Part 1:

Consider the following RDF graph G:

```
 @prefix rdf:  www.w3.org/1999/02/22-rdf-syntax-ns#> .
 @prefix rdfs: www.w3.org/2000/01/rdf-schema#> .
 @prefix docs:  org/docs/> .
 @prefix aut:  org/authors/> .
 @prefix voc:  org/vocab/> .
(1)  voc:inJournal rdfs:domain voc:Article .
(2)  voc:inJournal rdfs:range voc:Journal .
(3)  voc:Book rdfs:subClassOf voc:Publication .
(4)  voc:Article rdfs:subClassOf voc:Publication .
(5) voc:Monograph rdfs:subClassOf voc:Book .
(6)  voc:hasFirstAuthor rdfs:subPropertyOf voc:hasAuthor .
(7)  voc:hasAuthor rdfs:range voc:Author .
(8)  docs:a voc:hasFirstAuthor aut:tim .
(9)  docs:a voc:hasAuthor aut:james .
(10)  docs:a voc:inJournal docs:sciAm .
(11) docs:a voc:cites _:x .
(12) _:x a voc:Book .
(13) _:x voc:hasFirstAuthor aut:ora .
(14) _:x voc:cites docs:a .
```

For each of the triples (or set of triples) below, verify whether they can be either RDFS or simple entailed from G and show the process for deriving them, or give a short explanation of why they cannot be derived.

1. **docs:a a voc:Publication . (NO)**

   docs:a voc:cites _:x -> _:x a voc:Book where voc_cites has no relation with a at all. It can not be drived.

2. **aut:ora a voc:Author . (NO)**

   aut:ora has no predicate(relation) a in the graph. It can not be drived.

3. **voc:hasFirstAuthor rdfs:domain voc:Publication . (NO)**

   voc:hasFirstAuthor rdfs:subPropertyOf voc:hasAuthor ->
   voc:hasAuthor rdfs:range voc:Author (which means voc:hasAuthor is the instance of voc:Author property)
   But voc:Author(predicate) has no relations with voc:Publication(subject).

4. **voc:hasFirstAuthor rdfs:range voc:Author . (YES)**

   voc:hasFirstAuthor rdfs:subPropertyOf voc:hasAuthor ->
   voc:hasAuthor rdfs:range voc:Author -> (Deriving)
   voc:hasFirstAuthor rdfs:range voc:Author. (voc:hasFirstAuthor is the instance of voc:Author property.)

5. **_:y a voc:Publication . (YES)**

   _:y a voc:Book -> voc:Book rdfs:subClassOf voc:Publication -> (Deriving)
   _:y a voc:Publication.

6. **voc:Monograph rdfs:subClassOf voc:Publication . (YES)**

voc:Monograph rdfs:subClassOf voc:Book -> voc:Book rdfs:subClassOf voc:Publication -> (Deriving) voc:Monograph rdfs:subClassOf voc:Publication

7. **_:n voc:cites _:m . (YES)**
   _:m voc:cites _:p . (YES)
   _:p a voc:Article . (NO)

   -:n voc:cites docs:a -> docs:a voc:cites _:m -> (Deriving)
   _:n voc:cites _:m
   _:m voc:cites _:p (same reason)
   _:p a voc:Book -> voc:Book rdfs:subClassOf voc:Publication.
   voc:Book(Subject) has no relations with voc:Article(Subject) so that it can not be drived.

8. **voc:inJournal rdfs:domain voc:Publication . (YES)**

   voc:inJournal rdfs:domain voc:Article -> voc:Article rdfs:subClassOf voc:Publication -> (Deriving)
   voc:inJournal rdfs:subClassOf voc:Publication.