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Exercise #7

		A	B	C
P(A) = 0.5	wrong size, P(w |)	3/5	1/3	3/8
P(B) = 0.3	defects, P(d |)	1/10	1/2	1/4
P(C) = 0.2	change mind, P(m |)	3/10	1/6	3/8

i) find $P(A \mid m) = \dfrac{P(m \mid A)\,P(A)}{P(m \mid A)\,P(A) + P(m \mid B)\,P(B) + P(m \mid C)\,P(C)}$

$= \dfrac{(3/10)(0.5)}{(3/10)(0.5) + (1/6)(0.3) + (3/8)(0.2)}$

$= 0.545$

ii) find $P(C \mid w) = \dfrac{P(w \mid C)\,P(C)}{P(w \mid A)\,P(A) + P(w \mid B)\,P(B) + P(w \mid C)\,P(C)}$

$= \dfrac{(3/8)(0.2)}{(3/5)(0.5) + (1/3)(0.3) + (3/8)(0.2)}$

$= 0.158$

iii) find $P(B \mid d) = \dfrac{P(d \mid B)\,P(B)}{P(d \mid A)\,P(A) + P(d \mid B)\,P(B) + P(d \mid C)\,P(C)}$

$= \dfrac{(1/2)(0.3)}{(1/10)(0.5) + (1/2)(0.3) + (1/4)(0.2)}$

$= 0.6$

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Exercise #8

a] find female adults = 1 − 0.51

adults (male) = 0.51 } in
adults (female) = 0.49 } rural

= 0.49
≈ 49 %

b] given $P(r|m) = 0.095$ & $P(r|f) = 0.017$ } voters only

i) find $P(r|m) = 0.095$

ii) find $P(m|r) = \dfrac{P(r|m)\,P(m)}{P(r|m)P(m) + P(r|f)P(f)}$

$= \dfrac{(0.095)(0.51)}{(0.095)(0.51) + (0.017)(0.49)}$

$= 0.835$

iii) find $P(\bar{r}|f) = 0.983$

$= 0.983 \times 100000$

$= 98300$ people

	male	female
rural (R)	0.095	0.017
urban ($\bar{R}$)	0.905	0.983

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Exercise #9

$P(P) = 0.45$

$P(G|P) = 0.40$

$P(G|P') = 0.55$

i) find $P(P') = 1 - 0.45$

$= 0.55$

ii) find $(P|G) = \dfrac{P(G|P)\,P(P)}{P(G|P)\,P(P) + P(G|P')\,P(P')}$

$= \dfrac{(0.40)(0.45)}{(0.40)(0.45) + (0.55)(0.55)}$

$= 0.373$

iii) find $(P'|G) = \dfrac{P(G|P')\,P(P')}{P(G|P)\,P(P) + P(G|P')\,P(P')}$

$= \dfrac{(0.55)(0.55)}{(0.40)(0.45) + (0.55)(0.55)}$

$= 0.627$

iv) find $P(G) = P(G|P)\,P(P) + P(G|P')\,P(P')$

$= (0.40 \times 0.45) + (0.55 \times 0.55)$

$= 0.4825$