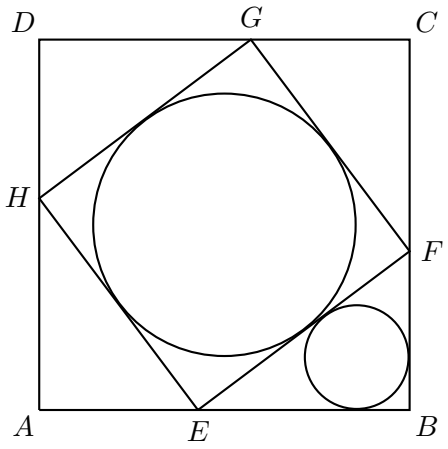
Math 460 – Problem Seminar
Weekly Problems #11, due by 3pm Mon 4/17/17

11.1 In the diagram below, the square $ABCD$ has side equal to 7 cm. The square $EFGH$ is inscribed in the square $ABCD$ in such a way that $AE = BF = CG = DH = 3$ cm.



(a) Find the area of square $EFGH$.

(b) Find the radius of the small circle (assumed to be inscribed in the triangle EBF).

(c) Assuming that the big circle is inscribed in the square $EFGH$, find the ratio of its area to that of the smaller circle.

11.2 If the length of a major diagonal of a rectangular box is 1, prove that the total surface area of the box is at most 2.

11.3 Prove that the surface area in problem **11.2** is exactly 2 if and only if the rectangular box is a cube.