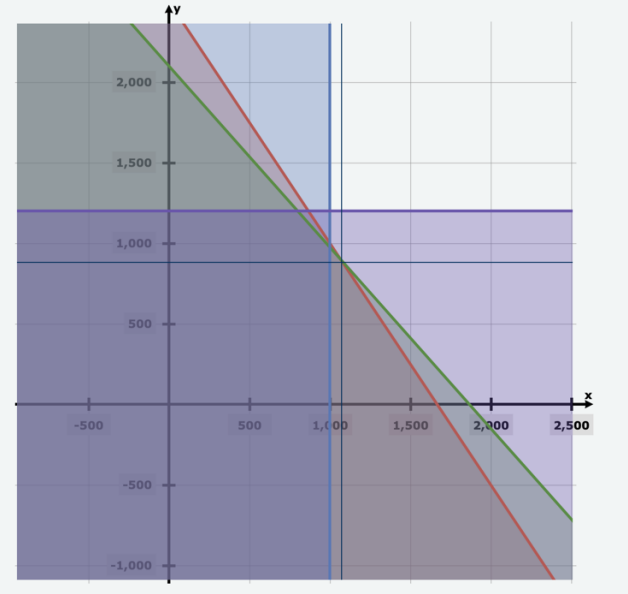
Quantitative Management Modeling

Module 2 Assignment

1.

a. X=Collegiate Model
   Y=Mini Model
b. Max Z = 32X+24Y
c. 3X+2Y≤5,000
   45X+40Y≤84,000
   0≤X≤1,000
   0≤Y≤1,200
d. Main Points of interest so far: (0,2100) & (1667,0)



-20(3x+2Y=5,000)
45X+40Y=84,000
=
-15X=-16,000
X=1,067 but can only do 1,000 max due to constraint
45(1,000)+40Y=84,000
40Y=39,000
Y=975
(0,1200)=$28,800 in profit
(1000,0) = $32,000 in profit
(1000,975)= $55,400 in profit
Answer = 1,000 Collegiate and 975 Mini

2.

a. X_{P1S} = Small units at plant 1
   X_{P1M} = Medium units at plant 1
   X_{P1L} = Large units at plant 1
   X_{P2S} = Small units at plant 2
   X_{P2M} = Medium units at plant 2
   X_{P2L} = Large units at plant 2
   X_{P3S} = Small units at plant 3
   X_{P3M} = Medium units at plant 3
   X_{P3L} = Large units at plant 3
b. Maximize $Z = \$420(X_{P1L}) + \$420(X_{P2L}) + \$420(X_{P3L}) + \$360(X_{P1M}) + \$360(X_{P2M}) + \$360(X_{P3M}) + \$300(X_{P1S}) + \$300(X_{P2S}) + \$300(X_{P3S})$

   $X_{P1S} + X_{P1M} + X_{P1L} \leq 750$

   $X_{P2S} + X_{P2M} + X_{P2L} \leq 900$

   $X_{P3S} + X_{P3M} + X_{P3L} \leq 450$

   $12_{P1S} + 15_{P1M} + 20_{P1L} \leq 13{,}000$

   $12_{P2S} + 15_{P2M} + 20_{P2L} \leq 12{,}000$

   $12_{P3S} + 15_{P3M} + 20_{P3L} \leq 5{,}000$

   $X_{P1S} + X_{P2S} + X_{P3S} \leq 750$

   $X_{P1M} + X_{P2M} + X_{P3M} \leq 1{,}200$

   $X_{P1L} + X_{P2L} + X_{P13L} \leq 900$

   $X \geq 0$