# Assignment 7

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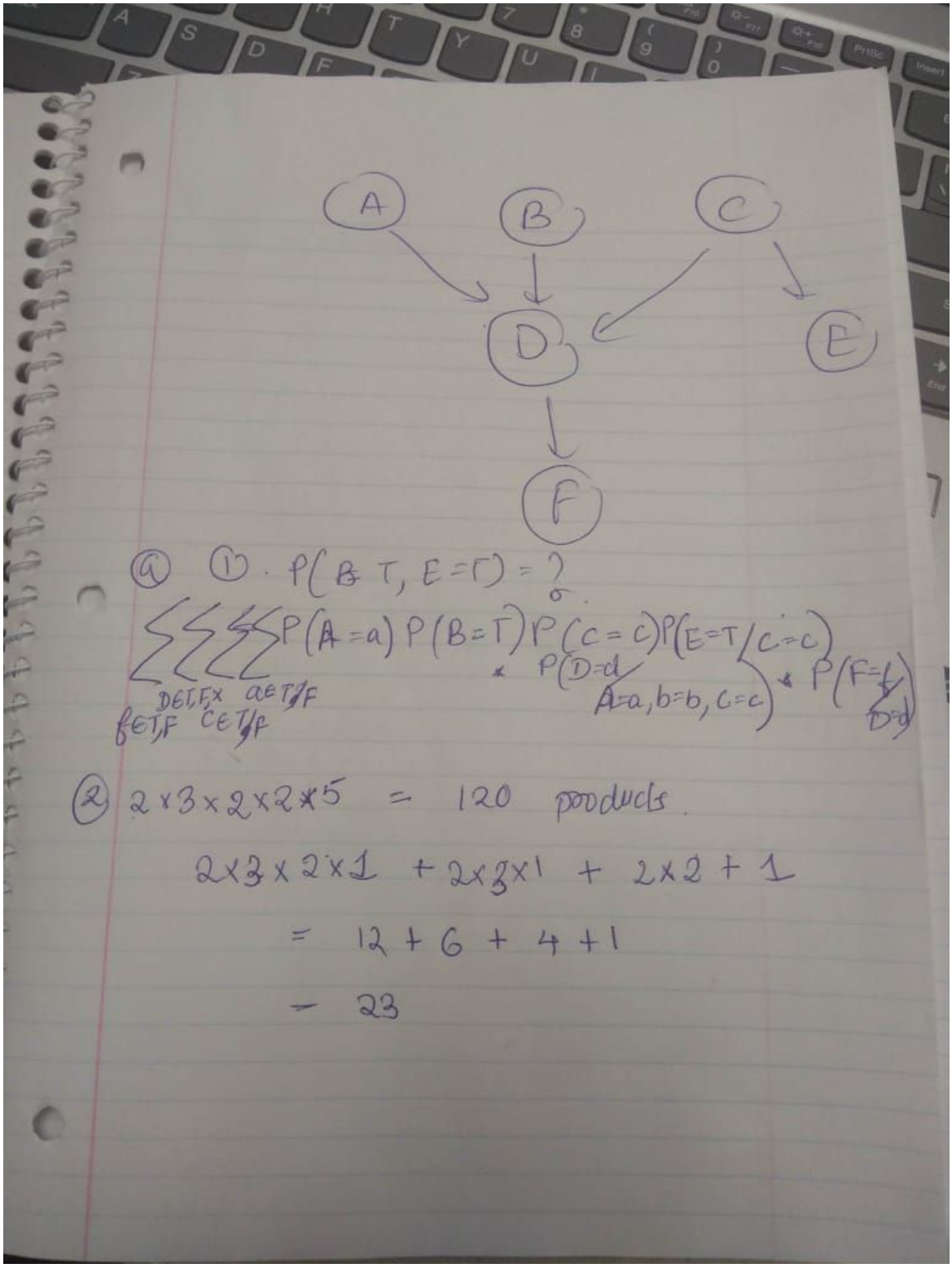
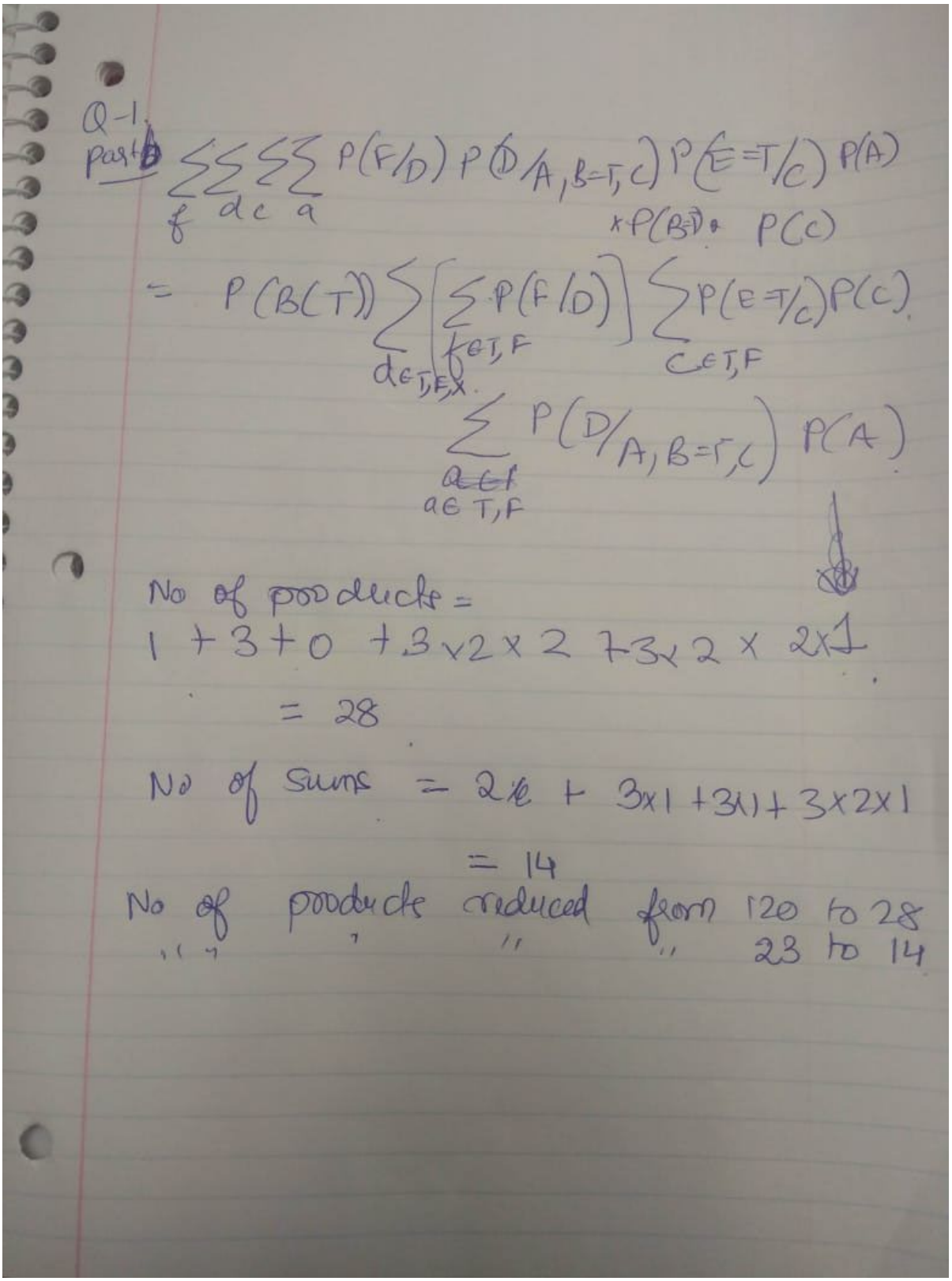
Question 1:

