

Answer on Question 37427 – Math – Statistics and Probability

We will need the following formula

$$P(B_i|A) = \frac{P(B_i)P(A|B_i)}{\sum_{k=1}^n P(B_k)P(A|B_k)} \quad (*)$$

This formula is a special case of the well-known Bayes' Theorem.

Let the events be as followed:

B_1 : We choose the first urn;

B_2 : We choose the second urn;

A : We found the gold coin.

We are searching for $P(B_2|A)$.

In our problem,

$$P(B_1) = P(B_2) = \frac{1}{2},$$

$$P(A|B_1) = \frac{1}{2},$$

$$P(A|B_2) = 1$$

Using (*), we get

$$P(B_2|A) = \frac{P(B_2)P(A|B_2)}{P(B_1)P(A|B_1) + P(B_2)P(A|B_2)} = \frac{\frac{1}{2} * 1}{\frac{1}{2} * \frac{1}{2} + \frac{1}{2} * 1} = \frac{2}{3}.$$

Answer: 2/3.