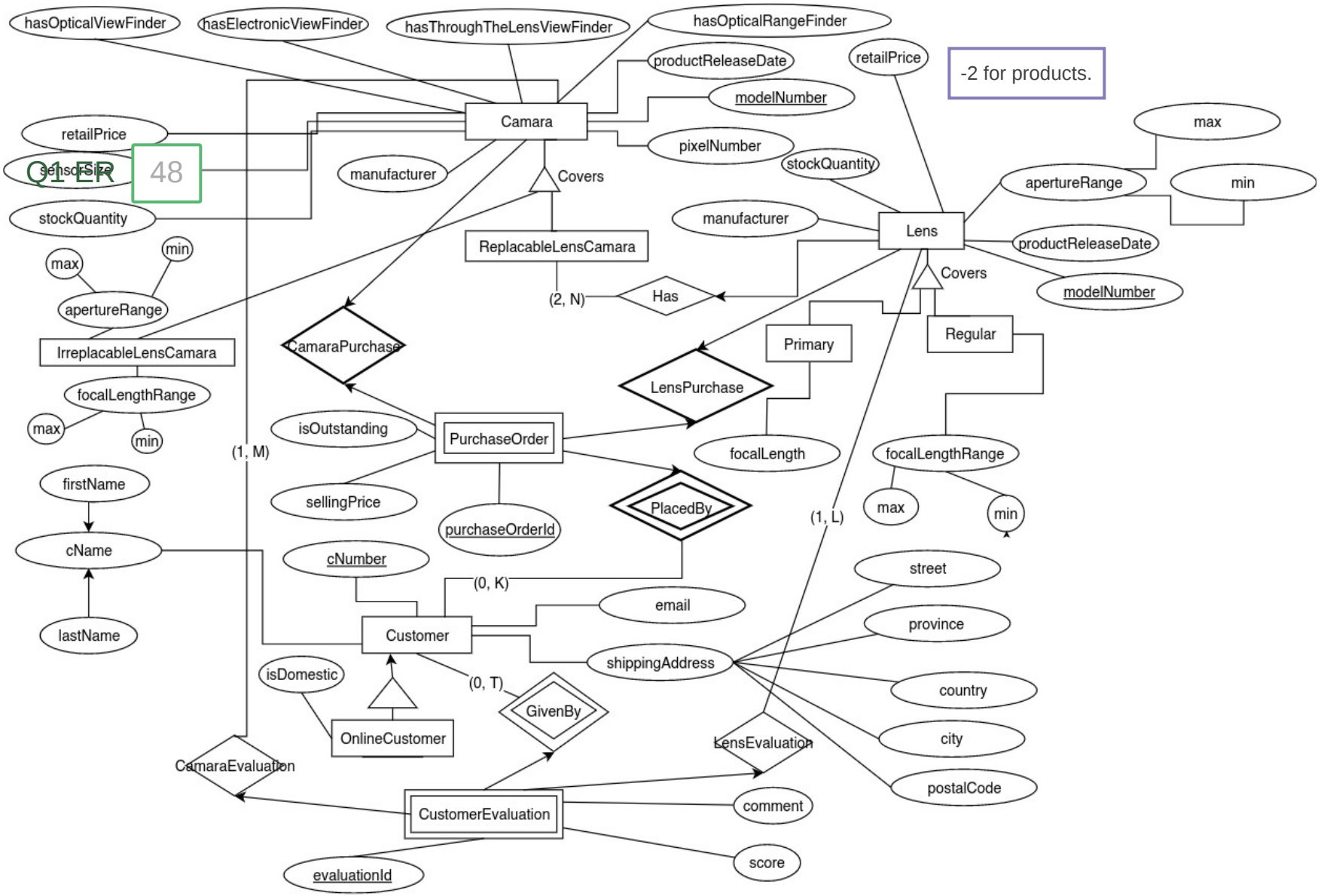
Q1 ER 48

-2 for products.



