

(3) Given: $\angle 6$ & $\angle 3$ are supplem.
$l \parallel p$

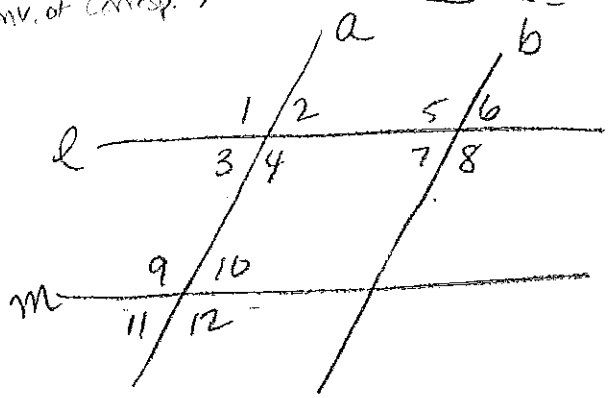
Prove: $m \parallel n$



1) $l \parallel p$	1) Given
2) $\angle 2$ & $\angle 3$ suppl.	2) SST $\angle$ Thm
3) $m\angle 2 + m\angle 3 = 180$	3) Defn. Supp.
4) $\angle 6$ & $\angle 3$ supp.	4) Given
5) $m\angle 6 + m\angle 3 = 180$	5) Defn Supp
6) $m\angle 2 + m\angle 3 = m\angle 6 + m\angle 3$	6) Substitution
7) $m\angle 2 = m\angle 6$	7) Subtraction
8) $\angle 2 \cong \angle 6$	8) Defn $\cong$
9) $m \parallel n$	9) Conv. of Corresp. $\angle$ Post.

Given: $\angle 8 \cong \angle 9$
$\angle 1 \cong \angle 12$

Prove: $a \parallel b$



1) $\angle 8 \cong \angle 9$, $\angle 1 \cong \angle 12$	1) Given
2) $\angle 12 \cong \angle 9$	2) VAT
3) $\angle 9 \cong \angle 8$	3) Symmetric
4) $\angle 1 \cong \angle 8$	4) Transitive
5) $a \parallel b$	5) Conv. of AIA ext. $\angle$ Thm

Name ANSWERS Period Date

Geometry 22: Even MORE Practice Chapter 3

1. **Match each term with its mathematical meaning.**

IV **A. transversal** — **I. two angles whose measures have a sum of 180°** E

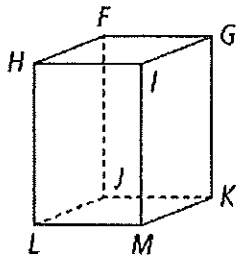
V **B. complementary angles** — **II. Two coplanar lines that never intersect** D

III **C. skew lines** — **III. Two non-coplanar lines that never intersect** C

II **D. parallel lines** — **IV. A line that intersects two or more coplanar lines at two distinct points** A

I **E. supplementary angles** — **V. two angles whose measures have a sum of 90°** B

2. **Identify the following in the diagram at the right.**



a. two lines that are parallel to plane FGI $\overleftrightarrow{LM}$ $\overleftrightarrow{JK}$

b. two lines that are parallel to $\overline{HL}$ $\overleftrightarrow{IM}$ $\overleftrightarrow{GK}$

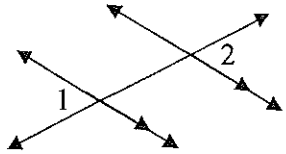
c. two lines that are skew to $\overline{FG}$ $\overleftrightarrow{HL}$ $\overleftrightarrow{MK}$

