Linear Programming Assignment

Question 1 - BackSavers:

a) ***Decision Variables:***
how many units of Collegiate and Mini backpacks to produce per week.

b) ***Objective Function :***

Let X_1 represent number of Collegiate backpacks produced per week
Let X_2 represent number of Minis backpacks produced per week
Let Z represent profit ($)

Max : $Z = 32X_1 + 24X_2$

c) ***Constraints:***
Labor – 35 laborers that provide 40hours of labor per week
Material – 5000 square foot shipment of material per week
Sales forecast – maximum sales as 1000 Collegiates and 1200 Minis

d) ***Mathematical formulation:***

$$45X_1 + 40X_2 \leq 84{,}000$$
$$3X_1 + 2X_2 \leq 5{,}000$$
$$X_1 \leq 1{,}000$$
$$X_2 \leq 1{,}200$$

$$Z = 32X_1 + 24X_2$$

Question 1 – Weigelt Corporation:

a) *Decision Variables:*

how many units of Large, Medium and Small to produce per day.

b) *Linear Programming Model :*

Let X_1 represent number of Large product per day
Let X_2 represent number Medium product per day
Let X_3 represent number Small product per day
Let Z represent profit ($)
Let Y_1 represent plant 1
Let Y_2 represent plant 2
Let Y_3 represent plant 3

$$Z = 420X_1 + 360X_2 + 300X_3$$

$$20X_1 + 15X_2 + 12X_3 \leq 30{,}000$$
$$X_1 + X_2 + X_3 \leq 2{,}100$$
$$X_1 \leq 900$$
$$X_2 \leq 1{,}200$$
$$X_3 \leq 750$$

$$2.8Y_1 + 2.33Y_2 + 4.67Y_3 \leq X_1 + X_2 + X_3$$