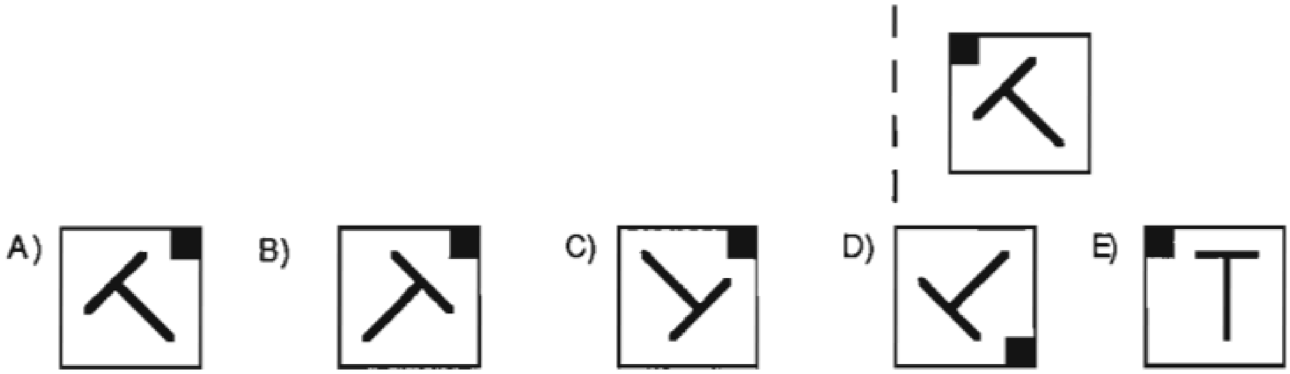
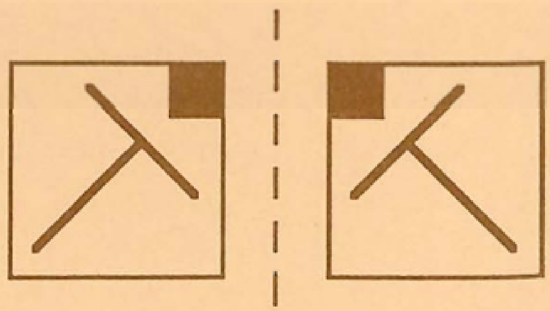
1989 Q11

11. Which of the five "T-like shapes" would be symmetric to the one shown with respect to the dashed line?



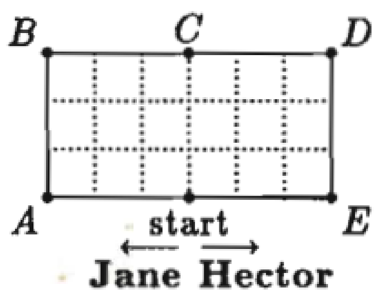
11. B Two figures are symmetric with respect to a line if the figures coincide when the paper is folded along that line.



2 / 8

1995 Q11

11. Jane can walk any distance in half the time it takes Hector to walk the same distance. They set off in opposite directions around the outside of the 18-block area as shown. When they meet for the first time, they will be closest to



(A) A (B) B (C) C

(D) D (E) E

11. **(D)** Jane covers twice as much distance as Hector in the same time. So Jane goes to A then B, as Hector goes to E. Jane continues to C then D as Hector goes to D.

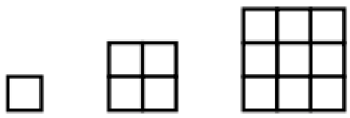
OR

Jane covers twice as much distance as Hector in the same time. When they meet, they will have covered 18 blocks. Since $12 + 6 = 18$ and 12 is twice 6, they must meet 6 blocks counterclockwise from the start, and this is point D.

3 / 8

2002 Q11

11. A sequence of squares is made of identical square tiles. The edge of each square is one tile length longer than the edge of the previous square. The first three squares are shown. How many more tiles does the seventh square require than the sixth?



