(50 points)

1. Using the following relations:

product (pno, pname, man)
pno – product number
pname – product name
man – manufacturer identification number
manufacturer (manno, mname, tickerno)
manno – manufacturer identification number
mname – manufacturer name
tickerno – stock market identification code

For each of the following, give the relational algebra (6 points each), tuple relational calculus (5 points each) and domain relational calculus (3 points each) notion for each.

a. Find the pno for all products.
b. Find all tuples in product where pname = “eraser”
c. Find the pno and tickerno for all products.

2. Write the SQL code for division. Try to do it without using the EXCEPT clause. If you cannot figure it out, I will accept the EXCEPT clause with a slight deduction in points. There are no particular tables for this assignment so you make up table and entity names if necessary for your code. (8 points)

Remember you can write $r \div s$ as

$temp1 \leftarrow \prod_{R-S} (r)$
$temp2 \leftarrow \prod_{R-S} ((temp1 \times s) - \prod_{R-S,S} (r))$
$result = temp1 - temp2$