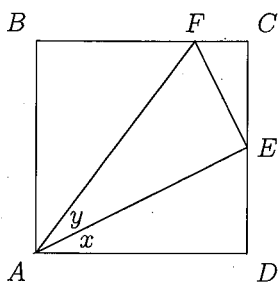


**MA183.**  $ABCD$  is a square of sides length 4,  $E$  is the midpoint of  $CD$ , and  $AE \perp EF$ , as shown. If  $x$  and  $y$  are the measures of  $\angle EAD$  and  $\angle FAE$  respectively, prove that  $x = y$ .



Originally question 5 from the 17th Blundon Mathematics Contest, 2000.

We received 17 solutions for this problem. We present the solution by the Missouri State University Problem Solving Group, which uses an auxiliary square.

Construct square  $CDHG$ , extend  $AE$  to  $AG$ , and let  $z$  denote the measure of  $\angle EGF$  as shown in the figure. Since  $AE = EG$ ,  $EF = EF$ , and  $\angle AEF$  and  $\angle FEG$  are both right angles,  $\triangle AEF \cong \triangle GEF$ . Therefore  $y = z$ . We also have  $x = z$  by alternating interior angles and the result follows.

