Ex 7 :

S = size

D : defect

M : change mind

$P(A) = \frac{1}{2}$ $P(B) = \frac{3}{10}$ $P(C) = \frac{1}{5}$

$P(S|A) = \frac{3}{5}$ $P(S|B) = \frac{1}{3}$ $P(S|C) = \frac{3}{8}$

$P(D|A) = \frac{1}{10}$ $P(D|B) = \frac{1}{2}$ $P(D|C) = \frac{1}{4}$

$P(M|A) = \frac{3}{10}$ $P(M|B) = \frac{1}{6}$ $P(M|C) = \frac{3}{8}$

i) $$P(A|M) = \frac{\frac{1}{2} \times \frac{3}{10}}{\left(\frac{1}{2} \times \frac{3}{10}\right) + \left(\frac{1}{6} \times \frac{3}{10}\right) + \left(\frac{1}{5} \times \frac{3}{8}\right)}$$

$$= \frac{6}{11} = 0.5455$$

ii) $P(c|s) = \dfrac{\frac{1}{5} \times \frac{3}{8}}{\left(\frac{1}{5} \times \frac{3}{8}\right) + \left(\frac{1}{2} \times \frac{3}{5}\right) + \left(\frac{3}{10} \times \frac{1}{3}\right)}$

$= \frac{3}{19} = 0.1579$

iii) $P(B|b) = \dfrac{\frac{3}{10} \times \frac{1}{2}}{\left(\frac{3}{10} \times \frac{1}{2}\right) + \left(\frac{1}{2} \times \frac{1}{10}\right) + \left(\frac{1}{5} \times \frac{1}{4}\right)}$

$= \frac{3}{5} = 0.6$

DATE

S M T W T F S

Ex 8 :

$P(m) = 0.51$ $\quad M$ = male

$P(\bar{m}) = 0.49$ $\quad \bar{m}$ = famale

a) $P(\bar{M}) = 1 - 0.51$

$= 0.49$

b) $P(M|R) = 0.095 \quad P(M|\bar{R}) = 0.905$

$P(\bar{M}|R) = 0.017 \quad P(\bar{M}|\bar{R}) = 0.983$

i) $P(R|M) = \dfrac{0.51 \times 0.095}{(0.51 \times 0.095) + (0.51 \times 0.905)}$

$= 0.095$

ii) $P(M|R) = \dfrac{0.095 \times 0.51}{(0.095 \times 0.51) + (0.017 \times 0.49)}$

$= 0.8533$

iii) $0.49 = \dfrac{n(\bar{M})}{100000}$ $\quad$ | $\quad 0.017 = \dfrac{n(\bar{M} \cap R)}{49000}$

$n(\bar{M}) = 49000$ $\quad$ | $\quad n(\bar{M} \cap R) = 833$

DATE

Ex 9 :

R = prison G = guilty

$\bar{R}$ = not prison $\bar{G}$ = not guilty

$P(R) = 0.45$ $P(G|R) = 0.4$

$P(\bar{R}) = 0.55$ $P(\bar{G}|R) = 0.6$

$P(G|\bar{R}) = 0.55$

$P(\bar{R}|\bar{G}) = 0.45$

i) $P(\bar{R}) = 1 - 0.45$

$= 0.55$

ii) $P(R|G) = \dfrac{0.4 \times 0.45}{(0.4 \times 0.45) + (0.55 \times 0.55)}$

$= 0.3731$

iii) $P(\bar{R}|G) = \dfrac{0.55 \times 0.55}{(0.55 \times 0.55) + (0.4 \times 0.45)}$

$= 0.6269$

iv) $P(G) = (0.45 \times 0.4) + (0.55 \times 0.55)$

$= 0.4825$