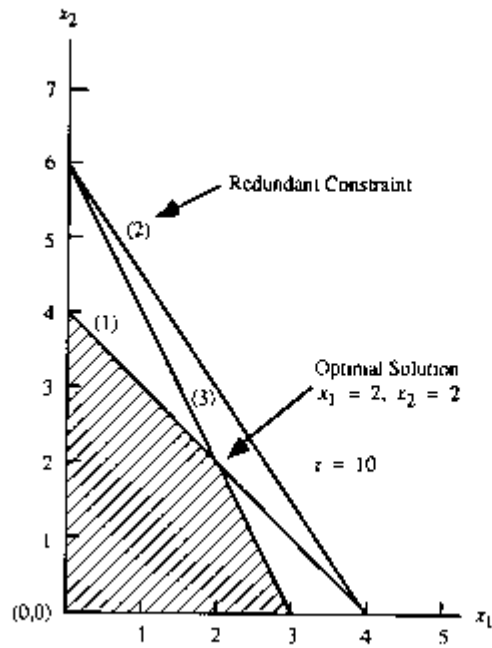


Chapter 2 Problems 13,16, 24, 26

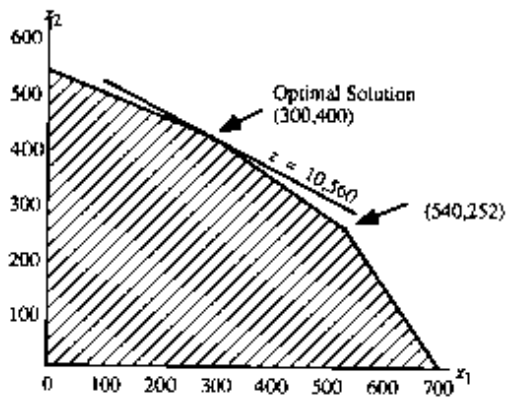
13. a



b. Yes, constraint 2.

The solution remains $x_1=2, x_2=2$ if constraint 2 is removed

16. a



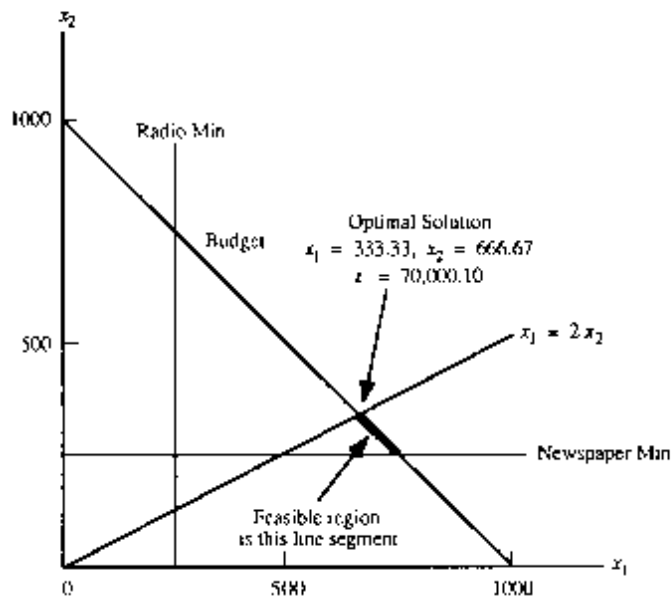
- b. Similar to part (a): the same feasible region with a different objective function. The optimal solution occurs at (708,0) with a profit of $z = 20(708) + 9(0) = 14,160$.
- c. The Sewing constraint is redundant. Such a change would not change the optimal solution on the original problem.

24. a

Let x_1 = amount spent on newspaper advertising
 x_2 = amount spent on radio advertising

$$\begin{array}{rcll}
 \text{Max} & 50x_1 + & 80x_2 & \\
 \text{S.t.} & & & \\
 & x_1 + & x_2 = & 1000 \quad \text{Budget} \\
 & x_1 & \geq & 250 \quad \text{Newspaper minimum} \\
 & & x_2 \geq & 250 \quad \text{Radio minimum} \\
 & x_1 - & 2x_2 \geq & 0 \quad \text{News} \geq 2 \text{ Radio} \\
 & x_1, x_2 \geq & 0 &
 \end{array}$$

b.



26. a

Let x_1 = number of jars of Western Foods Salsa produced
 x_2 = number of jars of Mexico City Salsa produced

$$\begin{array}{rllllll} \text{Max} & 1x_1 & + & 1.25x_2 & & & \\ \text{S. t.} & & & & & & \\ & 5x_1 & + & 7x_2 & \leq & 4480 & \text{Whole tomatoes} \\ & 3x_1 & + & 1x_2 & \leq & 2080 & \text{Tomato sauce} \\ & 2x_1 & + & 2x_2 & \leq & 1600 & \text{Tomato paste} \\ & x_1, x_2 & \geq & 0 & & & \end{array}$$

Note: units of constraints are ounces

b. Optimal solution: $x_1 = 560$, $x_2 = 240$
Value of optimal solution is 860