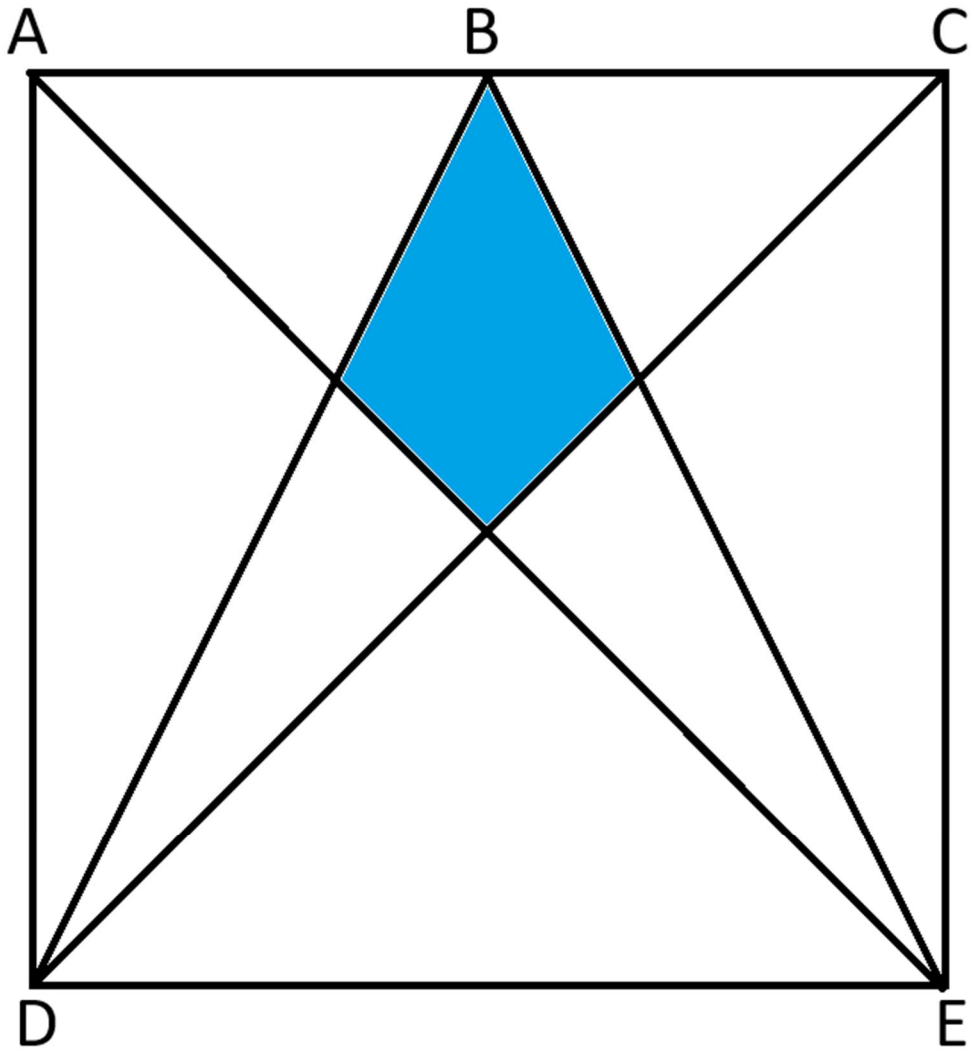
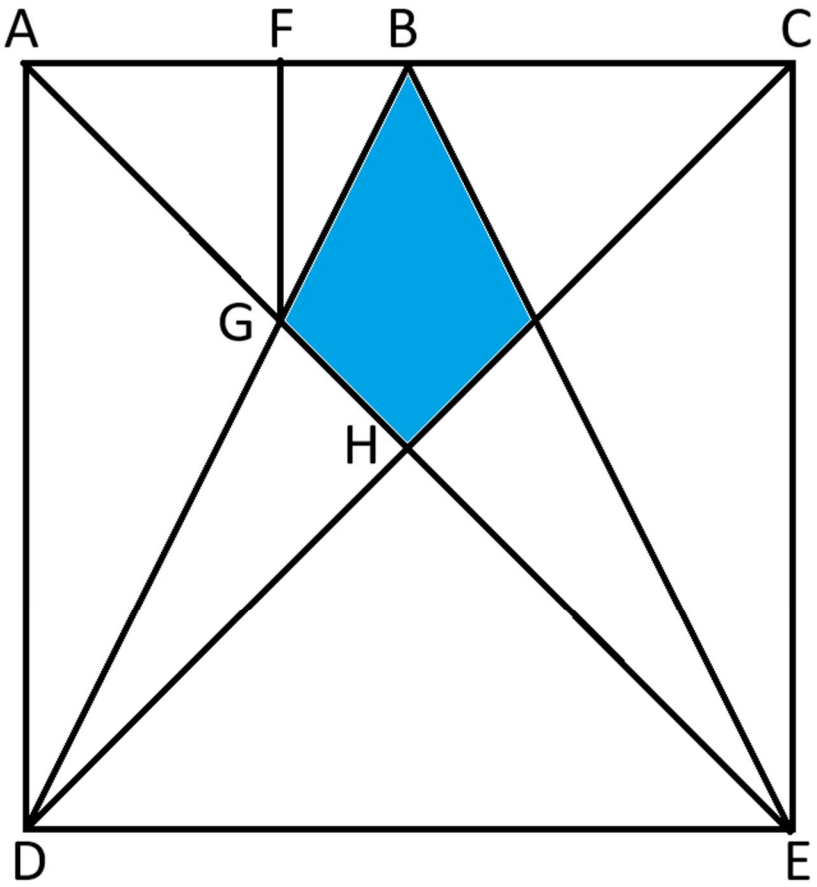
Question: In the following image, ACED is a square of side length 2. AB = BC. What is the area of the blue region?



Answer: 1/3

Solution: Consider the following additional points:



To find G, let's find the equations of lines AE and BD to find where they meet. Call that point (x,y).

AE: y = 2-x

BD: y = 2x

Solving for x:

2-x = 2x

3x = 2

x = 2/3

y = 2x = 2*(2/3) = 4/3

Let's solve for FG:

FG = 2 – y = 2 – 4/3 = 2/3

Next, find the area of triangle ABG:

ABG = (1/2)*base*height = (1/2)*1*(2/3) = 1/3

Triangle ACH = $(1/4)*2^2 = 1 = 2*ABG + Blue region$

We know ABG = 1/3 so:

Blue region = 1 – 2*ABG = 1 – 2*(1/3) = 1/3

Puzzle source: Nov/Dec 2024 issue of Mensa Bulletin (page 14)