

MAXIMIZE $P = 7x - 6y + 7z$ SUBJECT TO $3x + y - z \leq 70$, $2x + y - z \leq 42$, $-x + y + z \leq 70$, $x, y, z \geq 0$

$$\begin{array}{ccccccc|cccc} 3 & 1 & -1 & 1 & 0 & 0 & 0 & 70 & \textcircled{2} & 2 & 0 & 1 & 0 & 1 & 0 & 140 \\ 2 & 1 & -1 & 0 & 1 & 0 & 0 & 42 & \rightarrow & 1 & 2 & 0 & 0 & 1 & 1 & 0 & 112 \\ -1 & 1 & \textcircled{1} & 0 & 0 & 1 & 0 & 70 & & -1 & 1 & 1 & 0 & 0 & 1 & 0 & 70 \\ -7 & 6 & -7 & 0 & 0 & 0 & 1 & 0 & & -14 & 13 & 0 & 0 & 0 & 7 & 1 & 490 \end{array}$$

\uparrow PIVOT

WEEK 13

XPROVOS

5

$$\begin{array}{ccccccc|cccc} \textcircled{1} & 1 & 0 & 1/2 & 0 & 1/2 & 0 & 70 & & 1 & 1 & 0 & 1/2 & 0 & 1/2 & 0 & 70 \\ 1 & 2 & 0 & 0 & 1 & 1 & 0 & 112 & \rightarrow & 0 & 1 & 0 & -1/2 & 1 & 1/2 & 0 & 42 \\ -1 & 1 & 1 & 0 & 0 & 1 & 0 & 70 & & 0 & 2 & 1 & 1/2 & 0 & 3/2 & 0 & 140 \\ -14 & 13 & 0 & 0 & 0 & 7 & 1 & 490 & & 0 & 27 & 0 & 7 & 0 & 14 & 1 & 1470 \end{array}$$

DONE! $P = 1470$ AT $x = 70, y = 0, z = 140$

EXAM 4 PRACTICE SOLUTIONS

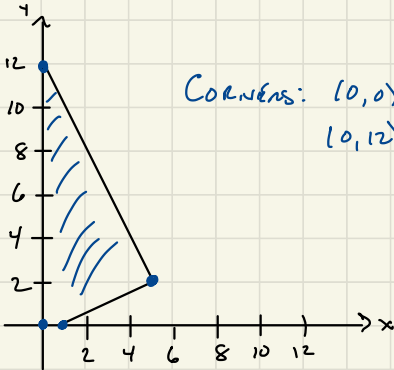
#1 MAXIMIZE $P = 8x + 3y$ ON THE REGION SHOWN.

WE NEED ONLY CHECK THE CORNER POINTS:

$$P(1,0) = 8, \quad P(5,0) = 40, \quad P(1,2.5) = 15.5, \quad P\left(\frac{14}{3}, \frac{2}{3}\right) = \frac{118}{3}$$

So $\text{Max} = 40$ @ $(5,0)$

#2 MAXIMIZE $P = 2x + 5y$ SUBJECT TO $2x + y \leq 12$, $x - 2y \leq 1$, $x, y \geq 0$



CORNERS: $(0,0), (1,0)$
 $(0,12), (5,1)$

$$P(0,0) = 0$$

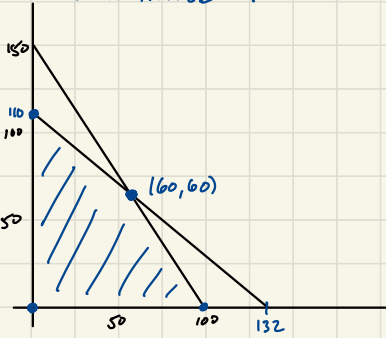
$$P(1,0) = 2$$

$$P(0,12) = 60$$

$$P(5,1) = 15$$

#3 Let $x = \#$ OF BLUE MODELS + $y = \#$ OF ORANGE MODELS.

Maximize $P = 12x + 10y$ Subject To $\frac{1}{4}x + \frac{1}{6}y \leq 25$, $\frac{1}{6}x + \frac{1}{5}y \leq 22$



$$P(0,0) = 0$$

$$P(0,110) = 1100$$

$$P(60,60) = 1320 \rightarrow \text{GO OF EACH}$$

$$P(100,0) = 1200$$

#4

$$\begin{array}{ccc|ccc|c} \textcircled{3} & 1 & 2 & 1 & 0 & 0 & 0 & 9 & 1 & 1/3 & 2/3 & 1/3 & 0 & 0 & 0 & 3 \\ & 2 & 3 & 1 & 0 & 1 & 0 & 8 & \rightarrow & 2 & 3 & 1 & 0 & 1 & 0 & 0 & 8 \\ & 1 & 2 & 3 & 0 & 0 & 1 & 7 & & 1 & 2 & 3 & 0 & 0 & 1 & 0 & 7 \\ \hline & -20 & -12 & -18 & 0 & 0 & 0 & 1 & 0 & -20 & -12 & -18 & 0 & 0 & 0 & 1 & 0 \end{array}$$

↑ Pivot Col

$$\begin{array}{ccc|ccc|c} & 1 & 1/3 & 2/3 & 1/3 & 0 & 0 & 0 & 3 & 1 & 1/3 & 2/3 & 1/3 & 0 & 0 & 0 & 3 \\ & 0 & 1 & -1/7 & -2/7 & 3/7 & 0 & 0 & 6/7 & \rightarrow & 0 & \textcircled{7/3} & -1/3 & -2/3 & 1 & 0 & 0 & 2 \\ & 0 & 5/3 & 7/3 & -1/3 & 0 & 1 & 0 & 4 & & 0 & 5/3 & 7/3 & -1/3 & 0 & 1 & 0 & 4 \\ \hline & 0 & -16/3 & -14/3 & 20/3 & 0 & 0 & 1 & 60 & & 0 & -16/3 & -14/3 & 20/3 & 0 & 0 & 1 & 60 \end{array}$$

↑ Pivot Col

$$\begin{array}{ccc|ccc|c} & 1 & 0 & 15/21 & 9/21 & -1/7 & 0 & 0 & 19/7 & & 1 & 0 & 15/21 & 9/21 & -1/7 & 0 & 0 & 19/7 \\ & 0 & 1 & -1/7 & -2/7 & 3/7 & 0 & 0 & 6/7 & \rightarrow & 0 & 1 & -1/7 & -2/7 & 3/7 & 0 & 0 & 6/7 \\ & 0 & 0 & \textcircled{16/7} & 1/7 & -5/7 & 1 & 0 & 18/7 & & 0 & 0 & 1 & 1/7 & -5/7 & 3/7 & 0 & 1 \\ \hline & 0 & 0 & -36/7 & 36/7 & 16/7 & 0 & 1 & 452/7 & & 0 & 0 & -36/7 & 36/7 & 16/7 & 0 & 1 & 452/7 \end{array}$$

↑ Pivot Col

So $P = 70$ At $x=2, y=1, z=1$