Answer on Question #56399 – Math – Statistics and Probability

The probability that John goes to the show is 1/3. If he goes to the show, the probability that he sees a python is 2/5. If he does not go to the show the probability that he sees a python is 1/8. Find the probability that;

i. John goes to the show but she doesn't see a python

ii. John sees a python elsewhere

Solution

Let *A* be the event "John goes to the show" and *B* be the event "John sees a python". Then

$$P(A) = \frac{1}{3}; P(B|A) = \frac{2}{5};\ P(B|\bar{A}) = \frac{1}{8}.$$

i. The probability that John goes to the show but she doesn't see a python is

$$P(A\ and\ \bar{B}) = P(A)P(\bar{B}|A) = P(A)\big(1 - P(B|A)\big) = \frac{1}{3}\left(1 - \frac{2}{5}\right) = \frac{1}{3}\cdot\frac{3}{5} = \frac{1}{5}.$$

ii. The probability that John sees a python elsewhere is

$$P(\bar{A}\ and\ B) = P(\bar{A})P(B|\bar{A}) = \big(1 - P(A)\big)P(B|\bar{A}) = \left(1 - \frac{1}{3}\right)\frac{1}{8} = \frac{2}{3}\cdot\frac{1}{8} = \frac{1}{12}.$$