Assignment 3

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Question: There are 40 students in Class X of a school of whom 25 are girls and 15 are boys. The class teacher has to select one student as a class representative. She writes the name of each student on a separate card, the cards being identical. Then she puts cards in a bag and stirs them thoroughly. She then draws one card from the bag.
Find the probability such that:

(i) the name written on the card is the name of a girl
(ii) the name written on the card is the name of a boy

Solution: We obtain the following distribution of students according to the question:

Number of Girls	Number of Boys	Total number of Students
25	15	40

TABLE I: Distribution of Students

Let's denote the outcome of the experiment by a random variable X such that $X \in \{0, 1\}$.
where,

Event	Description
X=0	Card having girl's name on it is drawn
X=1	Card having boy's name on it is drawn

TABLE II: Randomn Variable and Event Distribution

(i) The probability that the name written on the card is the name of a girl can be given as :

$$\Pr(X = 0) \tag{1}$$
$$= \frac{\text{Number of girl students in the class}}{\text{Total number of students in the class}} \tag{2}$$
$$= \frac{25}{40} \tag{3}$$
$$= \boxed{0.625} \tag{4}$$

Final Answer: The probability that the name written on the card is the name of a girl is 0.625.

(ii) The probability that the name written on the card is the name of a boy can be given as :

$$\Pr(X = 1) \tag{5}$$
$$= \frac{\text{Number of boy students in the class}}{\text{Total number of students in the class}} \tag{6}$$
$$= \frac{15}{40} \tag{7}$$
$$= \boxed{0.375} \tag{8}$$

Note: Since we know that the event mentioned are mutually exclusive and exhaustive in nature, the probability that the name written on the card is the name of a boy can also be given as:

$$\Pr(X = 1) = 1 - \Pr(X = 0) \tag{9}$$
$$= 1 - 0.625 \tag{10}$$
$$= \boxed{0.375} \tag{11}$$

Final Answer: The probability that the name written on the card is the name of a boy is 0.375.