Stick to Triangle

Question: A stick is broken into 3 parts, by choosing 2 points randomly along its length. With what probability can it form a triangle?

Solution: Let $X, Y \sim \text{Unif}(0, 1)$. Then the length of three sides are: $\min(X, Y)$, $\max(X, Y) - \min(X, Y)$, $1 - \max(X, Y)$.

To form a triangle, $\max > 1/2$, $\max - \min < 1/2$, $\min < 1/2$. Note $\max - \min = |X - Y|$.

Thus, $P = 1/4$.