

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 $P = (E_1 | F_1)$:

$$P(E_1) = \frac{1}{4}, P(F_1) = \frac{3}{4} \quad (2.0.2)$$

$$P(E_1 \cap F_1) = \frac{1}{4} \quad (2.0.3)$$

$$\therefore P(E_1|F_1) = \frac{1}{3} \quad (2.0.4)$$

2) We need to find $P = (E_2 | F_2)$:

$$P(E_2) = \frac{1}{4}, P(F_2) = \frac{1}{2} \quad (2.0.5)$$

$$P(E_2 \cap F_2) = \frac{1}{4} \quad (2.0.6)$$

$$\therefore P(E_2|F_2) = \frac{1}{2} \quad (2.0.7)$$

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
E_1	Both children are male
F_1	At least one child is male
E_2	Both children are female
F_2	At least one child is female
$(E_1 \cap F_1)$	Both children are male and at least one child is male
$(E_2 \cap F_2)$	Both children are female and at least one child is female

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

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