

Quiz 5

Full name:

Student number:

This question is about Brand X Computers. There are three factories that produce the computers: factory A, factory B, and factory C. 30% of the computers are produced in factory A, 35% are produced in factory B, and 35% are produced in factory C. It is known that 1.5% of the computers produced in factory A are defective; 1% of the computers produced in factory B are defective; and 2% of the computers produced in factory C are defective.

Fill in the blanks:

$P(\text{.....A.....}) = 0.30$, $P(\text{.....B.....}) = 0.35$, $P(\text{.....C.....}) = 0.35$

$P(\text{DIA.....}) = 0.015$, $P(\text{DIB.....}) = 0.01$, $P(\text{DIC.....}) = 0.02$

One computer has been found to be defective. You have been assigned the task of investigating the source of the defect.

What is the probability that the defective computer was produced in factory A? $P(A|D) = ?$

$$P(A|D) = \frac{P(A \cap D)}{P(D)} = \frac{P(D|A) \cdot P(A)}{P(D|A) \cdot P(A) + P(D|B) \cdot P(B) + P(D|C) \cdot P(C)}$$

$$= \frac{0.015 \cdot 0.30}{(0.015)(0.30) + (0.01)(0.35) + (0.02)(0.35)} = \frac{9}{30}$$

What is the probability that the defective computer was produced in factory B? $P(B|D) = ?$

$$P(B|D) = \frac{P(B \cap D)}{P(D)} = \frac{P(D|B) \cdot P(B)}{P(D)}$$

$$= \frac{(0.01) \cdot (0.35)}{(0.015)(0.30) + (0.01)(0.35) + (0.02)(0.35)} = \frac{7}{30}$$

What is the probability that the defective computer was produced in factory C? $P(C|D) = ?$

$$P(C|D) = \frac{P(C \cap D)}{P(D)} = \frac{P(D|C) \cdot P(C)}{P(D)}$$

$$= \frac{(0.02) \cdot (0.35)}{(0.015)(0.30) + (0.01)(0.35) + (0.02) \cdot (0.35)} = \frac{7}{15}$$