

```

1 (a)
2 u=c(0,-3,5)
3 A=rbind(c(-1,-2,0),
4         c(2,1,6),
5         c(1,-1,3),
6         c(-1,1,-3))
7 b=c(-2,10,4,-4)
8 o=lp("max",objective.in = u,const.dir = rep("<=",4),const.mat = A,const.rhs = b)
9 o$solution
10 o$objval
11 #dual form
12 ud=b
13 Ad=t(A)
14 bd=u
15 od=lp("min",objective.in = ud,const.dir = rep(">=",3),const.mat = Ad,const.rhs = bd)
16 od$solution
17 od$objval
18
> (a)
[1] 1 2 3 4
> u=c(0,-3,5)
> A=rbind(c(-1,-2,0),
+         c(2,1,6),
+         c(1,-1,3),
+         c(-1,1,-3))
> b=c(-2,10,4,-4)
> o=lp("max",objective.in = u,const.dir = rep("<=",4),const.mat = A,const.rhs = b)
> o$solution
[1] 0.6666667 0.6666667 1.3333333
> o$objval
[1] 4.666667
> #dual form
> ud=b
> Ad=t(A)
> bd=u
> od=lp("min",objective.in = ud,const.dir = rep(">=",3),const.mat = Ad,const.rhs = bd)
> od$solution
[1] 1.6666667 0.6666667 0.3333333 0.0000000
> od$objval
[1] 4.666667

```

```

> (b)
[1] -2 10 4 -4
> u=c(0,-4,3,2,-8)
> A=rbind(c(3,1,2,1,0),
+         c(-3,-1,0,-2,-1),
+         c(-1,1,0,-1,1))
> b=c(3,-3,-2)
> o=lp("max",objective.in = u,const.dir = rep("<=",3),const.mat = A,const.rhs = b)
> o$solution
[1] 0 0 0 3 0
> o$objval
[1] 6
> #dual form
> ud=b
> Ad=t(A)
> bd=u
> od=lp("min",objective.in = ud,const.dir = rep(">=",5),const.mat = Ad,const.rhs = bd)
> od$solution
[1] 2 0 0
> od$objval
[1] 6
(b)
u=c(0,-4,3,2,-8)
A=rbind(c(3,1,2,1,0),
        c(-3,-1,0,-2,-1),
        c(-1,1,0,-1,1))
b=c(3,-3,-2)
o=lp("max",objective.in = u,const.dir = rep("<=",3),const.mat = A,const.rhs = b)
o$solution
o$objval
#dual form
ud=b
Ad=t(A)
bd=u
od=lp("min",objective.in = ud,const.dir = rep(">=",5),const.mat = Ad,const.rhs = bd)
od$solution
od$objval

```