CS 348 Assignment 4

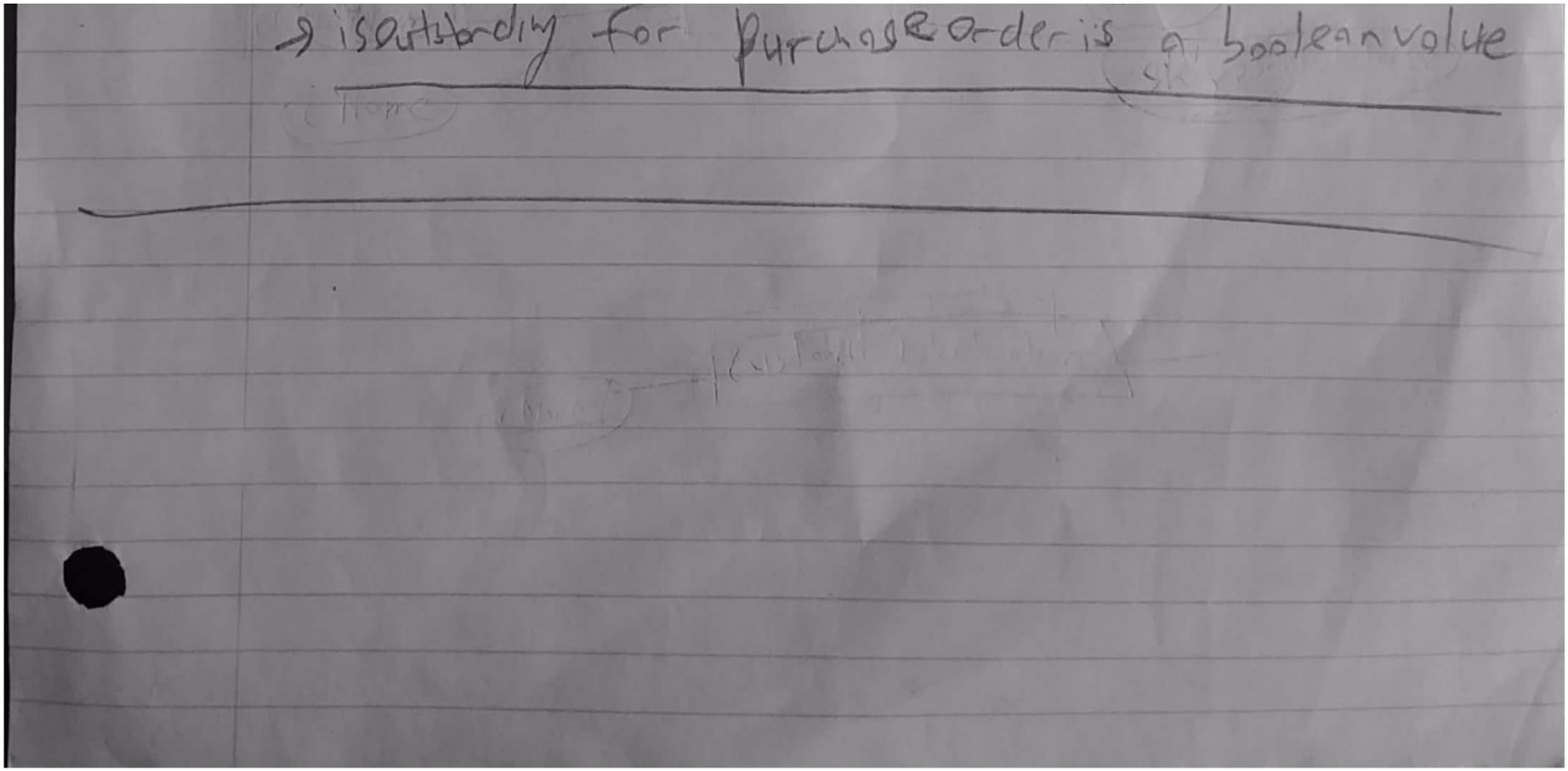
Clarifications

1 ii)

→ The isDomestic attribute of Online Customer Entity is a boolean.