d. a pair of parallel planes plane HFG and plane LMK

e. the intersection of *plane LMK* and *plane IGK* $\overleftrightarrow{MK}$

3. **In the problems below, find the value of x.**

a. $m\angle 1 = (3x-17)°$, $m\angle 2 = (x+1)°$

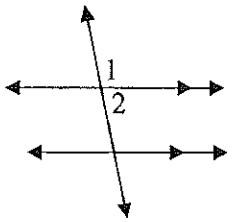


$3x-17 = x+1$

$2x = 18$

$x = 9$

b. $m\angle 1 = (95+7x)°$, $m\angle 2 = (55-x)°$



$95+7x+55-x = 180$

$150+6x = 180$

$6x = 30$

$x = 5$

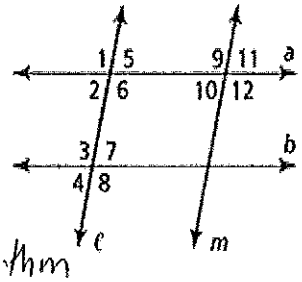
4. Use the given informatin to determine which lines, if any, are parallel. **Justify** each conclusion with a theorem or postulate.

a. $\angle 6$ is supplementary to $\angle 10$

$\ell \parallel m$, conv. of SSI & thm

b. $\angle 3 \cong \angle 8$

None (vert &)



c. $\angle 5$ is supplementary to $\angle 1$

None (alt. ext.)

d. $\angle 2 \cong \angle 7$

$a \parallel b$; conv. of alt. int. & thm

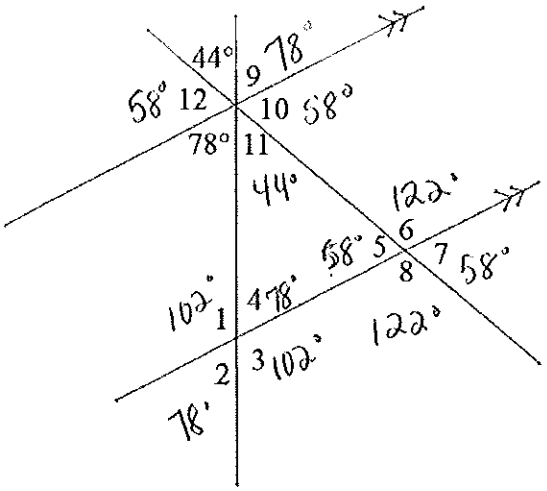
e. $\angle 4 \cong \angle 11$

none

f. $\angle 9 \cong \angle 1$

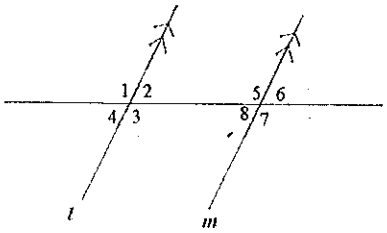
$\ell \parallel m$, conv. of corresp. & thm

5. **In the diagram below, find the missing angle measures.**



$m\angle 1 =$ 102°
$m\angle 2 =$ 78°
$m\angle 3 =$ 102°
$m\angle 4 =$ 78°
$m\angle 5 =$ 58°
$m\angle 6 =$ 122°
$m\angle 7 =$ 58°
$m\angle 8 =$ 122°
$m\angle 9 =$ 78°
$m\angle 10 =$ 58°
$m\angle 11 =$ 44°
$m\angle 12 =$ 58°

6. **Given that $l \parallel m$, find the value(s) of x and each angle. Be sure to check for extraneous solutions.**



a. $m\angle 3 = (x^2 + 112)°$ 161° ~~185°~~
$m\angle 8 = (16x + 131)°$ 19° ~~-13~~

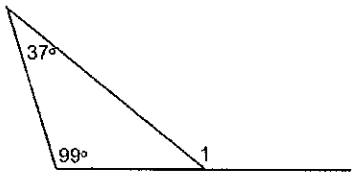
$x^2 + 112 + 16x + 131 = 180$
$x^2 + 16x + 243 = 180$
$x^2 + 16x + 63 = 0$
$(x + 7)(x + 9) = 0$
$x = -7, -9$

b. $m\angle 1 = (x^2 - 7x)°$ 8°
$m\angle 7 = (-x + 7)°$ 8°

$x^2 - 7x = -x + 7$
$x^2 - 6x - 7 = 0$
$(x + 1)(x - 7) = 0$
$x = -1, 7$

7. **Find the missing angle measure in the images below. Note: Drawings are NOT to scale.**

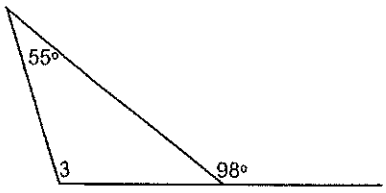
a.



