

# SOA Exam P 006 (General Probability)

Given: Sample = 937 men who died in 1999

Let A = event that a dead is due to a heart disease

B = event that the dead had at least one parent who suffered from heart disease

$B^c$  = event that neither of the dead's parents suffered from heart disease

Given:  $\#(A) = 210$

$$\#(B) = 312$$

$$\#(A \cap B) = 102$$

$$P(A) = \frac{\#(A)}{\text{Total \# in the sample}} = \frac{210}{937}$$

$$P(B) = \frac{\#(B)}{\text{Total \# in the sample}} = \frac{312}{937}$$

$$P(A \cap B) = \frac{\#(A \cap B)}{\text{Total \# in the sample}} = \frac{102}{937}$$

Want: The probability that a man randomly selected from the group died of heart disease (A) given that neither of his parents suffered from heart disease (B complement)

$$P(A | B^c) = \frac{P(A \cap B^c)}{P(B^c)}$$

$$P(B^c) = 1 - P(B) = 1 - \frac{312}{937}$$

$$P(A \cap B^c) = P(A) - P(A \cap B) = \frac{210}{937} - \frac{102}{937} = \frac{108}{937}$$

$$P(A | B^c) = \frac{\frac{108}{937}}{1 - \frac{312}{937}} = \frac{108}{625} = 0.173$$

ANS: B