

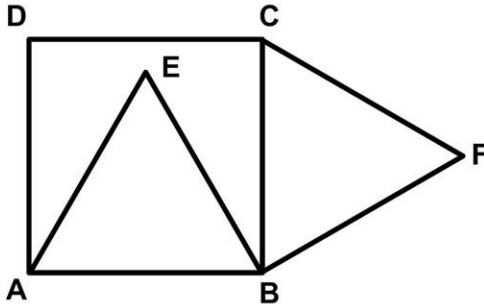
Line Work

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This is a fairly simple problem from Futility Closet,¹ which is currently under a hiatus.

Robert Bilinski proposed this problem in the April 2006 issue of *Crux Mathematicorum*. On square $ABCD$, two equilateral triangles are constructed, ABE internally and BCF externally, as shown. Prove that D , E , and F are collinear.



Solution

Because we have all the line segments equal in the figure, the derived angles are as shown in Figure 1. This means the angle between the red line segment and the blue line segment is 180° , that is, the two segments together form a straight line (through the points D , E , and F in the original figure).

(The Futility Closet solution is essentially the same, and so omitted.)

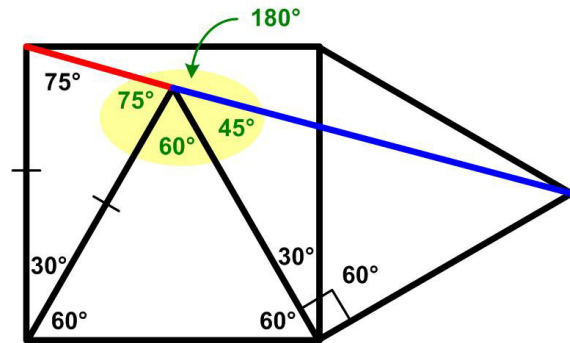


Figure 1

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¹ <https://www.futilitycloset.com/2022/03/26/line-work-2/>