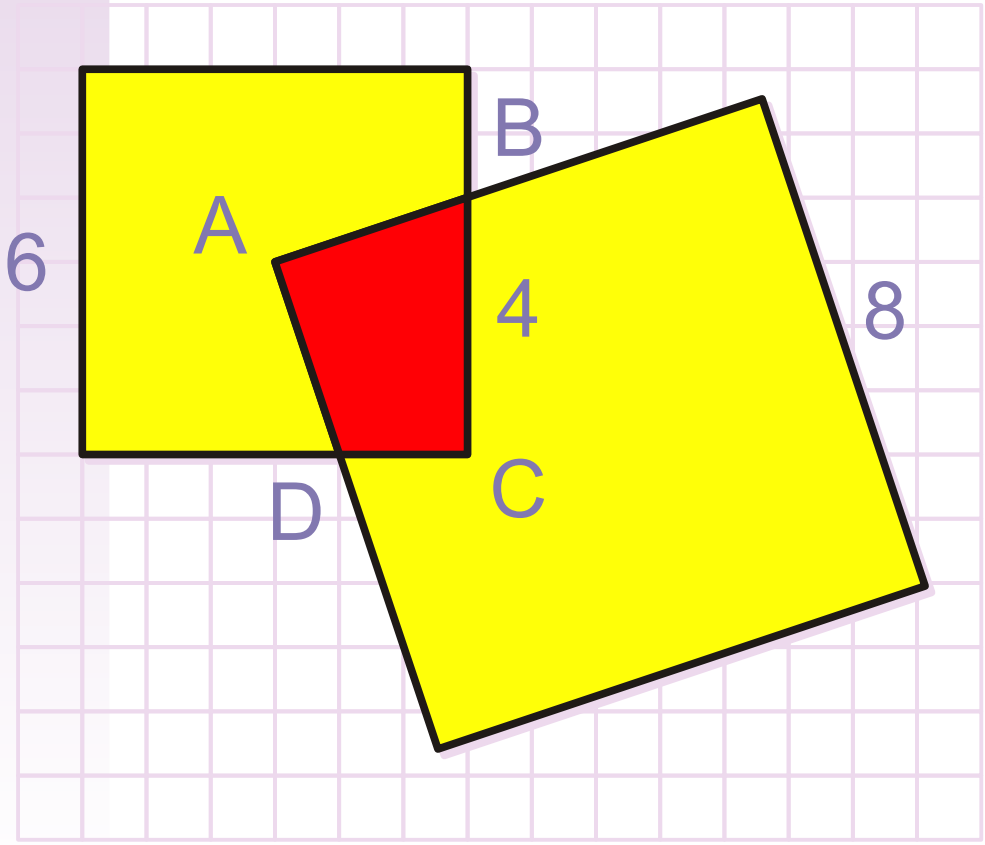
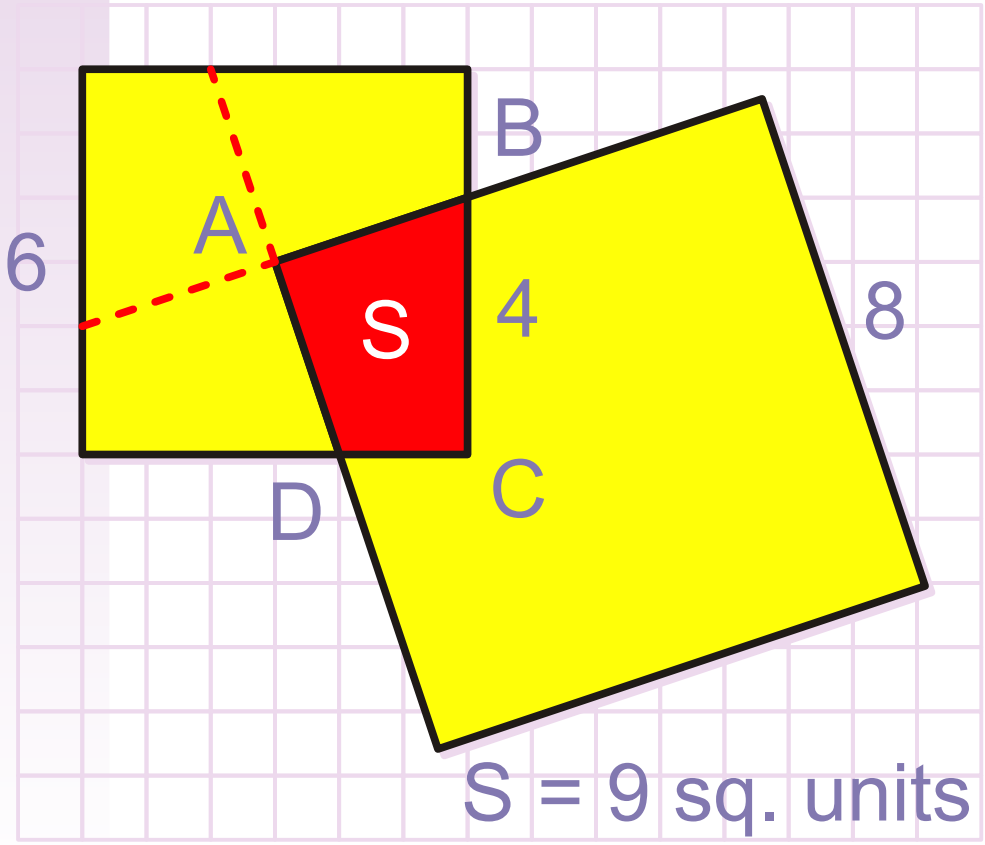


Square Intersection

after Martin Gardner

A square with side of eight units overlaps a square with side of six units in such a way that its corner A is placed exactly at the center of the small square. As the result of the overlapping the two sides of the large square intersect the two sides of the small square exactly at the points B and D as shown in the illustration. The BC line is 4 units long.

What is the area of overlap of the two squares, i.e. the area of the red quadrangle ABCD?



Square Intersection (solution)

To solve this puzzle just extend two sides of the large square as shown by the dotted lines in the illustration. This obviously divides the small square into four congruent parts. Since the small square has an area of 36 square units (6 x 6), the overlap (red quadrangle) must have an area of 36/4, or 9 square units. The amusing thing about the problem is that the area of overlap is constant regardless of the large square's position as it rotates around A. The fact that BC is 4 units long is actually irrelevant information.