Problem 1

a. Define the decision variables

X = Colegiate Units

Y = Mini Units

b. What is the objective function

MAX 32X + 24Y

c. What are the constraints

0 <= X <= 1000

0 <= Y <= 1200

3X + 2Y <= 5000

45X + 40Y <= 84,000

d. What down the full math formula for this LP problem

MAX 32X + 24Y = Profit

MIN 45X + 40Y = Labor Cost

Work:

	Collegiate	Mini	
sq ft required	3	2	
labor (mins)	45	40	
profit	32	24	
5000	sq ft of material per week		
Units sold of Colegiate per wk <= 1000			
Units sold of Mini per wk <= 1200			
35 employees, 40 hrs per week			

Problem 2

a. Decision variables for plants 1, 2 & 3

S = units of the small product

M = units of the medium product

L = units of the large product

b. Linear Programming model

MAX 300S + 360M + 420L = profit

Constraints:

S, M, L >= 0

Plant	Production Capacity	Storage Capacity	Avoid Layoffs (needs above .5 "50%")
1	S + M + L <= 750	12S + 15M + 20L <= 13000	(S + M + L) / 750 > .5
2	S + M + L <= 900	12S + 15M + 20L <= 12000	(S + M + L) / 900 > .5
3	S + M + L <= 450	12S + 15M + 20L <= 5000	(S + M + L) / 450 > .5

Work:

My assumption is that "most" of the production capacity means above 50%.

	small	medium	large
profit	300	360	420
storage	12	15	20
	excess cap to product / day	Storage space limit	
Plant 1	540	13000	
Plant 2	900	12000	
Plant 3	450	5000	
Each plant must use greater than 50% of their production capacity to avoid layoffs. The percentage should be the same for each plant.			