

# UNDERGRADUATE PROBLEM SOLVING CONTEST

## PROBLEM 4

DUE MARCH 5, 2012

Consider the triangle  $P_1P_2P_3$  and point  $P$  within the triangle. The lines  $P_1P$ ,  $P_2P$ , and  $P_3P$  intersect the opposite sides in points  $Q_1$ ,  $Q_2$ , and  $Q_3$ , respectively. Prove that, of the numbers

$$\frac{P_1P}{PQ_1}, \frac{P_2P}{PQ_2}, \frac{P_3P}{PQ_3},$$

at least one is  $\leq 2$  and at least one is  $\geq 2$ .

In the spirit of UPSC, you should not use the internet or look up the solution in a book. Please include your name, student ID number and email address on your solution.