

1. a)  $\pi_{name, age} (\sigma_{credits=4 \wedge grade=10} (Students \bowtie Enrolled \bowtie Courses))$
- b) i.  $P(P_1, (\pi_{sid} (\sigma_{grade \geq 7} (Enrolled \bowtie Courses))))$   
 ii.  $P(P_2, (\pi_{sid} (\sigma_{grade < 7} (Enrolled \bowtie Courses))))$   
 iii.  $\pi_{Sname} ((P_1 - P_2) \bowtie Students)$
- c)  $P(P_1, \sigma_{age \leq 25 \wedge grade \geq 7} (Courses \bowtie Enrolled \bowtie Students))$   
 $P(P_2, \sigma_{age > 25 \wedge grade < 7} (Courses \bowtie Enrolled \bowtie Students))$   
 $\pi_{name} (P_1 - P_2)$
- d)  $\pi_{age} (\sigma_{grade=10 \wedge 2 \cdot credits=4} (Students \bowtie Enrolled \bowtie Courses))$

--num2

--a)

```
select c.name
from courses c, enrolled e, students s
where c.cid = e.cid and s.sid = e.sid and
      s.sid = select max(select s.age
                          from students s
                          );
```

--b)

```
select c.cname
from courses c, enrolled e, students s
where c.cid=e.cid and s.sid = e.sid and s.age > 25 and e.grade > 7);
```

--c)

```
select c.cname
from students s, enrolled e
where s.sid =e.sid and 2 > (select count(*)
                            from enrolled e
                            where e.grade =10)
and 4>= (select count(*)
        from course c
        where e.cid = c.cid
```

```
) ;
```

```
--d)
```

```
select avg(e.grade)
from courses c, enrolled e, students s
where s.age >=25
group by c.cid
having 10 >= count (*)
```

```
--e)
```

```
select c.cname
from courses c
where not exists(
    (select s.sid from students select
        where s.age >=20)
    except
    (select e.sid from enrolled where
        e.cid = c.cid)
)
```