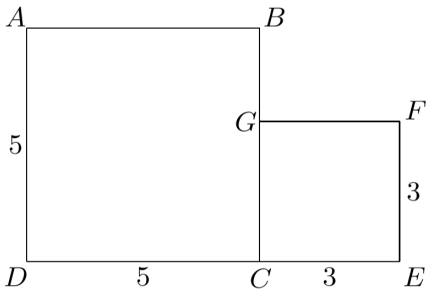
FSAP
Sum of Squares

Complete all work on a separate sheet of paper with exercises clearly labeled and all reasoning and work given.

1. A 5×5 square and a 3×3 square, as shown in the figure below, can be cut into pieces that can be arranged to form one larger square. You will build a model of this situation using graph paper and scissors.



   (a) If this larger square is constructed from all the pieces of the two smaller squares what must its area be? You don't need to actually construct this larger square to answer the question.

   (b) What is the side length of this larger square? Again you don't need to have constructed the large square yet.

   (c) Mark point P along segment $\overline{DC}$ so that it is 3 units away from D. How far away is point P from point E?

   (d) Draw segments $\overline{AP}$ and $\overline{PF}$. These segments cut the two smaller squares into 3 pieces. Use scissors to cut out the two squares joined along $\overline{GC}$ and cut this into three pieces along $\overline{AP}$ and $overline PF$. Rearrange the pieces to form the larger square. Draw a figure to demonstrate how to rearrange the pieces.

   (e) What must the length of $\overline{AP}$ be? What about PF?

2. Change the sizes of the two smaller squares to have side lengths 8 and 4.

   (a) Where should you mark the point P so that you can mimic the construction in the previous problem?

   (b) What are the lengths AP and PF?

3. Given two squares of any side length a and b, will the method outlined above always produce pieces that form a larger square? If you think yes, then explain how you know it will always work. If you think no, provide a counterexample – two specific squares that cannot be cut apart to form a new larger square.