$m\angle 1 = 99 + 37$

$136°$

b.



$55 + m\angle 3 = 98$

-55

$m\angle 3 = 43°$

8. In a triangle, $\angle 1$ is an exterior angle and $\angle 2$ and $\angle 3$ are its remote interior angles. Find the measures of $\angle 2$ and $\angle 3$, given that $m\angle 1 = 150$, $m\angle 2 = 2x + 3$, and $m\angle 3 = 5x + 7$. Sketch the image if necessary.

$150 = 2x + 3 + 5x + 7$

$150 = 7x + 10$

$140 = 7x$

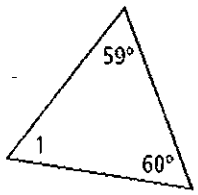
$x = 20$

$m\angle 2 = 43°$

$m\angle 3 = 107°$

9. **Find $m\angle 1$.**

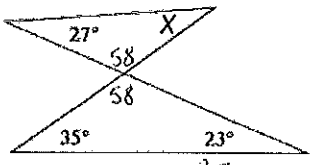
a.



$m\angle 1 + 119° = 180$

-119

$m\angle 1 = 61°$



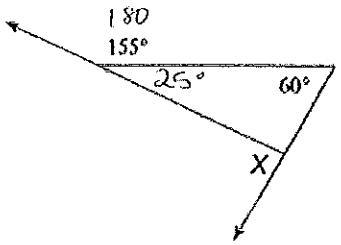
35

58

$85 + x = 180$

$x = 95°$

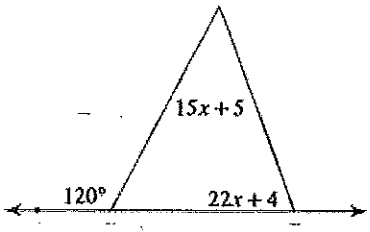
c.



$x = 85°$

10. **Find the value of each variable.**

a.



$120 = 15x + 5 + 22x + 4$

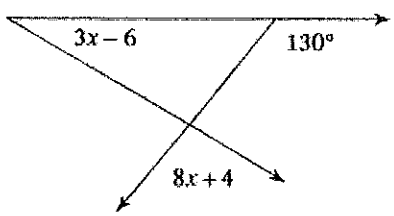
$120 = 37x + 9$

-9

$111 = 37x$

$x = 3$

b.



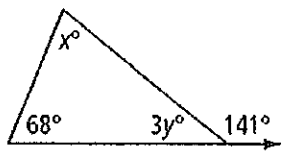
$130 = 3x - 6 + 8x + 4$

$130 = 11x - 2$

$132 = 11x$

$x = 12$

c.



