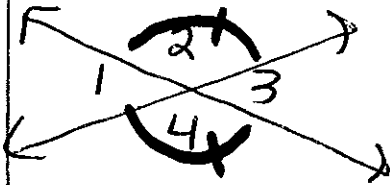


2-5 Proving Angles are Congruent  
Vertical Angles Theorem :

Thm  
2-1

If 2  $\angle$ 's are vertical, then they are  $\cong$ .



$$\angle 1 \cong \angle 3$$

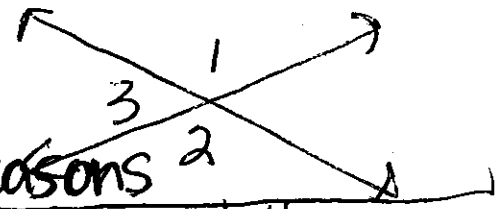
$$\boxed{\angle 2 \cong \angle 4}$$

In a proof of a theorem, a "Given" list shows you what you know from the hypothesis of the theorem.

There are paragraph proofs, flow-chart and 2-column proofs (T)

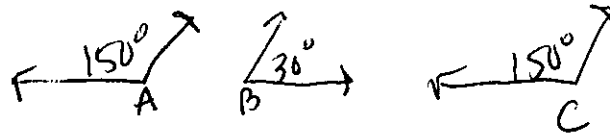
(ex) Given :  $\angle 1$  and  $\angle 2$  are vertical  $\angle$ 's.

Prove :  $\angle 1 \cong \angle 2$ .



Statements	Reasons
$m\angle 1 + m\angle 3 = 180$	Def. of suppl. $\angle$ 's
$m\angle 2 + m\angle 3 = 180$	Angle Addition Postulate
$m\angle 1 + m\angle 3 = m\angle 2 + m\angle 3$	" " "
$m\angle 1 = m\angle 2$	Substitution (transitive) Subtraction

$\therefore$  we proved vertical  $\angle$ 's are  $\cong$   
 $\uparrow$   
 therefore



Thm 2-2

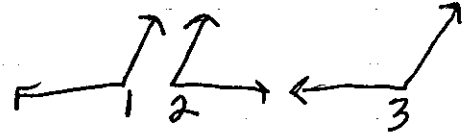
Congruent Supplements Theorem

If 2  $\angle$ 's are supplements of the same  $\angle$  (or of congruent angles), then the 2  $\angle$ 's are  $\cong$ .

ex

Given:  $\angle 1$  &  $\angle 2$  are supplementary  
 $\angle 3$  &  $\angle 2$  " " "

Prove:  $\angle 1 \cong \angle 3$



$$m\angle 1 + m\angle 2 = 180$$

$$m\angle 3 + m\angle 2 = 180$$

Def. supp.  $\angle$ 's

$$m\angle 1 + m\angle 2 = m\angle 3 + m\angle 2$$

$$m\angle 1 = m\angle 3$$

$$\angle 1 \cong \angle 3$$

Substitution  
 subtraction  
 property of congruence.

Thm 2-3

Congruent Complements Theorem

If 2  $\angle$ 's are complements of the same  $\angle$  (or of  $\cong \angle$ 's), then the 2  $\angle$ 's are  $\cong$ .

Thm 2-4

All right  $\angle$ 's are  $\cong$ .

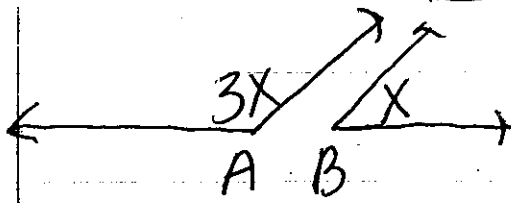
Thm 2-5

If 2  $\angle$ 's are  $\cong$  and supplementary then each is a right  $\angle$ .



Find the measure of each angle.

7.  $\angle A$  is three times as large as its supplement,  $\angle B$ .



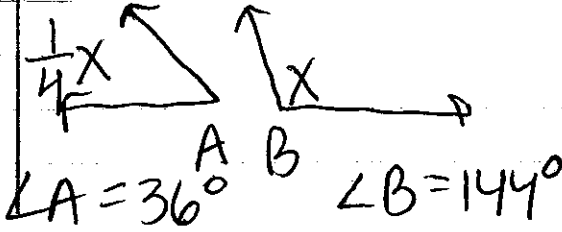
$$3x + x = 180^\circ$$

$$4x = 180^\circ$$

$$x = 45^\circ$$

$$\angle A = 3(45) = 135^\circ \quad \angle B = 45^\circ$$

8.  $\angle A$  is one fourth as large as its supplement,  $\angle B$ .



$$\frac{1}{4}x + x = 180^\circ$$

$$1\frac{1}{4}x = 180^\circ$$

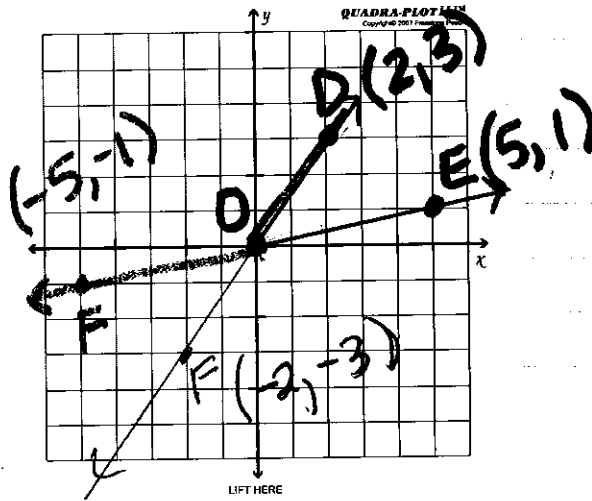
$$x = 144^\circ$$

$$\angle A = 36^\circ \quad \angle B = 144^\circ$$

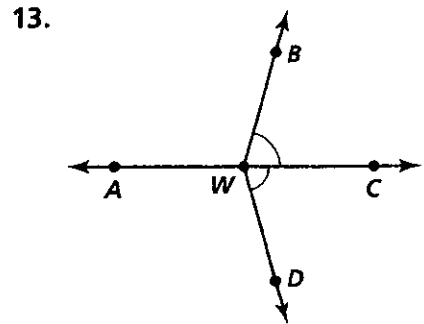
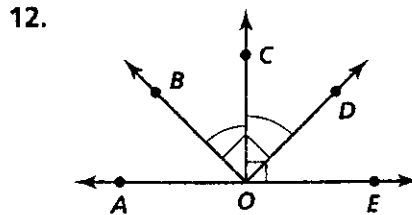
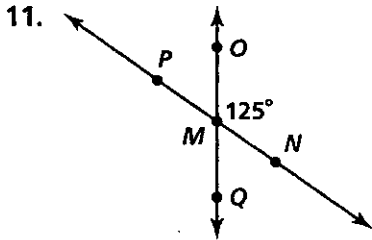
p. 113

#9

OF is an adjacent side and supplementary to  $\angle DOE$ .



Write three conclusions that can



p. 112-115

(1-8, 10, 12-17, 20, 21, 24, 26, 30, 32)