

Q #6 Key

1) $x = \#$ of newspaper ads Obj: $C = 100x + 150y + 300z$
 $y = \#$ of radio Ads
 $z = \#$ of TV Ads

Con $\begin{cases} 100x + 150y + 300z \leq 50,000 \\ 200x + 300y + 600z \geq 10,000 \\ y \geq 2z \\ x \geq 0, y \geq 0, z \geq 0 \end{cases}$

2) Maximize $g = -x - 2y - 4z$ $\rightarrow x + 2y + 4z + s = 0$
 Subject to: $\begin{cases} -x - 2y - z \leq -5 \\ -2x + y \leq -8 \\ x + y + 2z \leq 12 \\ x \geq 0, y \geq 0, z \geq 0 \end{cases}$

$\begin{cases} -x - 2y - z + \Delta_1 = -5 \\ -2x + y + \Delta_2 = -8 \\ x + y + 2z + \Delta_3 = 12 \end{cases}$

$2R_3 + R_1$
 $-R_3 + R_2$
 $-2R_3 + R_4$

$$\left[\begin{array}{ccccccc|c} -1 & -2 & -1 & 1 & 0 & 0 & 0 & -5 \\ -2 & 1 & 0 & 0 & 1 & 0 & 0 & -8 \\ 1 & 2 & 4 & 0 & 0 & 1 & 0 & 12 \\ \hline 1 & 2 & 4 & 0 & 0 & 0 & 1 & 0 \end{array} \right]$$

$-R_3 + R_1$
 $3R_3 + R_2$
 $R_3 + R_4$

$$\left[\begin{array}{ccccccc|c} 1 & 0 & 3 & 1 & 0 & 2 & 0 & 19 \\ -3 & 0 & -2 & 0 & 1 & -1 & 0 & -20 \\ 1 & 2 & 4 & 0 & 0 & 1 & 0 & 12 \\ \hline -1 & 0 & 0 & 0 & 0 & -2 & 1 & -24 \end{array} \right]$$

$-2R_1 + R_2$
 $-R_1 + R_3$
 $R_1 + R_4$

$$\left[\begin{array}{ccccccc|c} 0 & -1 & 1 & 1 & 0 & 1 & 0 & 7 \\ 0 & 3 & 4 & 0 & 1 & 2 & 0 & 16 \\ 1 & 1 & 2 & 0 & 0 & 1 & 0 & 12 \\ \hline 0 & 1 & 2 & 0 & 0 & -1 & 1 & -12 \end{array} \right]$$

$\left[\begin{array}{ccccccc|c} 0 & -1 & 1 & 1 & 0 & 1 & 0 & 7 \\ 0 & 5 & 2 & -2 & 1 & 0 & 0 & 2 \\ 1 & 2 & 1 & -1 & 0 & 0 & 0 & 5 \\ \hline 0 & 0 & 3 & 1 & 0 & 0 & 1 & -5 \end{array} \right]$

Min = 5
 when
 $x = 5$
 $y = 0$
 $z = 0$