Problem 1

	Collegiate	Mini
Sq Ft	3	2
Labour (mins)	45	40
Profit	32	24

5000 material per week

Units sold per week

Collegiate <= 1000

Mini <= 1200

   35 employees work 40 hrs. per week

a. Decision Variables:

      X = collegiate units
 Y = Mini Units

b. Objective Function: Max32X+24Y

c. Constraints:

Material Constraint: 3X+2Y <= 5000
Labour Constraint: 45X+40Y <=84,000

X <= 1000

Y <= 1200

d. Full math formula:

Max32X+24Y = Profit
Min 45X+40Y = labour Cost

Problem 2

Plant	Production Capacity	Storage Capacity	Layoffs
1	S+M+L <= 750	125+15M+20 (S+	>0.5
2	S+M+L <= 900	125+15M+20L <= 12000	(S+M+L)/900 >0.5
3	S+M+L <= 450	125+15M+20 (S+	> 0.5

	Small	Medium	Large
Profit	300	360	420
Storage	12	15	20
Plant 1	540	13000	
Plant 2	900	12000	
Plant 3	450	5000	

a. Decision Variables:

S = Small product
M = Medium Product
L = Large Product

b. Linear Programming Model:

Max300s+360m+420l = Profit

Maximize:

$300s_1 + 300s_2 + 300s_3 + 360m_1 + 360m_2 + 360m_3 + 420l_1 + 420l_2 + 420l_3$

Constraints:

S, M, L >= 0
Plant:

$s_1 + m_1 + l_2 <= 750$
$s_2 + m_2 + l_3 <= 900$
$s_3 + m_3 + l_3 <= 450$

Sales:

$s_1 + s_2 + s_3 <= 750$
$m_1 + m_2 + m_3 <=$
$1200 \ l_1 + l_2 + l_3 <=$
900

Storage:

$12s_1 + 15m_1 + 20l_1 \qquad <=$
$13000 \qquad 12s_2 + 15m_2 + 20l_2$
$<= \qquad\qquad 12000$
$12s_3 + 15m_3 + 20l_3 <= 5000$