1 Test (probability)

1.1 Example

The data file is stored in different values X_i and frequencies n_i. The result is in the table

X_i	2	5	6	8	9
n_i	14	28	15	11	32

Compute the average.

Result: 6.34

1.2 Example

Determine mode $\hat{x}$ and median $\tilde{x}$ of the data

$$x = [1, 3, 1, 2, 1, 1, 2, 3, 3, 2, 3, 1, 2, 1, 3]$$

Result: mode is 1; median is 2

1.3 Example

Write set of results of the experiment "throwing a dice".

Result: $\{1, 2, 3, 4, 5, 6\}$

1.4 Example

Random variable X has distribution function

$$F(x) = \frac{1}{3}x$$

for $x \in (0, 3)$. It is zero for $x \leq 0$ and one for $x \geq 3$. Determine its density function $f(x)$.

Result: $f(x) = \frac{1}{3}$ on $x \in (0, 3)$, zero elsewhere.

1.5 Example

Probability function of X is given by the table

x	1	2	3
$f(x)$	$2k$	$5k$	$3k$

Determine the constant k.

Result: $k = 0.1$

1.6 Example

Random variable X has density function

$$f(x) = \frac{1}{5}, \text{ for } x \in (0, 5)$$

and zero otherwise. Compute its expectation.

Result: $E = 2.5$

1.7 Example

Random vector $[X, Y]$ has joint probability function given by the table

$x \backslash y$	1	2
1	0.2	0.1
2	0.4	0.3

Determine the marginal $f(y)$.

Result: $[0.6,\ 0,4]$

1.8 Example

Write probability function of the binomial distribution of random variable X with parameters p and n.

For $p = 0.3$ and $n = 5$ determine $f(2)$.

Result: $\binom{n}{x} p^x (1-p)^{n-x}$, $x = 0, 1, 2, \cdots, n$; $\quad f(2) = 0.3087$.