$68 + x = 141$

-68

$x = 73$

$3y + 141 = 180$

-141

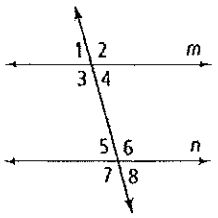
$3y = 39$

$y = 13$

8. Complete the following fill-in proofs.

a. Given: $m \parallel n$

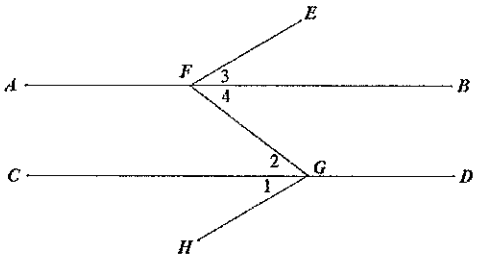
Prove: $m\angle 1 + m\angle 7 = 180°$



STATEMENTS	REASONS
1. $m \parallel n$	1. given
2. $\angle 1$ and $\angle 5$ are Corresponding Angles	2. defn. of corresp. $\angle$'s
3. $\angle 1 \cong \angle 5$	3. corresp. $\angle$ thm
4. $m\angle 1 = m\angle 5$	4. Defn. $\cong$
5. $\angle 5$ and $\angle 7$ are a linear pair	5. Defn. Lin. Pr.
6. $\angle 5$ and $\angle 7$ are supplem.	6. Linear Pair Postulate
7. $m\angle 5 + m\angle 7 = 180°$	7. Defn. supplem.
8. $m\angle 1 + m\angle 7 = 180$	8. Substitution

b. Given: $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$; $\angle 3 \cong \angle 1$

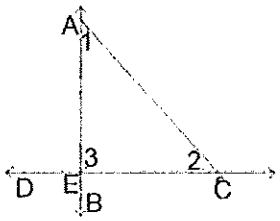
Prove: $\overleftrightarrow{EF} \parallel \overleftrightarrow{GH}$



STATEMENTS	REASONS
1. $\overline{AB} \parallel \overline{CD}$	1. Given
2. $\angle 4$ and $\angle 2$ are alternate interior angles	2. Defn. alt. int. $\angle$'s
3. $\angle 4 \cong \angle 2$	3. alt. int. $\angle$'s thm
4. $m\angle 4 = m\angle 2$	4. Definition of congruence
5. $\angle 3 \cong \angle 1$	5. given
6. $m\angle 3 = m\angle 1$	6. Defn. $\cong$
7. $m\angle EFG = m\angle 3 + m\angle 4$ $m\angle HGF = m\angle 1 + m\angle 2$	7. angle add. post.
8. $m\angle EFG = m\angle 1 + m\angle 2$	8. Substitution
9. $m\angle EFG = m\angle HGF$	9. substitution
10. $\angle EFG \cong \angle HGF$	10. Definition of congruence
11. $\angle EFG$ and $\angle HGF$ are alternate interior angles	11. Defn. alt. int. $\angle$'s
12. $\overline{EF} \parallel \overline{GH}$	12. Converse of alt. int $\angle$ thm

c. Given: $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$

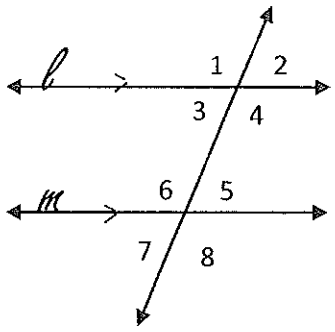
Prove: $\angle 1$ and $\angle 2$ are complementary angles



STATEMENTS	REASONS
1. $\overline{AB} \perp \overline{CD}$	1. Given
2. $\angle 3$ is a right angle	2. Defn. $\perp$
3. $m\angle 3 = 90°$	3. Definition of right angle
4. $m\angle 1 + m\angle 2 + m\angle 3 = 180°$	4. Triangle sum thm
5. $m\angle 1 + m\angle 2 + 90° = 180°$	5. Substitution
6. $m\angle 1 + m\angle 2 = 90$	6. Subtraction Property of Equality
7. $\angle 1$ and $\angle 2$ are complem.	7. Defn. complem.

Geometry 21 **PARALLEL PROOFS – beginning practice** Name ANSWERS per____ date____

Complete the following proofs:



1a) Given: $\ell \parallel m$

Prove: $\angle 1$ is supplementary to $\angle 5$

1) $\ell \parallel m$	1) Given
2) $\angle 1 \cong \angle 4$	2) V.A.T
3) 4 and $\angle 5$ suppl.	3) SSI & Thm
4) $m\angle 4 + m\angle 5 = 180$	4) Def. Supp.
5) $m\angle 1 = m\angle 4$	5) Def. $\cong$
6) $m\angle 1 + m\angle 5 = 180$	6) Substit.
7) $\angle 1$ & $\angle 5$ supp.	7) Def. supp.

