Cambridge International AS & A Level

---

https://babacambridgesolutions.com

Mathematics 9709/52

Paper 5 Probability & Statistics 1 **October/November 2025**

Question No (1)

1 A coin is biased so that the probability of obtaining a head when it is thrown is 0.4. The coin is thrown repeatedly until the first head is obtained.

(a) Find the probability that the first head is obtained on the 5th throw.

(b) Find the probability that the first head is obtained after the 6th throw.

Solution:

(a)

It's about the geometric distribution

By given condition

$P(H) = 0.4$

$P(T) = 1 - 0.4$ ∴ 1 is total probability

$= 0.6$

(First head occurs on the 5th throw means First 4 Throws must be tail and 5th Throw must be head)

$P(\text{first head on 5th}) = q^4 p$

$= (0.6)^4\ 0.4$

$= 0.05184$

(b)

$P(H) = 0.4$

$P(T) = 1 - 0.4$

$P(T) = 0.6$

$P(\text{First head after 6th Throw}) = 1 - (p + pq + pq^2 + pq^3 + pq^4 + pq^5)$

$$= 1 - (0.4 + (0.4)(0.6) + (0.4)(0.6)^2 + (0.4)(0.6)^3 + (0.4)(0.6)^4 + (0.4)(0.6)^5)$$

$$= 0.0467$$