Part a:



Part b:


Q-1.
part b
$\sum_f \sum_d \sum_c \sum_a P(F/D)\, P(D/A, B=T, C)\, P(E=T/C)\, P(A) \times P(B=T) \cdot P(C)$
$= P(B(T)) \sum_{d \in T,F,X} \left[ \sum_{f \in T,F} P(F/D) \right] \sum_{C \in T,F} P(E=T/C) P(C)$
$\sum_{a \in T,F} P(D/A, B=T, C)\, P(A)$
No of products =
1 + 3 + 0 + 3 x 2 x 2 + 3 x 2 x 2 x 1
= 28
No of sums = 2 + 3x1 + 3x1 + 3x2x1
= 14
No of products reduced from 120 to 28
" " " " 23 to 14

Question 2

Part a
Code submitted.

ThethaFever =0.6060

ThethaPaleness =.5040

ThethaCough = 0.1160

ThethaHwbc = 0.5060

ThethaPheunomia = 0.0200

Thetha0Fever =

0.6000

Thetha0Paleness =

0.5000

Thetha0Cough =

0.1000

Thetha0Hwbc =

0.5000

Thetha0Pheunomia =

0

Thetha1Fever =

0.9000

Thetha1Paleness =

0.7000

Thetha1Cough =

0.9000

Thetha1Hwbc =

0.8000

Thetha1Pheunomia =

1

Part b.

Part b) $P(P_n = T \mid Fever = T, Pale = F, Cough = T, HWBC = F)$

$= P(Fever = T, Pale = F, Cough = T, Hwbc = F \mid P_n = T)$

$\times P(P_n = T)$

$P(Fever = T, Pale = F, cough = T, Hwbc = F)$

$= P(Fever = T \mid P_n = T) P(Pale = F \mid P_n = T) P(Cough = T \mid P_n = T)$

$\times P(Hwbc = F \mid P_n = T) \times P(P_n = T)$

$P(Fever = T, Pale = F, Cough = T, Hwbc = F)$

$= \frac{\#(Fever = T \& P_n = T)}{\#(P_n = T)} \times \frac{\#(Pale = F \& P_n = T)}{\#(P_n = T)} \times$

$\times \frac{\#(Cough = T \& P_n = T)}{\#(P_n = T)} \times \frac{\#(Hwbc = T \& P_n = T)}{\#(P_n = T)} \times$

$\times \frac{\#(P_n = T)}{\#(Total)} \Big/ \frac{\#(Fever = T \& Pale = F, Cough = T, Hwbc}{\#(Total)}$