Now prove the SAME proof a DIFFERENT way!

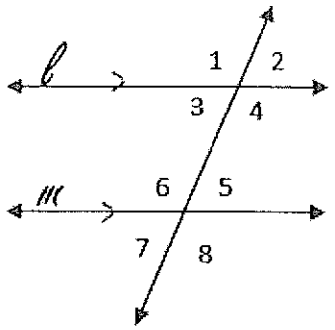
1b) Given: $\ell \parallel m$

Prove: $\angle 1$ is supplementary to $\angle 5$

1) $\ell \parallel m$	1) Given
2) $\angle 1 \cong \angle 6$	2) Corresp & thm
3) $m\angle 1 = m\angle 6$	3) Def. $\cong$
4) $\angle 6$ & $\angle 5$ supp	4) Lin Pr. Post.
5) $m\angle 6 + m\angle 5 = 180$	5) Def. supp.
6) $m\angle 1 + m\angle 5 = 180$	6) Substit.
7) $\angle 1$ & $\angle 5$ supp	7) Def. supp

2)Given: $\ell \parallel m$; m< 2 = 70°

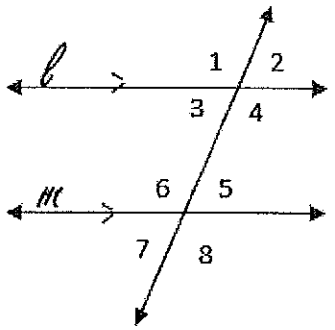
Prove: m< 8 = 110°



1) $\ell \parallel m$	1) Given
2) $\angle 2 \cong \angle 5$	2) Corresp. ∠ thm
3) $m\angle 2 = m\angle 5$	3) Def. ≅
4) $m\angle 2 = 70$	4) given
5) $m\angle 5 = 70$	5) Subst.
6) $\angle 5 \therefore \angle 8$ supp.	6) LPP
7) $m\angle 5 + m\angle 8 = 180$	7) Def. supp.
8) $70 + m\angle 8 = 180$	8) Substit.
9) $m\angle 8 = 110°$	9) subtraction

3)Given: $\ell \parallel m$; m< 8 = 3x + 12; m< 3 = 2x + 18°

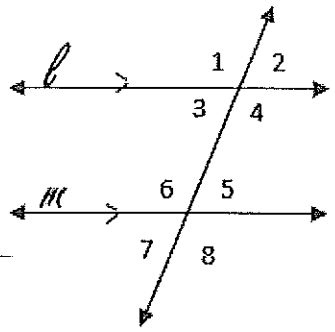
Prove: x = 30



1) $\ell \parallel m$	1) Given
2) $\angle 8 \cong \angle 6$	2) VAT
3) $m\angle 8 = m\angle 6$	3) Def. ≅
4) $\angle 3 \therefore \angle 6$ supp.	4) SSI ∠ thm
5) $m\angle 3 + m\angle 6 = 180$	5) Def. supp.
6) $m\angle 3 = 2x+18$, $m\angle 8 = 3x+12$	6) Given
7) $2x+18+3x+12 = 180$	7) Substit.
8) $5x + 30 = 180$	8) simplify
9) $5x = 150$	9) Subtract
10) $x = 30$	10) Divisn

4)Given: < 1 is supplementary to <7

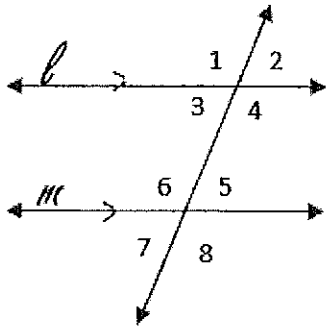
. rove: $\ell \parallel m$



S	R
1) $\angle 1$ supp $\angle 7$	1) Given
2) $\angle 6$ supp. $\angle 7$	2) $\angle$. P. P.
3) $\angle 1 \cong \angle 6$	3) $\cong$ supp. thm
4) $\ell \parallel m$	4) Conv. of Corresp $\angle$ thm

5)Given: m< 3 = 80° ; m< 8 = 100°

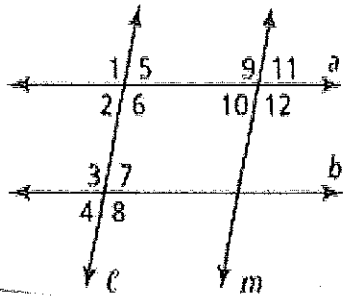
Prove: $\ell \parallel m$



S	R
1) $m\angle 3 = 80$ $m\angle 8 = 100$	1) Given
2) $80 + 100 = 180$	2) Math
3) $m\angle 3 + m\angle 8 = 180$	3) Substit.
4) $\angle 6 \cong \angle 8$	4) VAT
5) $m\angle 6 = m\angle 8$	5) Def. congr.
6) $m\angle 3 + m\angle 6 = 180$	6) Substit.
7) $\angle 3$ & $\angle 6$ supp.	7) Defn. supp.
8) $\ell \parallel m$	8) Conv. of SSI $\angle$ thm

6)Given: $\ell \parallel m$; m <12 = m< 8

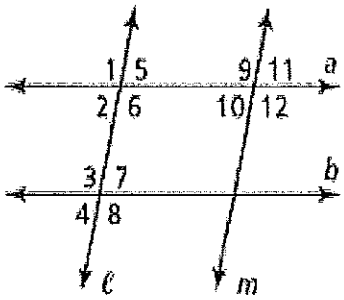
Prove: $a \parallel b$



S	R
1) $\ell \parallel m$; $m\angle 12 = m\angle 8$	1) Given
2) $\angle 12 \cong \angle 8$	2) Defn. $\cong$
3) $\angle 6 \cong \angle 12$	3) Corresp. $\angle$ thm
4) $\angle 6 \cong \angle 8$	4) transitive
5) $a \parallel b$	5) Conv. of corresp. $\angle$ thm

7)Given: $\ell \parallel m$; < 9 is supplementary to < 7

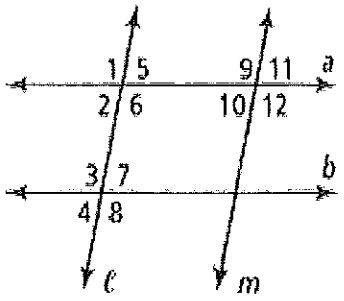
Prove: $a \parallel b$



S	R
1) $\ell \parallel m$; $\angle 9$ supp. $\angle 7$	1) Given
2) $\angle 9$ supp. $\angle 5$	2) SSI $\angle$ thm
3) $\angle 7 \cong \angle 5$	3) $\cong$ supp. thm
4) $a \parallel b$	4) conv. of corresp. $\angle$ thm

8)Given: $a \parallel b$; $\angle 9 \cong \angle 8$

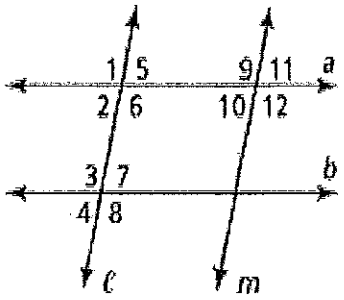
Prove: $\ell \parallel m$



S	R
1) $a \parallel b$; $\angle 9 \cong \angle 8$	1) Given
2) $\angle 1 \cong \angle 8$	2) alt. int. $\measuredangle$ thm
3) $\angle 1 \cong \angle 9$	3) transitive
4) $\ell \parallel m$	4) conv. of corresp. $\measuredangle$ thm