(A) 11 **(B)** 12 **(C)** 13 **(D)** 14 **(E)** 15

11. **(C)** To build the second square from the first, add 3 tiles. To build the third from the second, add 5 tiles. The pattern of adding an odd number of tiles continues. For the fourth square, add 7; for the fifth, add 9; for the sixth, add 11 and for the seventh, add 13.

OR

The number of additional tiles needed is $7^2 - 6^2 = 49 - 36 = 13$.

OR

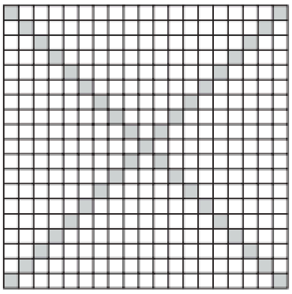
To build the second square from the first, add $2 + 1 = 3$ tiles. To build the third from the second, add $3 + 2 = 5$ tiles. The pattern continues and $7 + 6 = 13$.

2017 Q11

11. A square-shaped floor is covered with congruent square tiles. If the total number of tiles that lie on the two diagonals is 37, how many tiles cover the floor?

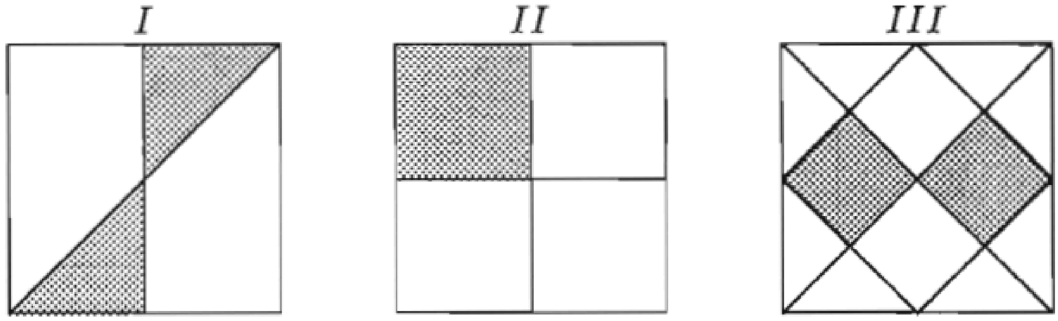
(A) 148 **(B)** 324 **(C)** 361 **(D)** 1296 **(E)** 1369

11. **Answer (C):** If the total number of tiles in the two diagonals is 37, there are 19 tiles in each diagonal (with one tile appearing in both diagonals). The number of tiles on a diagonal is equal to the number of tiles on a side. Therefore, the square floor is covered by $19 \times 19 = 361$ square tiles.



1994 Q12

12. Each of the three large squares shown below is the same size. Segments that intersect the sides of the squares intersect at the midpoints of the sides. How do the shaded areas of these squares compare?

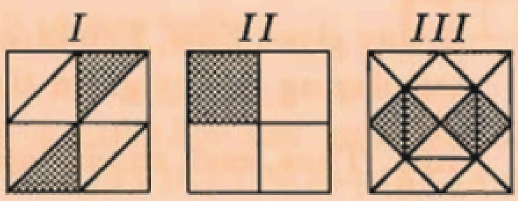


(A) The shaded areas in all three are equal.
(B) Only the shaded areas of I and II are equal.
(C) Only the shaded areas of I and III are equal.
(D) Only the shaded areas of II and III are equal.
(E) The shaded areas of I, II and III are all different.

12. **(A)** The shaded area of square II is clearly 1/4 of the total area. In square I each shaded triangle is 1/2 of 1/4 or 1/8 of the total area, so the total shaded area is $\frac{1}{8} + \frac{1}{8} = \frac{1}{4}$ of the total. In square III, each shaded diamond can be visualized as two triangles. Each of these triangles is 1/4 of 1/4 or 1/16 of the total area, so the four triangles make up 4/16 or 1/4 of the total. Thus the shaded areas in all three are equal.

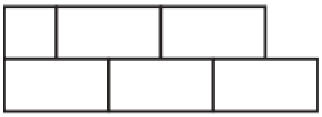
OR

Partition the squares to note that 2 of 8 congruent triangles are shaded in I, that 1 of 4 congruent small squares is shaded in II and that 4 of 16 congruent triangles are shaded in III.



