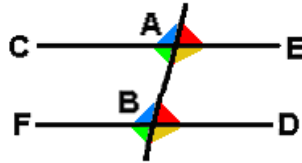


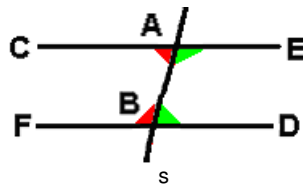
**Solution to Exercise 14.3.** In the drawings below, **D** and **E** lie on one side of the line **AB**, while **C** and **F** lie on the opposite side (all within some fixed plane); furthermore, points **X** and **Y** (not pictured) are such that  $X^*A^*B$  and  $Y^*B^*A$ . The related pairs of angles in these drawings have matching colors.

*Pairs of corresponding angles*



(The pairs are  $\angle CAX$  and  $\angle FBA$ ,  $\angle EAX$  and  $\angle DBA$ ,  $\angle CAB$  and  $\angle FBY$ ,  $\angle EAB$  and  $\angle DBY$ )

*Pairs of consecutive angles*



(The pairs are  $\angle CAB$  and  $\angle FBA$ ,  $\angle EAB$  and  $\angle DBA$ )

We shall prove that Equivalent Statement 14 in the hint is logically equivalent to the statement in the exercise. If the consecutive angles are supplementary, then  $X^*A^*B$  and  $Y^*B^*A$  together with the Supplement Postulate imply that

$$180 = |\angle CAB| + |\angle FBA| = |\angle CAB| + (180 - |\angle FBY|)$$

so that  $0 = |\angle CAB| - |\angle FBY|$  and hence  $|\angle CAB| = |\angle FBY|$ . Similarly,

$$180 = |\angle FBA| + |\angle CAB| = |\angle FBA| + (180 - |\angle CAX|)$$

and as in the preceding sentence  $0 = |\angle FBA| - |\angle EAX|$  so that we have  $|\angle FBA| = |\angle EAX|$ . If we replace **C** and **F** in these arguments by **E** and **D** respectively, we obtain the remaining to Corresponding Angle (Measure) equations  $|\angle XAE| = |\angle ABD|$  and  $|\angle EAB| = |\angle DBY|$ .

Conversely, suppose that Equivalent Statement 14 is known to be true. Then we have the following:

$$|\angle CAB| = |\angle FBY| = 180 - |\angle FBA|$$

$$|\angle EAB| = |\angle DBY| = 180 - |\angle DBA|$$

These imply that the angles in each pair of consecutive angles are supplementary. ■