Answer on Question #60064 – Math – Statistics and Probability

Question

It is noted that 8% of Kaplan students are left-handed. If 20 students are randomly selected, calculate the

i) probability that none of them are left-handed

ii) probability that at most 2 are left-handed

iii) standard deviation for the number of left-handed students.

Solution

Let ξ be the number of left-handed student. Then using the binomial distribution we have

i) probability that none of them are left-handed is

$$P(\xi = 0) = C_{20}^{0} \cdot (0.08)^{0} \cdot (1 - 0.08)^{20} \approx 0.189.$$

ii) probability that at most 2 are left-handed is

$$P(\xi \leq 2) = P(\xi = 0) + P(\xi = 1) + P(\xi = 2) = 0.189 + C_{20}^{1} \cdot (0.08)^{1} \cdot (1 - 0.08)^{19} +$$

$$+C_{20}^{2} \cdot (0.08)^{2} \cdot (1 - 0.08)^{18} \approx 0.7879.$$

iii) standard deviation for the number of left-handed students is

$$\sigma_{\xi} = \sqrt{20 \cdot 0.08 \cdot (1 - 0.08)} \approx 1.213.$$

Answer:

i) 0.189;

ii) 0.7879;

iii) 1.213.