**Klein Industries manufactures three types of portable air compressors: small, medium, and large, which have unit profits of $20.50, $34.00, and $42.00, respectively. The projected monthly sales are:**

 **Small Medium Large**

**Minimum 14,000 6,200 2,600**

**Maximum 21,000 12,500 4,200**

**The production process consists of three primary activities: bending and forming, welding, and painting. The amount of time in minutes needed to process each product in each department is shown below:**

 **Small Medium Large Available Time**

**Bending/ 0.4 0.7 0.8 23,400**

**Forming**

**Welding 0.6 1.0 1.2 23,400**

**Painting 1.4 2.6 3.1 46,800**

**How many of each type of air compressor should the company produce to maximize profit?**

1. **Formulate and solve a linear optimization model using the auxiliary variable cells method and explain the sensitivity information.**
2. **Solve the model without the auxiliary variables and explain the relationship between the reduced costs and the shadow prices found in part a.**