~~NABIL NAUFAL~~

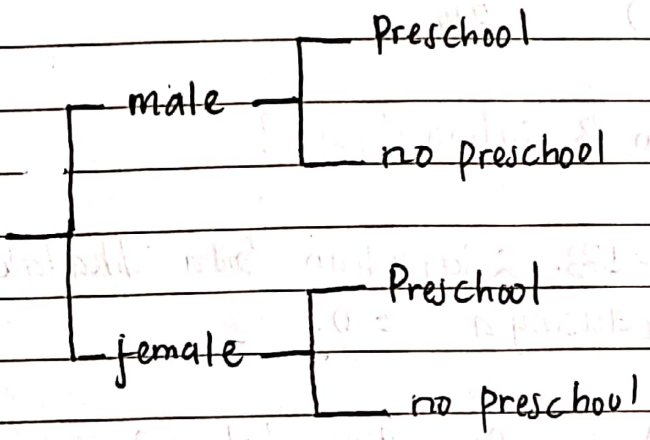
G1401211008

No. :

4.6 Preschool or not

a). Sebuah percobaan acak dengan kemungkinan perolehan gender : laki - laki atau Perempuan, serta apakah preschool atau no preschool.

b).



Terdapat 4 kejadian sederhana :

E_1 = male & preschool

E_2 = male & no preschool

E_3 = female & preschool

E_4 = female & no preschool

c).

	male	female
preschool	8	9
No preschool	6	2

Masing-masing peluang berdasarkan 4 kejadian sederhana :

$P(E_1) = \frac{8}{25}$ $\quad P(E_2) = \frac{6}{25}$ $\quad P(E_3) = \frac{9}{25}$ $\quad P(E_4) = \frac{2}{25}$

d). Peluang terpilih male $P(E_m)$

$P(E_m) = \frac{14}{25}$

Peluang terpilih female dan no preschool $P(E_4)$

$P(E_4) = \frac{2}{25}$

4.51 $P(A) = 0.4$ and $P(A \cap B) = 0.12$

a). Find $P(B|A)$

Jawab:

$$P(B|A) = \frac{P(A \cap B)}{P(A)} = \frac{0.12}{0.4} = 0.3$$

b). Apakah kejadian A dan B saling lepas?

Jawab:

Tidak, karena $P(A \cap B) = 0.3$. 2 kejadian bisa dikatakan saling lepas jika irisan keduanya $= 0$.

c). Jika $P(B) = 0.3$, apakah A dan B saling bebas?

Jawab:

Ya. Karena $P(A \cap B) = P(A)\,P(B) = 0.12$

4.54 $P(T) = 98\%$

a). Non user fail both test $P(N)$

$P(N) = (1 - P(T))\,(1 - P(T))$

$= (1 - 98\%)^2$

$P(N) = \frac{4}{10.000} = 0,0004$

b). A drug user detected (fails at least one test)

Jawab:

$= 1 - P(N)$

$= 1 - 0.0004$

$= 0.9996$

No. :