9)Given: $\ell \parallel m$; $\angle 11 \cong \angle 4$

Prove: $\angle 6$ is supplementary to $\angle 7$ (HINT: first prove $a \parallel b$)



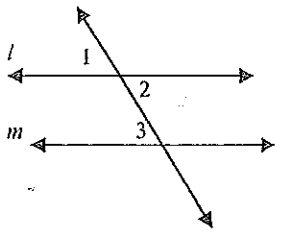
S	R
1) $\ell \parallel m$; $\angle 11 \cong \angle 14$	1) Given
2) $\angle 11 \cong \angle 5$	2) corresp. $\measuredangle$ thm
3) $\angle 5 \cong \angle 4$	3) transitive
4) $a \parallel b$	4) conv. of alt. ext. $\measuredangle$ thm
5) $\angle 6$ supp. $\angle 7$	5) SSI $\measuredangle$ thm

Parallel Lines Proof Worksheet

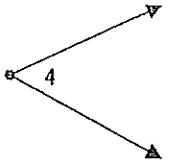
Name _____

Write a 2 column or flow proof on your own paper.

1. Given: $l \parallel m$; $\angle 2 \cong \angle 4$
   Prove: $\angle 4 \cong \angle 3$



2. Given: $l \parallel m$; $\angle 1 \cong \angle 4$
   Prove: $\angle 3 \cong \angle 4$



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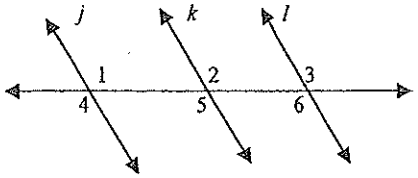
3. Given: $j \parallel k, k \parallel l$
   Prove: $\angle 1 \cong \angle 3$



4. Given: $j \parallel k, k \parallel l$
   Prove: $\angle 1 \cong \angle 6$

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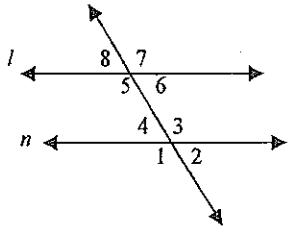
5. Given: $l \parallel n$
   Prove: $m\angle 3 + m\angle 6 = 180°$

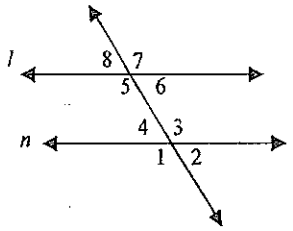


6. Given: $l \parallel n$
   Prove: $m\angle 2 + m\angle 7 = 180°$

3.4

---

7. Given: $m\angle 1 = 101°$, $m\angle 5 = 101°$
   Prove: $l \parallel n$



8. Given: $m\angle 3 = 105°$, $m\angle 6 = 75°$
   Prove: $l \parallel n$

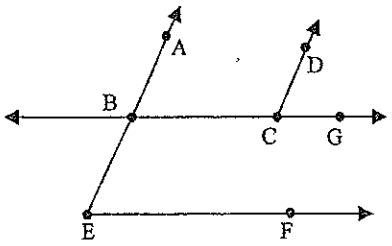
Use for #7 – #10

9. Given: $\angle 8 \cong \angle 2$
   Prove: $l \parallel n$

10. Given: $\angle 7$ is supplementary to $\angle 2$
    Prove: $l \parallel n$

---

11. Given: $m\angle BCD + m\angle BEF = 180°$, $\overline{AB} \parallel \overline{DC}$
    Prove: $\overline{BC} \parallel \overline{EF}$



12. Given: $\overline{BC} \parallel \overline{EF}$, $\angle BEF \cong \angle DCG$
    Prove: $\overline{AB} \parallel \overline{DC}$