2000 Q12

12. A block wall 100 feet long and 7 feet high will be constructed using blocks that are 1 foot high and either 2 feet long or 1 foot long (no blocks may be cut). The vertical joins in the blocks must be staggered as shown, and the wall must be even on the ends. What is the smallest number of blocks needed to build this wall?



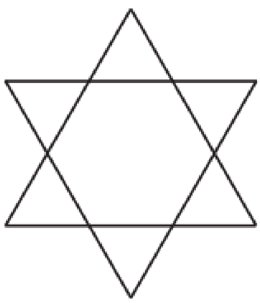
(A) 344 **(B)** 347 **(C)** 350 **(D)** 353 **(E)** 356

12. **Answer (D):** If the vertical joins were not staggered, the wall could be build with $\frac{1}{2}(100 \times 7) = 350$ of the two-foot blocks. To stagger the joins, we need only to replace, in every other row, one of the longer blocks by two shorter ones, placing one at each end. To minimize the number of blocks this should be done in rows 2, 4, and 6. This adds 3 blocks to the 350, making a total of 353.

7 / 8

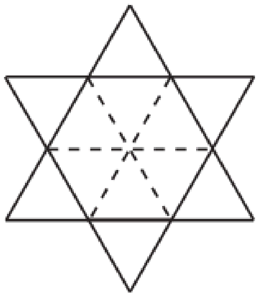
2007 Q12

12. A unit hexagram is composed of a regular hexagon of side length 1 and its 6 equilateral triangular extensions, as shown in the diagram. What is the ratio of the area of the extensions to the area of the original hexagon?



(A) 1:1 **(B)** 6:5 **(C)** 3:2 **(D)** 2:1 **(E)** 3:1

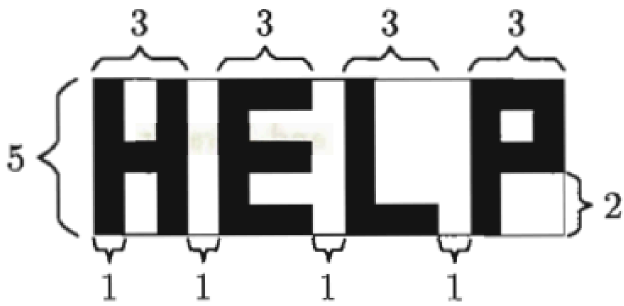
12. **(A)** Use diagonals to cut the hexagon into 6 congruent triangles. Because each exterior triangle is also equilateral and shares an edge with an internal triangle, each exterior triangle is congruent to each interior triangle. Therefore, the ratio of the area of the extensions to the area of the hexagon is 1:1.



8 / 8

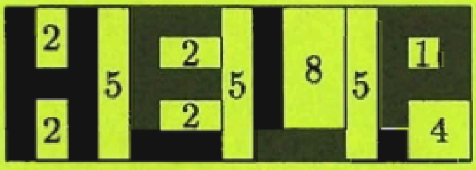
1993 Q13

13. The word "**HELP**" in block letters is painted in black with strokes 1 unit wide on a 5 by 15 rectangular white sign with dimensions as shown. The area of the white portion of the sign, in square units, is



(A) 30 **(B)** 32 **(C)** 34 **(D)** 36 **(E)** 38

13. **(D)** The white portion can be partitioned into rectangles as shown.



The sum of the areas of the white rectangles is $4(2) + 3(5) + 8 + 1 + 4 = 36$.

OR

Compute the area of the black letters and subtract it from $5 \times 15 = 75$, the total area of the sign:

H: $2(1 \times 5) + 1 \times 1 = 11$.
E: $1 \times 5 + 3(2 \times 1) = 11$.
L: $1 \times 5 + 1 \times 2 = 7$.
P: $1 \times 5 + 2(1 \times 1) + 1 \times 3 = 10$.

The area of the white portion is $75 - (11 + 11 + 7 + 10) = 36$.

OR

Superimpose a 1×1 grid on the sign and count the 36 white squares: