

7. Solution: D

Let

A = event that a policyholder has an auto policy

H = event that a policyholder has a homeowners policy

Then based on the information given,

$$\Pr(A \cap H) = 0.15$$

$$\Pr(A \cap H^c) = \Pr(A) - \Pr(A \cap H) = 0.65 - 0.15 = 0.50$$

$$\Pr(A^c \cap H) = \Pr(H) - \Pr(A \cap H) = 0.50 - 0.15 = 0.35$$

and the portion of policyholders that will renew at least one policy is given by

$$0.4 \Pr(A \cap H^c) + 0.6 \Pr(A^c \cap H) + 0.8 \Pr(A \cap H)$$

$$= (0.4)(0.5) + (0.6)(0.35) + (0.8)(0.15) = 0.53 \quad (= 53\%)$$
