**Q1)**Total sqft nylon sheet = 5000 sqft

Total time of working = 84000minutes=84000/60 = 1400 hours

1. **Decision variables** = Collegiate(x), Mini(y)
2. **Objective function** = Profit Maximization Zmax = 32x+24y
3. **Constraints** = x<=1000

y<=1200

1. **Mathematical formulation** 🡪 3x+2y <= 5000 (Material)

(3/4)x+(2/3)y <=1400 (Time) where x,y>=0

NOTE:(45mins = 3/4 hour)

(40 mins = 2/3 hour)

**Q 2) a)Decision variables** =

L1, M1, and S1 be the quantities of products with large, medium, and small sizes of Plant one. L2, M2, and S2 be the quantities of products with large, medium, and small sizes of Plant two. L3, M3, and S3 be the quantities of products with large, medium, and small sizes of Plant three.

**b) Linear programming model**=

1)Decision variables = Lx, Mx, Sx

2)Objective fun = Zmax =420L1+420L2+420L3+360M1+360M2+360M3+300S1+300S2+300S3

**Time Constraints**=

L1+M1+S1 <= 750 (plant 1 spare capacity)

L2+M2+S2 <= 900 (plant 2 spare capacity)

L3+M3+S3 <= 450 (plant 3 spare capacity)

L1+L2+L3 <= 900 (sales forecast of Large)

M1+M2+M3 <= 1200 (sales forecast of Medium)

S1+S2+S3 <= 750 (sales forecast of Small)

20L1+15M1+12S1 <= 13000 (storage space in plant 1)

20L2+15M2+12S2 <= 12000 (storage space in plant 2)

20L3+15M3+12S3 <= 5000 (storage space in plant 3)

Lx, Mx, Sx >= 0

It is given that each plant should be using equal percentage of its production units

900\*( L1+M1+S1)= 750\*(L2+M2+S3) & 450\*(L1+M2+S2)=900\*(L3+M3+S3)

**Non-Negativity:**L1,L2,L3,M1,M2,M3,S1,S2,S3 >=0