

Assignment 12

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Download all python codes from

[https://github.com/tejasri3657/Assignment-12/blob/main/Assignment_12\(1\).py](https://github.com/tejasri3657/Assignment-12/blob/main/Assignment_12(1).py)

and latex-tikz codes from

<https://github.com/tejasri3657/Assignment-12/new/main>

1) We need to find $P = (E1 | F1)$:

$$P(E1) = \frac{1}{4}, P(F1) = \frac{3}{4} \quad (2.0.2)$$

$$P(E1 \cap F1) = \frac{1}{4} \quad (2.0.3)$$

$$\therefore P(E1|F2) = \frac{1}{3} \quad (2.0.4)$$

2) We need to find $P = (E2 | F2)$:

$$P(E2) = \frac{1}{4}, P(F2) = \frac{1}{2} \quad (2.0.5)$$

$$P(E2 \cap F2) = \frac{1}{4} \quad (2.0.6)$$

$$\therefore P(E2|F2) = \frac{1}{2} \quad (2.0.7)$$

1 QUESTION No. 2.5

A couple has two children,

- 1) Find the probability that both children are male, if it is known that at least one of the children is male.
- 2) Find the probability that both children are female, if it is known that at least one of the children is female.

2 SOLUTION

Lemma 2.1. If A and B are two events in a sample space S , then the Conditional Probability of A given B is defined as $P(A | B) = \frac{P(A \cap B)}{P(B)}$

From the given information we have,

Events	Description
$E1$	Both children are male
$F1$	At least one child is male
$E2$	Both children are female
$F2$	At least one child is female
$(E1 \cap F1)$	Both children are male and at least one child is male
$(E1 \cap F2)$	Both children are female and at least one child is female

Let boy be denoted by B and girl be denoted by G respectively.

$$S = \{BB, BG, GB, GG\} \quad (2.0.1)$$