3.

Student (Student-name, Department)
Course (Course-name, Department)
Enrollment (Student-name, Course-name)

a)

$$\Pi_{\text{student name}}\left(\sigma_{\substack{\text{course name} \\ = \text{"Intro to CS"}}}(\text{Enrollment})\right)$$

b) (All students) − (All students who only took home dept. courses)

$$\Pi_{\text{student.name}}\left(\sigma_{\substack{\text{student.dept} \\ \neq \\ \text{course.dept}}}(\text{Student} \bowtie (\text{Enrollment} \bowtie \text{Course}))\right)$$

c) (All departments) − (All departments with students in them)

$$= \Pi_{\text{Dept}}(\text{Course}) - \Pi_{\text{dept}}(\text{Student})$$

d)

$$\Pi_{\text{student.dept}}\left(\text{Student} \bowtie \left(\text{Enrollment} \bowtie \sigma_{\substack{\text{dept} \\ = \\ \text{"MSBA"}}}(\text{Course})\right)\right)$$

e) If I do → Enrollment ⋈ Course, this will give me data on students enrolled in classes & the departments of those classes & names of the classes. Sometimes, there will be multiple instances of a student name if they take more than one course. In addition, there may be some students enrolled in no courses. →