

Four coins are tossed together. Find the probability that at least 3 are tails.

Solution:

The number of combinations of getting k tails in n coins is:

$$C_n^k = \frac{n!}{k! * (n - k)!}$$

The number of combinations of getting 4 tails in 4 coins is:

$$C_4^4 = \frac{4!}{4! * 0!} = 1$$

The number of combinations of getting 3 tails in 4 coins is:

$$C_4^3 = \frac{4!}{3! * (4 - 3)!} = 4$$

Hence the number of combinations of getting at least 3 tails in 4 coins is:

$$n_A = C_4^4 + C_4^3 = 1 + 4 = 5$$

The total number of outcomes if four coins are tossed is:

$$n = 2^4 = 16$$

Hence the probability that at least 3 are tails is:

$$P(A) = \frac{n_A}{n} = \frac{5}{16}$$

Answer: $\frac{5}{16}$