**In Matlab main7 file, I put values**

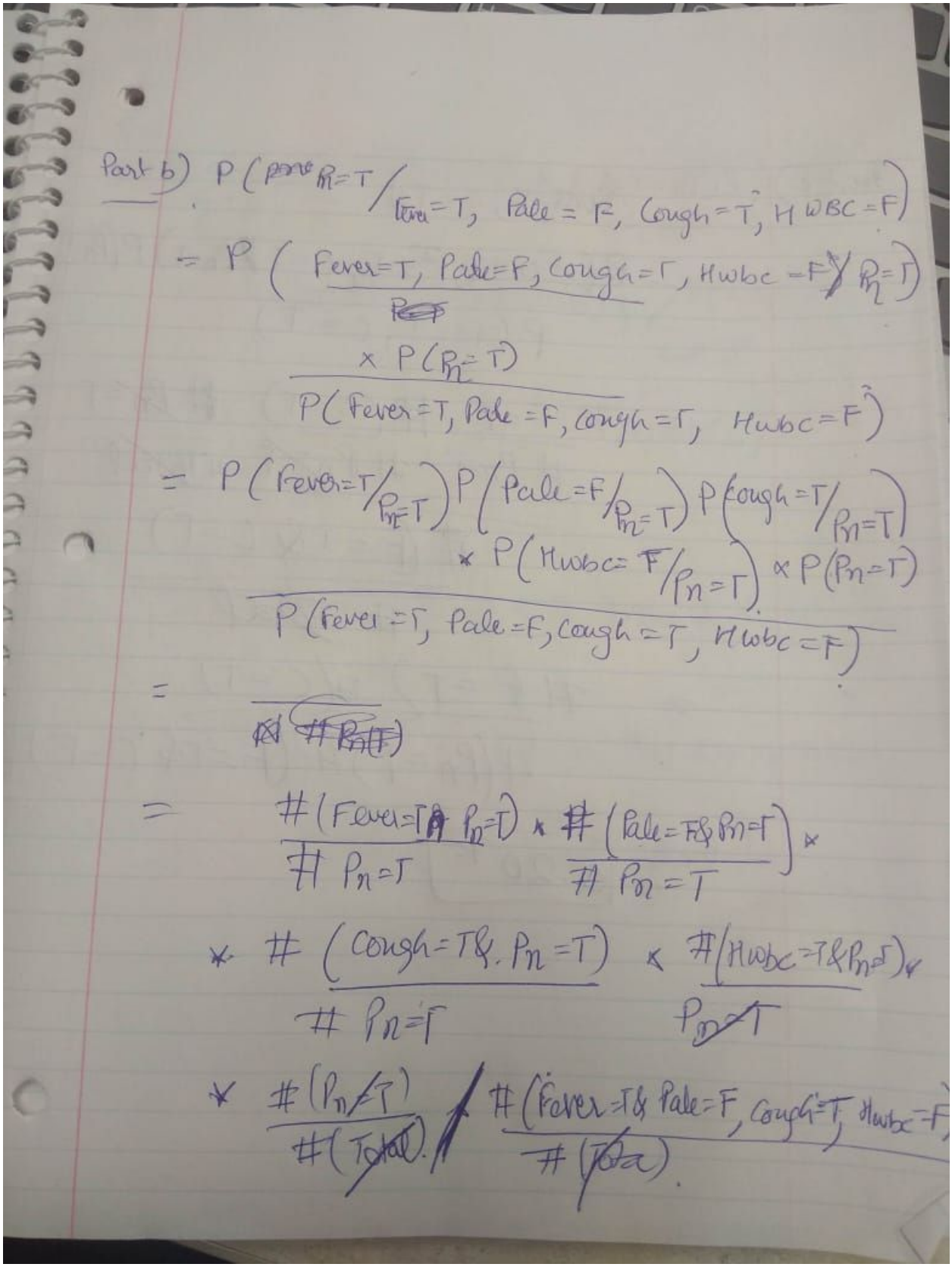
```
Na=size(find(nemo(:,1)==1))
Nb=size(find(nemo(:,2)==0))
Nc=size(find(nemo(:,3)==1))
Nd=size(find(nemo(:,4)==0))
Ny=size(find(nemo(:,5)==1))

%bs=size(example)
out=zeros(bs(1),1)
Na=size(find(nemo(:,1)==1))
Nb=size(find(nemo(:,2)==0))
Nc=size(find(nemo(:,3)==1))
Nd=size(find(nemo(:,4)==0))
Ny=size(find(nemo(:,5)==1))
Naay=size(find(nemo(:,1)==1 & nemo(:,5)==1))
Nbay=size(find(nemo(:,2)==0 & nemo(:,5)==1))
Ncay=size(find(nemo(:,3)==1 & nemo(:,5)==1))
Nday=size(find(nemo(:,4)==0 & nemo(:,5)==1))
NNNN=size(find(nemo(:,4)==0 & nemo(:,1)==1 & nemo(:,2)==0 & nemo(:,3)==1))
NN=size( find(nemo(:,1)==1 & nemo(:,3)==1) )

R=(Naay).*(Nbay).*(Ncay).*(Nday)./(Ny)./(Ny)./(Ny)./(NNNN)
```

**Ans: 0.0608**

Part c:


Part b) P(Pn=T / Fever=T, Pale=F, Cough=T, HWBC=F)
= P(Fever=T, Pale=F, Cough=T, Hwbc=F / Pn=T)
× P(Pn=T)
P(Fever=T, Pale=F, Cough=T, Hwbc=F)
= P(Fever=T/Pn=T) P(Pale=F/Pn=T) P(Cough=T/Pn=T)
× P(Hwbc=F/Pn=T) × P(Pn=T)
P(Fever=T, Pale=F, Cough=T, Hwbc=F)
= #(Fever=T & Pn=T) / #Pn=T × #(Pale=F & Pn=T) / #Pn=T ×
× #(Cough=T & Pn=T) / #Pn=T × #(Hwbc=T & Pn=T) /
× #(Pn=T) / #(Total) / #(Fever=T & Pale=F, Cough=T, Hwbc=F) / #(Total)

**Matlab main file I have put value**
R2=(Naay).*(Ncay)./(Ny)./(NN)

**Answer:0.2077**

Part d;
Code submitted.