Assignment 2 ——— Gordon Wall (gwall12)

1. Back Savers

Let X_j = quantity of type (j) product to make per week.

$j = 1 \rightarrow$ collegiate $j = 2 \rightarrow$ mini

Max Profit (P) = $32X_1 + 24X_2$

Subject To :

$$3X_1 + 2X_2 \leq 5{,}000$$
$$X_1 \leq 1{,}000$$
$$X_2 \leq 1{,}200$$
$$45X_1 + 40X_2 \leq 84{,}000$$
$$X_1, X_2 \geq 0$$

* 35 laborers × 40 hours/wk = 1,400 hrs/wk
convert to minutes
84,000 min/wk

2. Weigelt Corp.

Let X_{jp} = quantity of size (j) product to make by each (p) plant per day.

j = L → large size j = M → medium size
j = S → small size

p = 1 → plant 1 p = 2 → plant 2
p = 3 → plant 3

Max Profit (P) = $420X_{L1} + 360X_{M1} + 300X_{S1}$
$+ 420X_{L2} + 360X_{M2} + 300X_{S2}$
$+ 420X_{L3} + 360X_{M3} + 300X_{S3}$

Subject To :

$$\begin{aligned}
X_{L1} + X_{M1} + X_{S1} &\leq 750 \\
X_{L2} + X_{M2} + X_{S2} &\leq 900 \\
X_{L3} + X_{M3} + X_{S3} &\leq 450 \\
20X_{L1} + 15X_{M1} + 12X_{S1} &\leq 13{,}000 \\
20X_{L2} + 15X_{M2} + 12X_{M2} &\leq 12{,}600 \\
20X_{L3} + 15X_{M3} + 12X_{M3} &\leq 5{,}600 \\
X_{L1} + X_{L2} + X_{L3} &\leq 900 \\
X_{M1} + X_{M2} + X_{M3} &\leq 1{,}200 \\
X_{S1} + X_{S2} + X_{S3} &\leq 750 \\
\frac{(X_{L1} + X_{M1} + X_{S1})}{750} - \frac{(X_{L2} + X_{M2} + X_{S2})}{900} &= 0
\end{aligned}$$

over →

S.T. :

$$\frac{(X_{L2} + X_{M2} + X_{S2})}{900} - \frac{(X_{L3} + X_{M3} + X_{S3})}{450} = 0$$

All $X_{jp} \geq 0$