

Answer on Question #53389 – Math – Statistics and Probability

A class has 10 boys and 5 girls. Three students are selected at random one after another. Find the probability that

(i) the first two are boys and the third is girl;

(ii) first and third are of the same sex and the second is of opposite sex.

Solution

If a class has 10 boys and 5 girls, and three students are selected at random one after another then

(i) the probability, that the first two are boys and third is girl, is

$$p = \frac{10}{15} \cdot \frac{9}{14} \cdot \frac{5}{13} = \frac{30}{182} = \frac{15}{91} \approx 0.165 ;$$

(ii) the probability, that the first and the third are of the same sex and the second is of opposite sex,

is

$$p = p(1 = \text{boy}, 2 = \text{girl}, 3 = \text{boy}) + p(1 = \text{girl}, 2 = \text{boy}, 3 = \text{girl}) =$$

$$= \frac{10}{15} \cdot \frac{5}{14} \cdot \frac{9}{13} + \frac{5}{15} \cdot \frac{10}{14} \cdot \frac{4}{13} =$$

$$= \frac{10 \cdot 9 \cdot 5 + 10 \cdot 5 \cdot 4}{15 \cdot 14 \cdot 13} = \frac{10 \cdot 9 + 10 \cdot 4}{3 \cdot 14 \cdot 13} = \frac{5 \cdot 9 + 5 \cdot 4}{3 \cdot 7 \cdot 13} = \frac{65}{3 \cdot 7 \cdot 13} = \frac{5}{3 \cdot 7} = \frac{5}{21} \approx 0.238.$$