SOLUTIONS

201-922-DW (Introduction to Statistical Methods)

# Quiz 1 – Probability Distributions

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Consider the random variable, x, described by the sum of the faces observed when 2 fair dice are rolled once.

a. Tabulate the probability distribution of X

b. Find μ

THERE ARE 36 possible observations:

(die 1, die 2):

| | | | | | |
|---|---|---|---|---|---|
| (1,1) | (2,1) | (3,1) | (4,1) | (5,1) | (6,1) |
| (1,2) | (2,2) | (3,2) | (4,2) | (5,2) | (6,2) |
| (1,3) | (2,3) | (3,3) | (4,3) | (5,3) | (6,3) |
| (1,4) | (2,4) | (3,4) | (4,4) | (5,4) | (6,4) |
| (1,5) | (2,5) | (3,5) | (4,5) | (5,5) | (6,5) |
| (1,6) | (2,6) | (3,6) | (4,6) | (5,6) | (6,6) |

THERE ARE 11 possible values of x

| X | P(X=x) |
|---|---|
| 2 | 1/36 |
| 3 | 2/36 |
| 4 | 3/36 |
| 5 | 4/36 |
| 6 | 5/36 |
| 7 | 6/36 |
| 8 | 5/36 |
| 9 | 4/36 |
| 10 | 3/36 |
| 11 | 2/36 |
| 12 | 1/36 |

b. we will compute $x \cdot P(x)$ for each value of X

| X | $x \cdot P(X=x)$ |
|---|---|
| 2 | 2/36 |
| 3 | 6/36 |
| 4 | 12/36 |
| 5 | 20/36 |
| 6 | 30/36 |
| 7 | 42/36 |
| 8 | 40/36 |
| 9 | 36/36 |
| 10 | 30/36 |
| 11 | 22/36 |
| 12 | 12/36 |

$$\mu = \sum x\,P(x)$$

$$= \frac{[2+6+12+20+30+42+40+36+30+22+12]}{36}$$

$$= \frac{252}{36}$$

$$= \boxed{7}$$