Problem 5

You toss three fair coins. What is the probability that at least two show heads? Also, what is the probability that at least two show heads, given that the number of heads showing is even?

Solution

Let E be the experiment of tossing three fair coins. The sample space for E is Ω = {TTT, TTH, THT, THH, HTT, HTH, HHT, HHH}.
Let Event A: {At least two heads}
or $A = \{THH, HTH, HHT, HHH\}$

$\implies P(A) = \frac{4}{8}$

Let Event B: {Even # of heads}
or $B = \{TTT, THH, HTH, HHT\}$

$\implies P(B) = \frac{4}{8}$

$P(A|B) = \frac{P(A \cap B)}{P(B)}$
$A \cap B = \{THH, HTH, HHT\}$

$P(A|B) = \frac{\frac{3}{8}}{\frac{4}{8}} = \frac{3}{4}$