→ hasOpticalViewFinder, hasElectronicViewFinder, hasThroughTheLensViewFinder, hasOpticalRangeFinder are boolean values

→ Only one of hasOpticalViewFinder, hasThroughTheLensViewFinder and hasOpticalRangeFinder is True. (No more than 1 feature from the following set {3, 4, 5})



Scanned by CamScanner

Q2 21

2i)

```
create table camara (
  modelNumber char(30) not null,
  manufacturer char(30) not null,
  productReleaseDate date not null,
  retailPrice integer not null,
  sensorSize integer not null ,
  stockQuantity integer not null,
  pixelNumber integer not null ,
  hasOpticalViewFinder bit not null,
  hasElectronicViewFinder bit not null,
  hasThroughTheLensViewFinder bit not null,
  hasOpticalRangeFinder bit not null ,
  primary key (modelNumber)
)

//Replacable lens must have atleast 2 lens
create table replacableLensCamara (
  modelNumber char(30) not null ,
  primary key (modelNumber)
)

create table irreplacableLensCamara (
 modelNumber char(30) not null ,
 focalLengthRangeMax integer not null ,
 focalLengthRangeMin integer not null ,
 appertureRangeMax integer not null ,
 appertureRangeMin integer not null ,
 primary key (modelNumber)
```

```
)

create table lens ( \
  modelNumber char(30) not null ,
  camaraModelNumber char(30)  ,
  manufacturer char(30) not null ,
  productReleaseDate date not null ,
  retailPrice integer not null ,
  stockQuantity integer not null ,
  apertureRangeMax integer not null ,
  apertureRangeMin integer not null ,
  foreign key (camaraModelNumber) references replacableLensCamara(modelNumber) ,
  primary key (modelNumber))
```

```
create table regularLens(
  modelNumber char(30) not null ,
  focalLenghtMax integer not null,
  focalLengthMin integer not null,
  primary key (modelNumber)
)

create table primaryLens(
  modelNumber char(30) not null,
  focalLenght integer not null,
  primary key (modelNumber)
)


create table camaraPurchaseOrder(
  purchaseOrderId char(30) not null,
  customerNumber char(30) not null,
  camaraModelNumber char(30) not null ,
  sellingPrice integer not null ,
  isOutstanding bit not null ,
  foreign key (camaraModelNumber) references camara(modelNumber) ,
  foreign key (customerNumber) references customer(cNumber) ,
  primary key (purchaseOrderId, customerNumber)
)



create table lensPurchaseOrder(
  purchaseOrderId char(30) not null ,
```

```
  customerNumber char(30) not null,
  lensModelNumber char(30) not null ,
  sellingPrice integer not null ,
  isOutstanding bit not null ,
  foreign key (lensModelNumber) references lens(modelNumber) ,
  foreign key (customerNumber) references customer(cNumber) ,
  primary key (purchaseOrderId, customerNumber)
)

create table customer(
  cNumber char(30) not null,
  email char(100) not null,
  cFirstName char(100) not null,
```

```
  cLastName char(100) not null,
  primary key (cNumber)
)

create table onlineCustomer(
  cNumber char(30) not null
  email char(100) not null,
  cFirstName char(100) not null,
  cLastName char(100) not null,
  isDomestic bit not null,
  primary key (cNumber)
)


create table camaraCustomerEvaluation(
 evaluationId char(30) not null ,
 customerNumber char(30) not null ,
 comment char(2000) not null ,
 score integer not null ,
 camaraModelNumber char(30) not null ,
 foreign key (camaraModelNumber) references camara(modelNumber) ,
 foreign key (customerNumber) references customer(cNumber) ,
 primary key (evaluationId, customerNumber)
)

create table lensCustomerEvaluation(
 evaluationId char(30) not null,
 customerNumber char(30) not null,
 comment char(2000) not null,
 score integer not null,
```

```
  lensModelNumber not null,
  foreign key (lensModelNumber) references lens(modelNumber) ,
  foreign key (customerNumber) references customer(cNumber),
  primary key (evaluationId, customerNumber)
)
```

