A store has 80 modems in its inventory, 30 coming from Source A and the remainder from Source B. Of the modems from Source A, 20% are defective. Of the modems from Source B, 8% are defective. Calculate the probability that exactly two out of a random sample of five modems from the store’s inventory are defective.

A. 0.010  B. 0.078  C. 0.102  D. 0.105  E. 0.125

Solution.
The number of defective modems in the inventory is $20\% \cdot 30 + 8\% \cdot 50 = 10$ (out of 80). Note that the number of defectives in the inventory is fixed, i.e., we are not told that there is $\frac{1}{8}$ probability that a modem in the inventory is defective, but rather that exactly $\frac{1}{8}$ of all modems are defective. The probability that exactly two modems in a random sample of five modems from the store’s inventory are defective is

$$\binom{10}{2} \binom{70}{3} \binom{80}{5} = 0.102.$$ 

Answer C.

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