Answer on Question #80375 – Math – Statistics and Probability

Question

(3) The probability that a regularly scheduled flight departs on time is $P(D) = 0.83$; the probability that it arrives on time is $P(A) = 0.82$; and the probability that it departs and arrives on time is $P(D \cap A) = 0.78$. Find the probability that a plane
(a) arrives on time, given that it departed on time, and
(b) departed on time, given that it has arrived on time.

Solution

Using a conditional probability for any two events A and D:
$$P(D \cap A) = P(A)P(D|A)$$
and
$$P(D \cap A) = P(D)P(A|D)$$

(a)

$$P(A|D) = \frac{P(D \cap A)}{P(D)}$$
$$P(A|D) = \frac{0.78}{0.83} = \frac{78}{83} \approx 0.94$$

(b)

$$P(D|A) = \frac{P(D \cap A)}{P(A)}$$
$$P(D|A) = \frac{0.78}{0.82} = \frac{39}{41} \approx 0.95.$$

Answer: (a) 78/83; (b) 39/41.