Answer on Question #57038 – Math – Statistics and Probability

A survey of mathematics students at the college revealed that 48% consistently spent at least 1.5 hours on mathematics homework and 52% spent less. Of those who spent at least 1.5 hours on homework, 79% made an A or B in the course. Of those who spent less than 1.5 hours, 26% made an A or B. A student made an A or B in the course. Find the probability that the student spent at least 1.5 hours on homework.

Solution

Let *L* be the event "student spent at least 1.5 hours on mathematics homework" and *M* be the event "student made an A or B in the course".

Given

$$P(L) = 0.48, \qquad P(L^c) = 0.52;$$

$$P(M|L) = 0.79, \qquad P(M|L^c) = 0.26,$$

we need to find

$$P(L|M).$$

It follows from Bayes' theorem that

$$P(L|M) = \frac{P(L)P(M|L)}{P(L)P(M|L) + P(L^c)P(M|L^c)} = \frac{0.48 \cdot 0.79}{0.48 \cdot 0.79 + 0.52 \cdot 0.26} = 0.7372.$$

Answer: 0.7372.