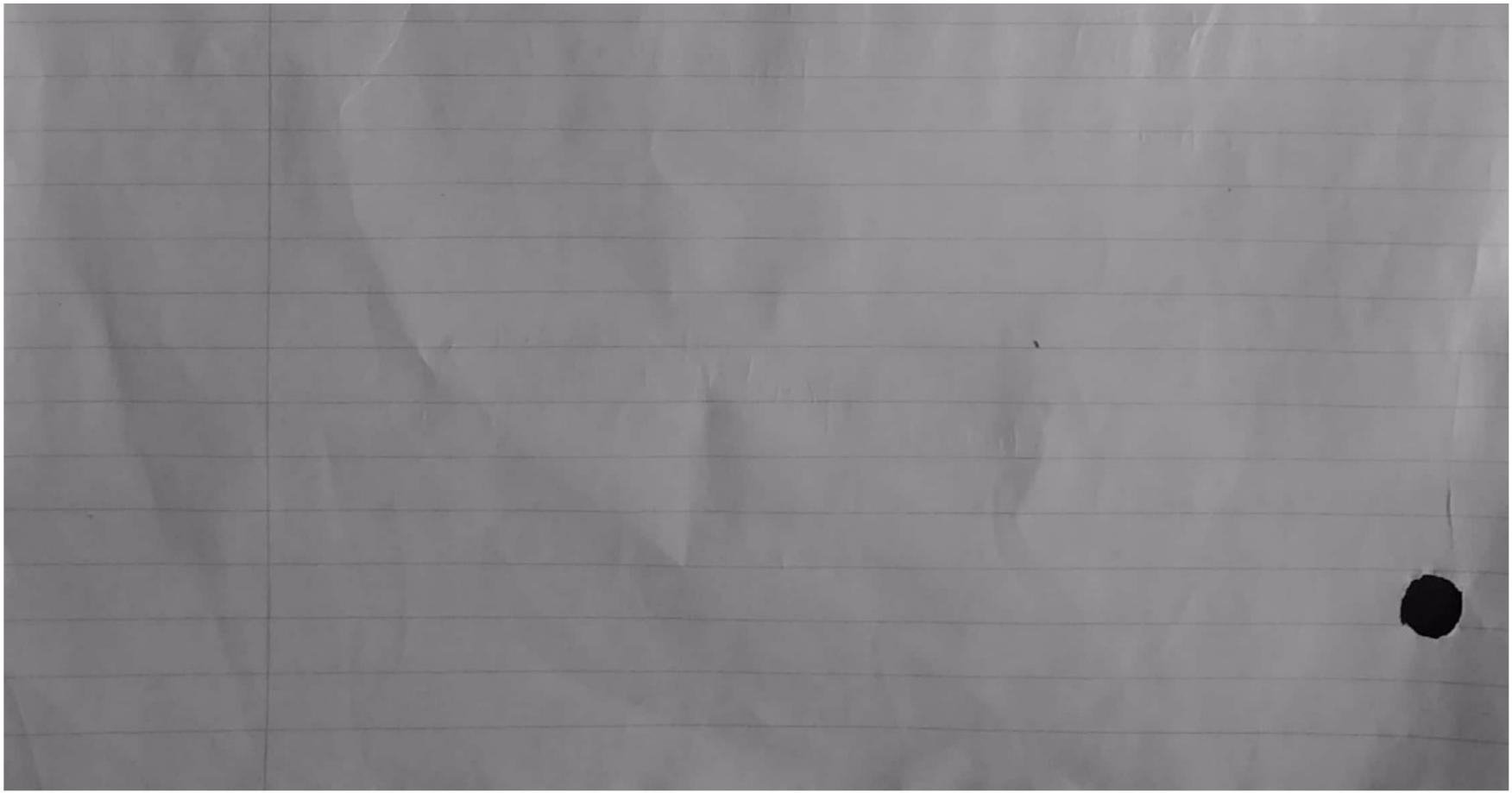
2ii) : only one of hasOpticalRangeFinder, hasThroughTheLensViewFinder and hasOpticalViewFinder is true.

Violations

Find cameras that have no evaluations

Find Lens that have no evaluations

relational algebra



Scanned by CamScanner

Q3 20

(CS 348 A4)

All relations in BCNF are already 3NF

3.i) $\{ABC \rightarrow D, D \rightarrow A\}$

(a) ABC is the candidate key
BCD is a candidate key ✓

Check FDs:

$ABC \rightarrow D$, ABC is a candidate key ✓

$D \rightarrow A$, D is not a candidate key, so NOT BCNF

Check FDs:

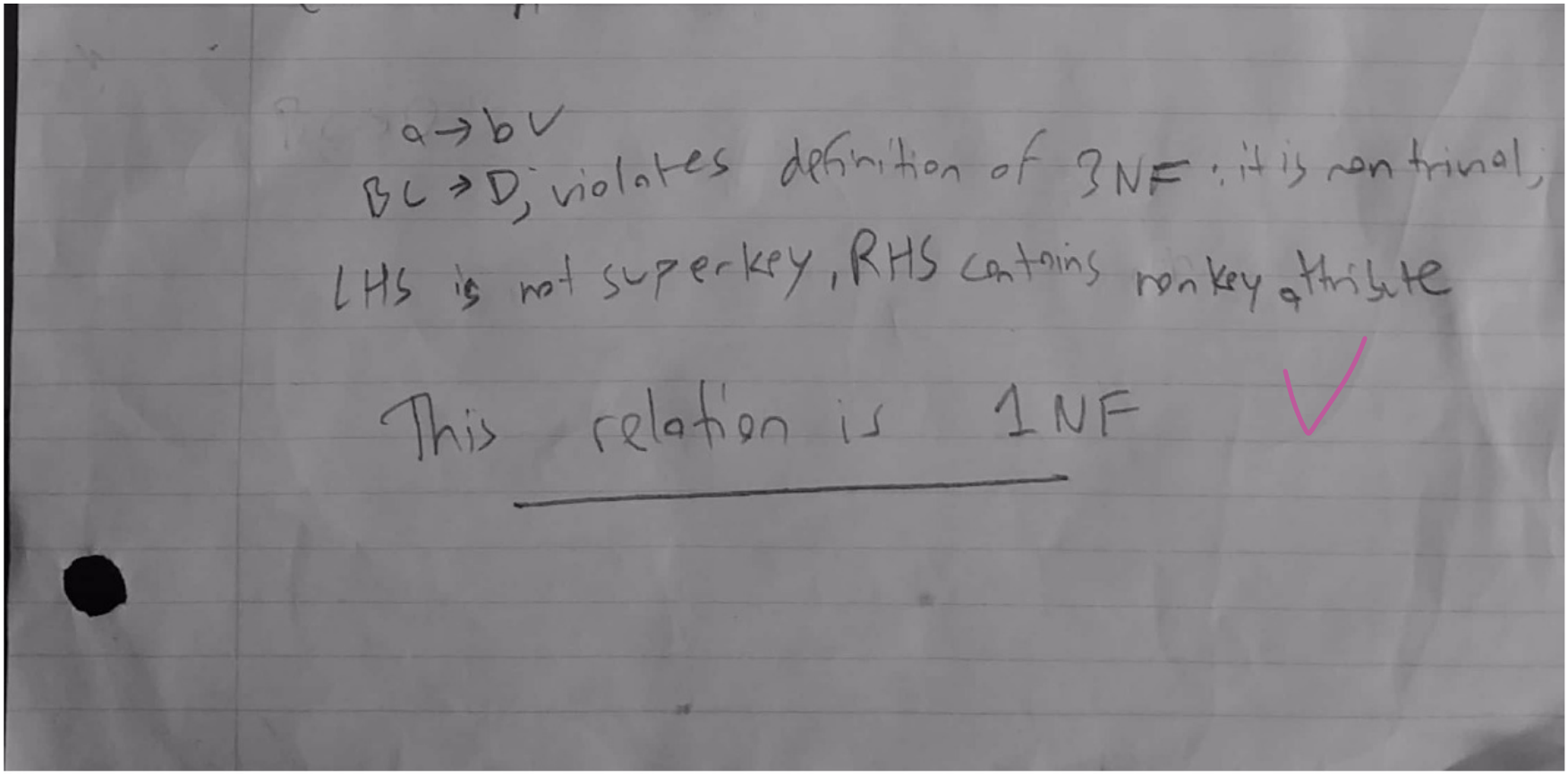
$ABC \rightarrow D$, ABC is candidate key ✓

$D \rightarrow A$, D not candidate key, but A is part of (ABC) so it is OK ✓

This relation is 3NF.

