# PROBABILITY

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**13.4.12** [1]Two numbers are selected at random (without replacement) from the first six positive integers. Let X denote the larger of the two numbers obtained. Find E(X).

**Solution:**

**13.5.12** Two numbers are selected at random (without replacement) from the first six positive integers in ${}^6P_2$ =30 ways.
$\vec{X}$ denote the larger of the two numbers obtained.
$X = \{2, 3, 4, 5, 6\}$

**13.6.12**

$$X = 2, \implies \frac{{}^1C_1 \times 2}{{}^6P_2} = \frac{1}{15} \tag{13.6.12.1}$$

$$X = 3, \implies \frac{{}^2C_1 \times 2}{{}^6P_2} = \frac{2}{15} \tag{13.6.12.2}$$

$$X = 4, \implies \frac{{}^3C_1 \times 2}{{}^6P_2} = \frac{3}{15} \tag{13.6.12.3}$$

$$X = 5, \implies \frac{{}^4C_1 \times 2}{{}^6P_2} = \frac{4}{15} \tag{13.6.12.4}$$

$$X = 6, \implies \frac{{}^5C_1 \times 2}{{}^6P_2} = \frac{1}{3} \tag{13.6.12.5}$$

**13.7.12** Probability distribution as follows:

| **Probability** | **Value** |
|---|---|
| **P(2)** | 1/15 |
| **P(3)** | 2/15 |
| **P(4)** | 3/15 |
| **P(5)** | 4/15 |
| **P(6)** | 1/3 |

Table 2: Probability distribution

[1]Read question numbers as (CHAPTER NUMBER).(EXERCISE NUMBER).(QUESTION NUMBER)

**13.8.12**

$$E(X) = 2 \times \frac{1}{15} + 3 \times \frac{2}{15} + 4 \times \frac{3}{15} + 5 \times \frac{4}{15} + 6 \times \frac{1}{3} \tag{13.8.12.1}$$

$$E(X) = \frac{2}{15} + \frac{2}{5} + \frac{4}{5} + \frac{4}{3} + \frac{2}{1} \tag{13.8.12.2}$$

$$E(X) = \frac{70}{15} \tag{13.8.12.3}$$

$$E(X) = \frac{14}{3} \tag{13.8.12.4}$$