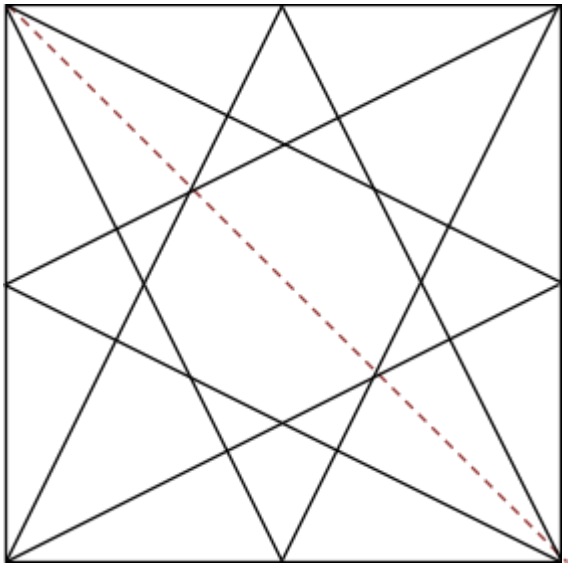
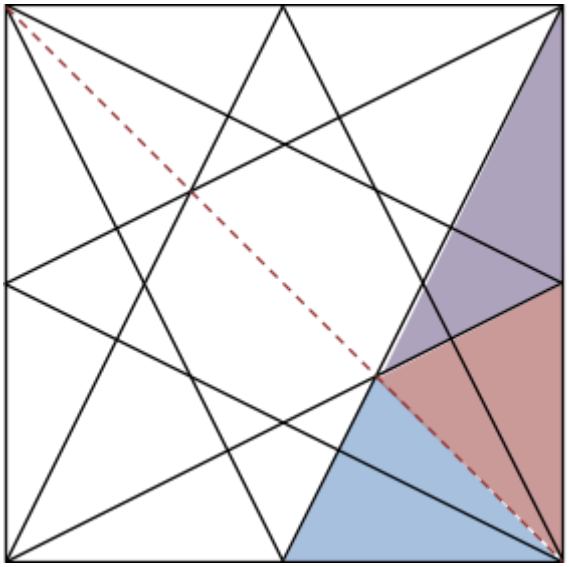
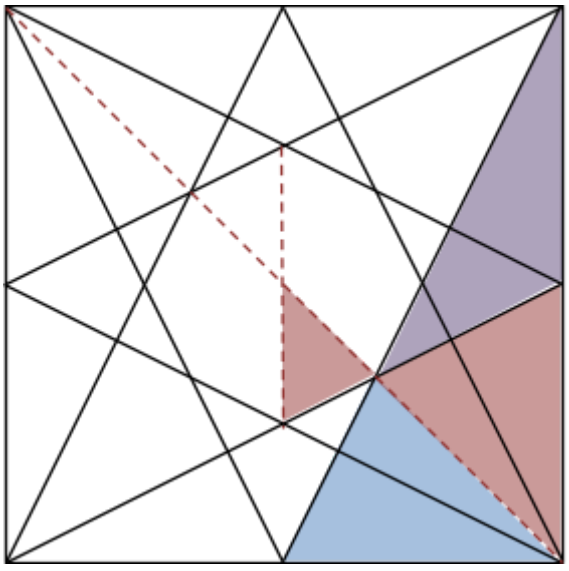


Alternate proof. Shorter, but uses more “advanced” concepts, such as proportion.

1. Draw diagonal



2. The three shaded triangles have total ¼ the area of the square. Each of the shaded triangles has the same area and is 1/12 of the area of the square.



3. Smaller (and similar) pink triangle has linear dimensions ½ the larger pink triangle (ratio 1:2), therefore, its area is ¼ of 1/12, or 1/48 of the square. (N.B. Odd critiques aside, there is nothing “really obscure” about fundamental mathematics.)

   Octagon is made up of 8 congruent smaller triangles, therefore, area of octagon is
   8 × 1/48 = 1/6 of the square.

   (Previous proof, using primary school concepts only.)