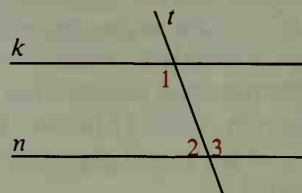


Theorem 3-6

If two lines are cut by a transversal and same-side interior angles are supplementary, then the lines are parallel.

Given: Transversal t cuts lines k and n ;
 $\angle 1$ is supplementary to $\angle 2$.

Prove: $k \parallel n$



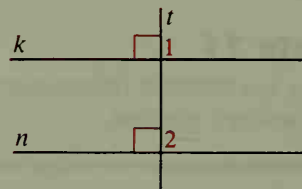
The proof is left as Exercise 22.

Theorem 3-7

In a plane two lines perpendicular to the same line are parallel.

Given: $k \perp t$; $n \perp t$

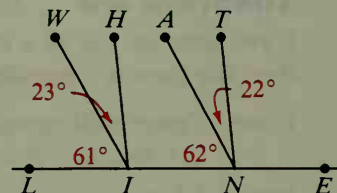
Prove: $k \parallel n$



The proof is left as Exercise 23.

Example 1 Which segments are parallel?

- Solution**
- (1) \overline{HI} and \overline{TN} are parallel since corresponding angles have the same measure:
 $m\angle HIL = 23 + 61 = 84$
 $m\angle TNI = 22 + 62 = 84$
 - (2) \overline{WI} and \overline{AN} are *not* parallel since $61 \neq 62$.



Example 2 Find the values of x and y that make $\overline{AC} \parallel \overline{DF}$ and $\overline{AE} \parallel \overline{BF}$.

Solution If $m\angle CBF = m\angle BFE$,
 then $\overline{AC} \parallel \overline{DF}$. (Why?)

$$3x + 20 = x + 50$$

$$2x = 30$$

$$x = 15$$

If $\angle AEF$ and $\angle F$ are supplementary,
 then $\overline{AE} \parallel \overline{BF}$. (Why?)

$$(2y - 5) + (x + 50) = 180$$

$$(2y - 5) + (15 + 50) = 180$$

$$2y = 120$$

$$y = 60$$

