

- Coin A is flipped three times and coin B is flipped four times. What is the probability that the number of heads obtained from flipping the two fair coins is the same?

(A) $\frac{19}{128}$

(B) $\frac{23}{128}$

(C) $\frac{1}{4}$

(D) $\frac{35}{128}$

(E) $\frac{1}{2}$

2004 AMC 10 A, Problem #10—

“Compute the probability that both have 0, 1, 2, and 3 heads.”

- **Solution (D)** The result will occur when both A and B have either 0, 1, 2, or 3 heads, and these probabilities are shown in the table.

Heads	0	1	2	3
A	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{8}$
B	$\frac{1}{16}$	$\frac{4}{16}$	$\frac{6}{16}$	$\frac{4}{16}$

The probability of both coins having the same number of heads is

$$\frac{1}{8} \cdot \frac{1}{16} + \frac{3}{8} \cdot \frac{4}{16} + \frac{3}{8} \cdot \frac{6}{16} + \frac{1}{8} \cdot \frac{4}{16} = \frac{35}{128}.$$

Difficulty: Hard

NCTM Standard: Data Analysis and Probability Standard: Understand and apply basic concepts of probability

Mathworld.com Classification:

Probability and Statistics > Probability > Coin Tossing