

1.

```

1 library(lpSolveAPI)
2 lprec<-make.lp(4,7)
3 set.objfn(lprec,rep(1,7))
4 set.column(lprec,1,c(1,1,0,0))
5 set.column(lprec,2,c(0,1,1,0))
6 set.column(lprec,3,c(0,0,1,1))
7 set.column(lprec,4,c(1,0,0,0))
8 set.column(lprec,5,c(0,1,0,0))
9 set.column(lprec,6,c(0,0,1,0))
10 set.column(lprec,7,c(0,0,0,1))
11 lp.rownames<-c("8am-Noon","Noon-4pm","4pm-8pm","8pm-Midnight")
12 lp.colnames<-c("8am-4pm (L)","Noon-8pm(L)","4pm-Midnight(L)","8am-Noon (S)","Noon-4pm (S)","4pm-8pm (S)","8pm-Midnight (S)")
13 dimnames(lprec)<-list(lp.rownames,lp.colnames)
14 rhs<-c(4,8,10,6)
15 set.rhs(lprec,rhs)
16 set.constr.type(lprec, rep(">=",4))
17 get.objective(lprec)
18 get.variables(lprec)

```

2.

Cameron Croghan Question 2

C = # of Collegiate to produce

M = # of Minis to produce

Maximize Profit $P = \$32C + \$24M$

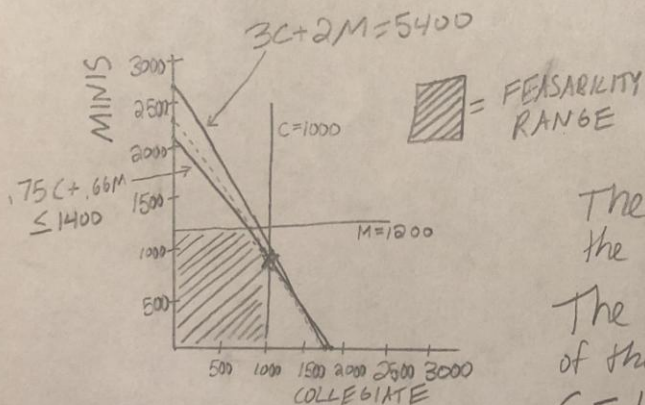
$3C + 2M \leq 5000$ sq ft Nylon

$.75C + .66M \leq 1400$ hrs

$C \geq 0$ $M \geq 0$

Sales $C \leq 1000$

Forecast $M \leq 1200$



Objective Function
Line = $\$32C + \$24M = 60,800$

The \$60,800 number falls outside of the feasibility range

The objection hits the outermost point of the feasibility region at \$55,400 profit
 $C = 1000$ $M = 975$

3a. Decision Variables= How much of each size to produce at each plant (9 total)

b. X_{1s} <- # of small units produced / day at plant 1

X_{1m} <- # of medium units produced / day at plant 1

X_{1l} <- # of large units produced / day at plant 2 etc.

'Maximize P'

$$P = 300X_{1s} + 360X_{1m} + 420X_{1l} + 300X_{2s} + 360X_{2m} + 420X_{2l} + 300X_{3s} + 360X_{3m} + 420X_{3l}$$

Constraints

$$X_{1s} + X_{1m} + X_{1l} \leq 750$$

$$X_{2s} + X_{2m} + X_{2l} \leq 900$$

$$X_{3s} + X_{3m} + X_{3l} \leq 450$$

$$12X_{1s} + 15X_{1m} + 20X_{1l} \leq 13000$$

$$12X_{2s} + 15X_{2m} + 20X_{2l} \leq 12000$$

$$12X_{3s} + 15X_{3m} + 20X_{3l} \leq 5000$$

$$X_{1s} + X_{2s} + X_{3s} \leq 750$$

$$X_{1m} + X_{2m} + X_{3m} \leq 1200$$

$$X_{1l} + X_{2l} + X_{3l} \leq 900$$

$$\text{All } X \geq 0$$