Random Ratio

Question: p and q are two points chosen at random between 0 and 1. What is the probability that the ratio p/q lies between 1 and 2?

Solution: Let $X, Y \sim \text{Unif}(0, 1)$. Then $P(1 <= X/Y <= 2) = \int_{1<=x/y<=2} 1 dx dy = 1/4$.