c). A drug user passes both test

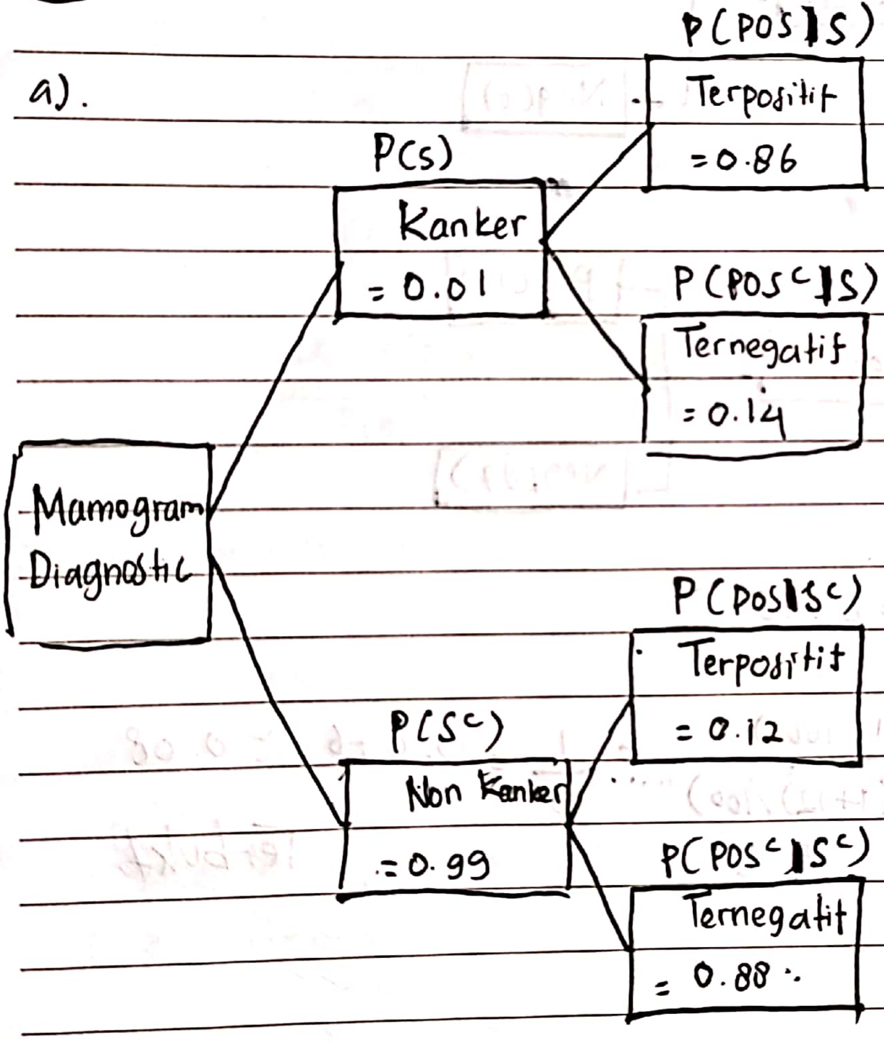
$= (1-P(T))\,(1-P(T))$

$= (1-98\%)^2$

$= 0.0004$

5.57 Mammogram Diagnostic

a).



$P(S \cap POS) = P(S) \times P(POS \mid S)$
$= 0.01 \times 0.86$
$= 0.0086$

$P(S \cap POS^c) = P(S) \times P(POS^c \mid S)$
$= 0.01 \times 0.14$
$= 0.0014$

$P(S^c \cap POS) = P(S^c) \times P(POS \mid S^c)$
$= 0.99 \times 0.12$
$= 0.1188$

$P(S^c \cap POS^c) = P(S^c) \times P(POS^c \mid S^c)$
$= 0.99 \times 0.88$
$= 0.8712$

b). Buktikan $P(POS) = 0.1274$

Jawab:

