

Assignment 7

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CBSE Probability Grade 12

Exercise 13.3.3: Of the students in a college, it is known that 60% reside in hostel and 40% are day scholars (not residing in hostel). Previous year results report that 30% of all students who reside in hostel attain A grade and 20% of day scholars attain A grade in their annual examination. At the end of the year, one student is chosen at random from the college and he has an A grade, what is the probability that the student is a hostler?

Solution:

Event	Description
H	Student is a hostler
D	Student is a day scholar
A	Student gets an A grade

TABLE I

Event H: Student is a hostler

$$\Pr(H) = 60\% \quad (1)$$

$$= 0.6 \quad (2)$$

Event D: Student is a day scholar

$$\Pr(D) = 40\% \quad (3)$$

$$= 0.4 \quad (4)$$

Event A: Student gets an A grade

The probability that student gets A grade, if hostler is

$$\Pr(A|H) = 30\% \quad (5)$$

$$= 0.3 \quad (6)$$

The probability that student gets A grade, if hostler is

$$\Pr(A|D) = 20\% \quad (7)$$

$$= 0.2 \quad (8)$$

Probability that the student selected is a hostler, if he has an A grade is

$$\Pr(H|A) = \frac{\Pr(H) \times \Pr(A|H)}{\Pr(D) \times \Pr(A|D) + \Pr(H) \times \Pr(A|H)} \quad (9)$$

$$= \frac{0.6 \times 0.3}{0.4 \times 0.2 + 0.6 \times 0.3} \quad (10)$$

$$= \frac{0.18}{0.08 + 0.18} \quad (11)$$

$$= \frac{0.18}{0.26} \quad (12)$$

$$= \frac{0.18}{0.26} \quad (13)$$

$$= \frac{9}{13} \quad (14)$$

Probability that the student selected is a hostler, if he has an A grade is $\frac{9}{13}$.