1. A manufacturer of bicycles builds one, three, and ten-speed models. The bicycles are made of both aluminum and steel. The company has available 91,800 units of steel and 42,000 units of aluminum. The one, three, and ten-speed models need, respectively, 20, 30, and 40 units of steel and 12, 21, and 16 units of aluminum. How many of each type of bicycle should be made to maximize profit if the company makes $8 per one-speed, $12 per three-speed, and $24 per ten-speed? What is the maximum possible profit?

2. A political party is planning a half-hour television show. The show will have 3-minutes of direct requests for money from viewers. Three of the party’s politicians will be on the show: a senator, a congresswoman, and a governor. The senator, a party “elder statesman,” demands that he be on screen at least twice as long as the governor. The total time taken by the senator and the governor must be at least twice the time taken by the congresswoman. On the basis of a preshow survey, it is believed that 40, 60, and 50 (in thousands) viewers will watch the program for each minute the senator, congresswoman, and governor, respectively, are on the air. Find the time that should be allotted to each politician in order to get the maximum number of viewers. Find the maximum number of viewers.

3. The Cut-Right Company sells sets of kitchen knives. The Basic Set consists of 2 utility knives and 1 chef’s knife. The Regular Set consists of 2 utility knives, 1 chef’s knife, and 1 slicer. The Deluxe Set consists of 3 utility knives, 1 chef’s knife, and 1 slicer. The profit is $30, $40, and $60 respectively. The factory has on hand 800 utility knives, 400 chef’s knives, and 200 slicers. Assuming all the sets will be sold, how many of each type should be made up in order to maximize profit? What is the maximum profit?