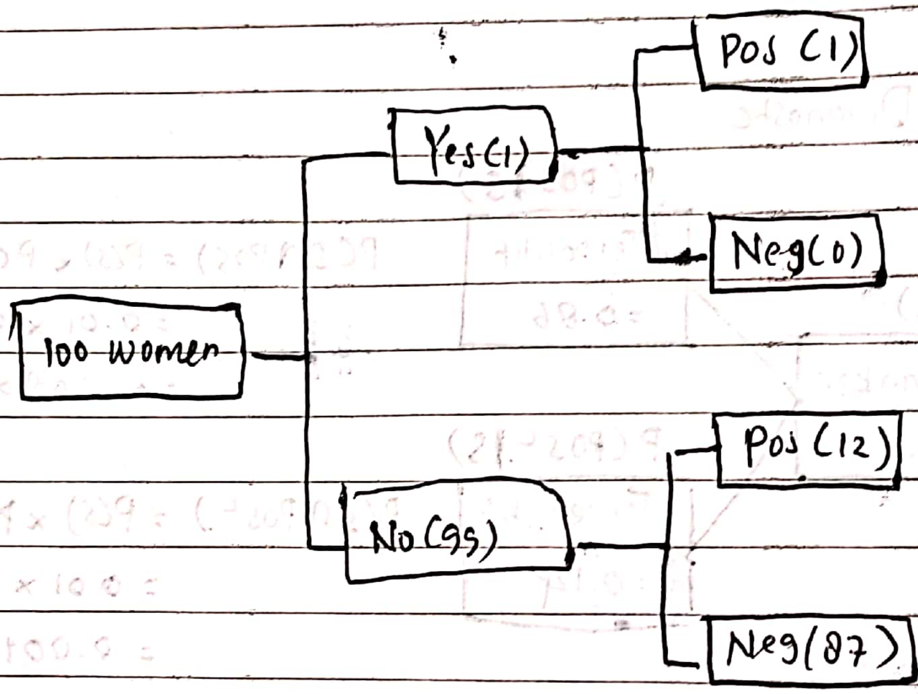
$P(POS) = P(S \cap POS) + P(S^c \cap POS)$

$= 0.0086 + 0.1188$

$= 0.1274$ (Terbukti)

c). $P(S \mid Pos) = \dfrac{P(S \cap Pos)}{P(Pos)} = \dfrac{0.0086}{0.1274} = 0.0675$

d). Breast Cancer Diagnostic Test



Buktikan bahwa $P(S \mid Pos) = 0.08$

Jawab:

$$P(S \mid Pos) = \frac{P(S \cap Pos)}{P(Pos)} = \frac{(1/100)}{((1+12)/100)} = \frac{1}{13} = 0.076 \approx 0.08$$

Terbukti

No.:

(5.16) Bayers Rule, Suppose we know $P(A)$, $P(B)$, and $P(B^c \mid A^c)$, but we want to find $P(A \mid B)$.

a). Using the definition of conditional probability for $P(A \mid B)$ and for $P(B \mid A)$, explain why $P(A \mid B) = P(A \cap B)/P(B) = [P(A)P(B \mid A)]/P(B)$.

Jawab:

$$P(A \mid B) = \frac{P(A \cap B)}{P(B)}$$, jika A dan B saling bebas : $P(A \cap B) = P(A)P(B)$

$$= \frac{P(A).P(B)}{P(B)}$$, $P(B) = P(B \mid A)$ jika A dan B saling bebas

$$= \frac{P(A).P(B \mid A)}{P(B)}$$ Terbukti

b). Spitting the event that B occurs into two parts, according to whether A occurs, explain why

$$P(B) = P(B \cap A) + P(B \cap A^c)$$

Jawab:

$P(B \cap A) + P(B \cap A^c)$

$= P(B \cap A) + [P(B) - P(B \cap A)]$

$= P(B)$ Terbukti

c). Using part B and the definition of conditional probability, explain why $P(B) = P(A)P(B \mid A) + P(A^c)P(B \mid A^c)$

Jawab:

$P(A)P(B \mid A) + P(A^c)P(B \mid A^c)$

$$= P(A).\frac{P(A \cap B)}{P(A)} + P(A^c).\frac{P(A^c \cap B)}{P(A^c)}$$

$= P(A \cap B) + P(A^c \cap B)$

$= P(A \cap B) + P(B) - P(A \cap B)$

$= P(B)$ Terbukti

180 mm x 257 mm

d). Combining with you have shown in parts a–c, reason that

$$P(A|B) = \frac{P(A)\,P(B|A)}{P(A)\,P(B|A) + P(A^c)\,P(B|A^c)}$$

Jawab:

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

$$= \frac{\frac{P(A)}{P(A)} \cdot P(A \cap B)}{P(A)P(B|A) + P(A^c)P(B|A^c)} \rightarrow \text{Dari } c$$

$$= \frac{P(A) \cdot P(B|A)}{P(A)P(B|A) + P(A^c)P(B|A^c)}$$

Terbukti