Problem #6443 In a certain geographic location, 25% of the wage earners have a college degree and 75% do not. Of those who have a college degree, 5% earn more than $100,000 a year. Of those who do not have a college degree, 2% earn more than$100,000 a year. If a wage earner is selected at random, find the probability that she or he earns more than $100,000 a year.

Solution Let H_1 — be an event that randomly chosen person has a college degree. H_2 — does not have a college degree . Then $P(H_1) = 0.25$ and $P(H_2) = 0.75$. Let A be an event that randomly chosen person earns more than 100,000 $ a year, then $P(A|H_1) = 0.05$ and $P(A|H_2) = 0.02$. Thus, by law of total probability one can get $P(A) = P(A|H_1)P(H_1) + P(A|H_2)P(H_2) = 0.25 \cdot 0.05 + 0.02 \cdot 0.75 = 0.0275$.

Answer 0.0275.