Understanding Relational Algebra

Consider the following relational schema:

Customer(*cId*: integer, *cName*:string, *cAddr*:string, *cAge*:integer)
Movie(*mName*:string, *mTime*:float, *mRating*:string)
Theater(*tName*:string, *tCapacity*:integer, *tAddr*:string)
Visit(*cId*: integer, *mName*:string, *tName*:string, *vPrice*:money)

Using this schema, answer the following questions:

a) (**5 pts**) Write a relational expression for the query: **Find the name and address of all customers who watched a movie that lasted more than two hours.**

b) (**5 pts**) Consider the following query: **Find the names of movies that cost less than some other movies.**

Write a relational expression for it.

Problem (Continuation)

c) (**5 pts**) Consider the query: **Find the name, capacity and address for all theaters showing an R-rated movie that lasts longer than 2 hours.**
Write a relational expression for it

d) (**5 pts**) Consider the following relational expression:

$$\pi_{tName}(Theater \triangleright\!\triangleleft (Visit \triangleright\!\triangleleft \sigma_{mName="ET"}(Movie))) \cup \pi_{tName}(Theater \triangleright\!\triangleleft \sigma_{cId="123"}(Visit))$$

Which of the following best explains the meaning of this expression?:

I. Find the names of theaters showing the movie named "ET" and the visited by customer with cId = "123".
II. Find the names of theaters showing the movie named "ET" in which customer with cId = "123" watched that movie.
III. Find the names of theaters showing the movie named "ET" or visited by customer with cId = "123".
IV. Both I and III
V. None of the above.

Answer: _____

Problem (Continuation)

e) (**5 pts**) Consider the following query: **Find the name, id and age for all customers who watched both "ET" and "Amy" at Cineplex theater.**

Write a relational expression for it.