2.Back Savers is a company that produces backpacks primarily for students. They are considering offering some combination of two different models—the Collegiate and the Mini. Both are made out of the same rip-resistant nylon fabric. Back Savers has a long-term contract with a supplier of the nylon and receives a 5000 square-foot shipment of the material each week. Each Collegiate requires 3 square feet while each Mini requires 2 square feet. The sales forecasts indicate that at most 1000 Collegiates and 1200 Minis can be sold per week. Each Collegiate requires 45 minutes of labor to produce and generates a unit profit of $32. Each Mini requires 40 minutes of labor and generates a unit profit of $24. Back Savers has 35 laborers that each provides 40 hours of labor per week. Management wishes to know what quantity of each type of backpack to produce per week.

a.Clearly define the decision variables

b.What is the objective function?

c.What are the constraints?

d.Write down the full mathematical formulation for this LP problem.

a. X1 (units of Collegiate produced per week)

   X2(units of Mini produced per week)

   Z (profits per week)

b. Max: Z=32X1+24X2

c. X1≧1,000

   X2≧1,200

   3X1+2X2≦5000

   45X1+40X2=84,000

   X1,X2 would be integer

d. Max:Z=32X1+24X2

   X1≧1,000

   X2≧1,200

   3X1+2X2≦5000

   45*X1+40*X2≦84,000

X1,X2 would be integer