

## 2024 AP DAILY: PRACTICE SESSIONS

# AP Statistics Session 4 – FRQ (Part A: Probability and Sampling Distributions)

### Question 1

Approximately 3.5 percent of all children born in a certain region are from multiple births (that is, twins, triplets, etc.). Of the children born in the region who are from multiple births, 22 percent are left-handed. Of the children born in the region who are from single births, 11 percent are left-handed.

- What is the probability that a randomly selected child born in the region is left-handed?
- What is the probability that a randomly selected child born in the region is a child from a multiple birth, given that the child selected is left-handed?
- A random sample of 20 children born in the region will be selected. What is the probability that the sample will have at least 3 children who are left-handed?

### Question 2:

A farm produces olive oil that is put into bottles that are sealed with a cork. The diameter of the bottle opening is 1.03 inches. To provide an acceptable fit, the cork diameter should be from 0.99 inch to 1.03 inches. The corks are purchased in bulk from a supplier, and the distribution of cork diameters is approximately normal with mean 1.00 inch and standard deviation 0.05 inch.

- If one cork is selected at random, what is the probability that the cork selected will provide an acceptable fit for the bottle? Show your work.

A farm manager decides to purchase the corks from a new supplier. Seventy percent of corks produced by the new supplier have a diameter with an acceptable fit.

- The farm manager is investigating how many corks in a box of 20 randomly selected corks will provide an acceptable fit. Consider the probability that **at least** 19 of the corks will provide an acceptable fit for the bottle.
  - Define the random variable of interest and state how the random variable is distributed.
  - What is the probability that **at least** 19 of the corks will provide an acceptable fit for the bottle? Show your work.
- Suppose corks are inspected one at a time until an acceptable fit is found. Let the random variable  $W$  represent the number of corks inspected. What is the probability that  $W$  is less than or equal to 2? Show your work.