3.ii) $\{A \rightarrow B, BC \rightarrow D, A \rightarrow C\}$

(a) A is the candidate key ✓



Scanned by CamScanner

3iii) $\{AB \to C, AB \to D, C \to A, D \to B\}$

AB is a candidate key

CD is a candidate key

AD is a candidate key

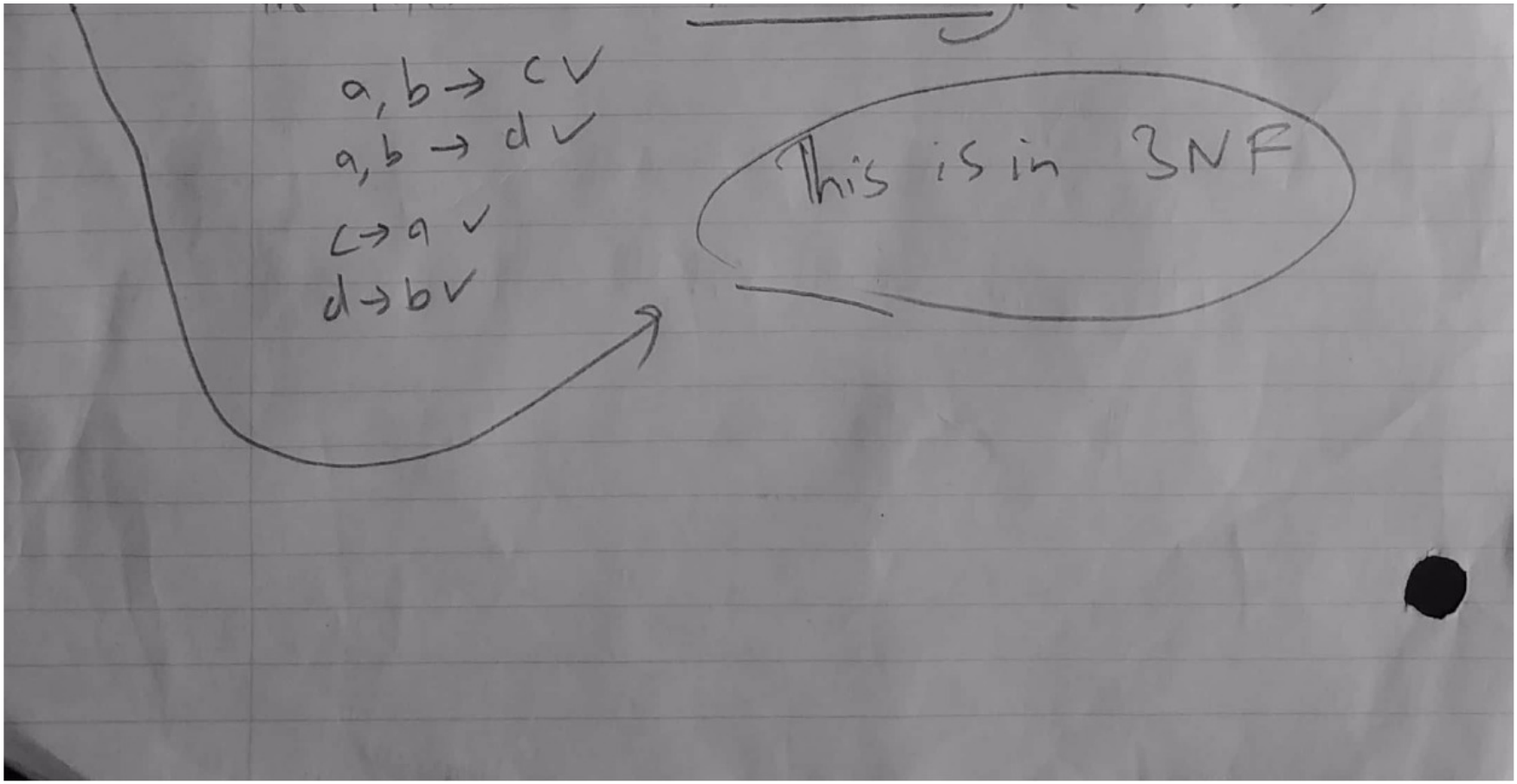
BC is a candidate key

A table is in BCNF if and only if for every nontrivial FD, the LHS is a superkey.

$C \to a$ is non-trivial and its LHS is not a superkey. Violates BCNF.

3NF

For each FD, check whether LHS is super key or the RHS are all key attributes $\to \{a, b, c, d\}$



Scanned by CamScanner