**Situation:** You supervise 40 hours of assembly crew and 15 hours of shipping crew. They handle two products the MintyBoost and the TV-B-Gone. The MB takes 15 minutes to assemble, and 5 minutes to pack, while the TV takes 10 minutes to assemble, and 5 minutes to pack. Middle management has given you free reign on how many to produce for now.

| | MB | TV | Labor |
|---|---|---|---|
| Assembly | 15 min | 10 min | 40 hrs |
| Shipping | 5 min | 5 min | 15 hrs |

**Goal:** Keep the crew busy

(a) What do you have the most direct control over? What is the most direct decision you need to make?

(b) What should $x$ and $y$ represent? Be **specific**. Your answer must be sufficient to handle the question, "ok, so $x = 7$. what does that mean?"

(c) What constraints do you operate under? Why can't you just set $x = 10000$ and $y = 999999$?

(d) The constraints actually determine a college algebra problem. Solve it as $x = \ldots$, $y = \ldots$

(e) Now what does it actually mean? What are you the manager actually going to do with the answer to this college algebra problem?

Solve some systems:

$$\begin{cases} 15x + 10y = 2400 \\ 5x + 5y = 900 \\ x - 2y = 0 \end{cases}$$

$$\begin{cases} x + y = 4 \\ x + y = 8 \end{cases}$$

$$\begin{cases} 2x + 2y = 8 \\ x + y = 8 \end{cases}$$

$$\begin{cases} 5x + 5y = 20 \\ 4x + 4y = 32 \end{cases}$$

$$\begin{cases} 10x - 15y = 20 \\ 4x - 6y = 32 \end{cases}$$

What value of $k$ makes the following impossible?

$$\begin{cases} x + y = 4 \\ 7x + ky = 56 \end{cases}$$

$$\begin{cases} 3x - 7y = 13 \\ 6x + ky = 38 \end{cases}$$