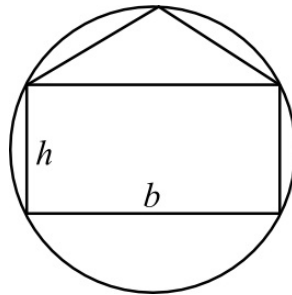




PUTNAM EXAM SEMINAR
FALL 2013

QUIZ 4
OCTOBER 9

Exercise 1. Inscribe a rectangle of base b and height h and an isosceles triangle of base b in a circle of radius 1 as shown. For what value of h do the rectangle and triangle have the same area?



[Putnam 1986, B1]

Exercise 2. A right circular cone has base of radius 1 and height 3. A cube is inscribed in the cone so that one face of the cube is contained in the base of the cone. What is the side-length of the cube? [Putnam 1998, A1]

Exercise 3. Let s be any arc of the unit circle lying entirely in the first quadrant. Let A be the area of the region lying below s and above the x -axis and let B be the area of the region lying to the right of the y -axis and to the left of s . Prove that $A + B$ depends only on the arc length, and not on the position, of s . [Putnam 1998, A2]