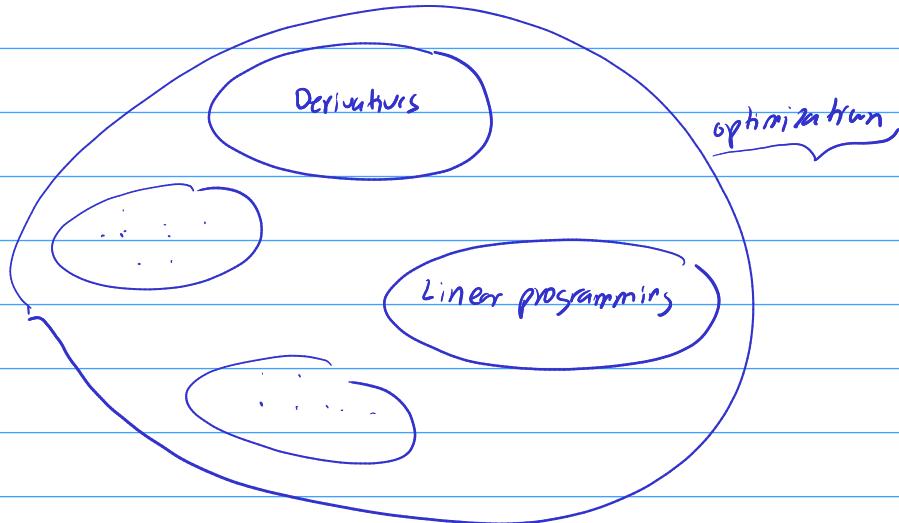


Optimization



Linear programming

Example

A toy manufacturer makes wooden blocks and horses. The production process involves two basic types of labor: carpentry and design. A block requires 2 hours of carpentry and 1 hour of design, and a horse requires 1 hour of carpentry and 3 hours of design. [The profit is \$10 per block and \$14 per horse.] The manufacturer's employees can supply a maximum of 10 hours of carpentry work and 15 hours of design work per day. How many blocks and horses should be made each day to maximize profit?

$$x \quad y$$

Step 1 : Name variables and set up the linear programming prob.

Step 2 : use Excel to solve the problem.

Step 1 : x : number of blocks

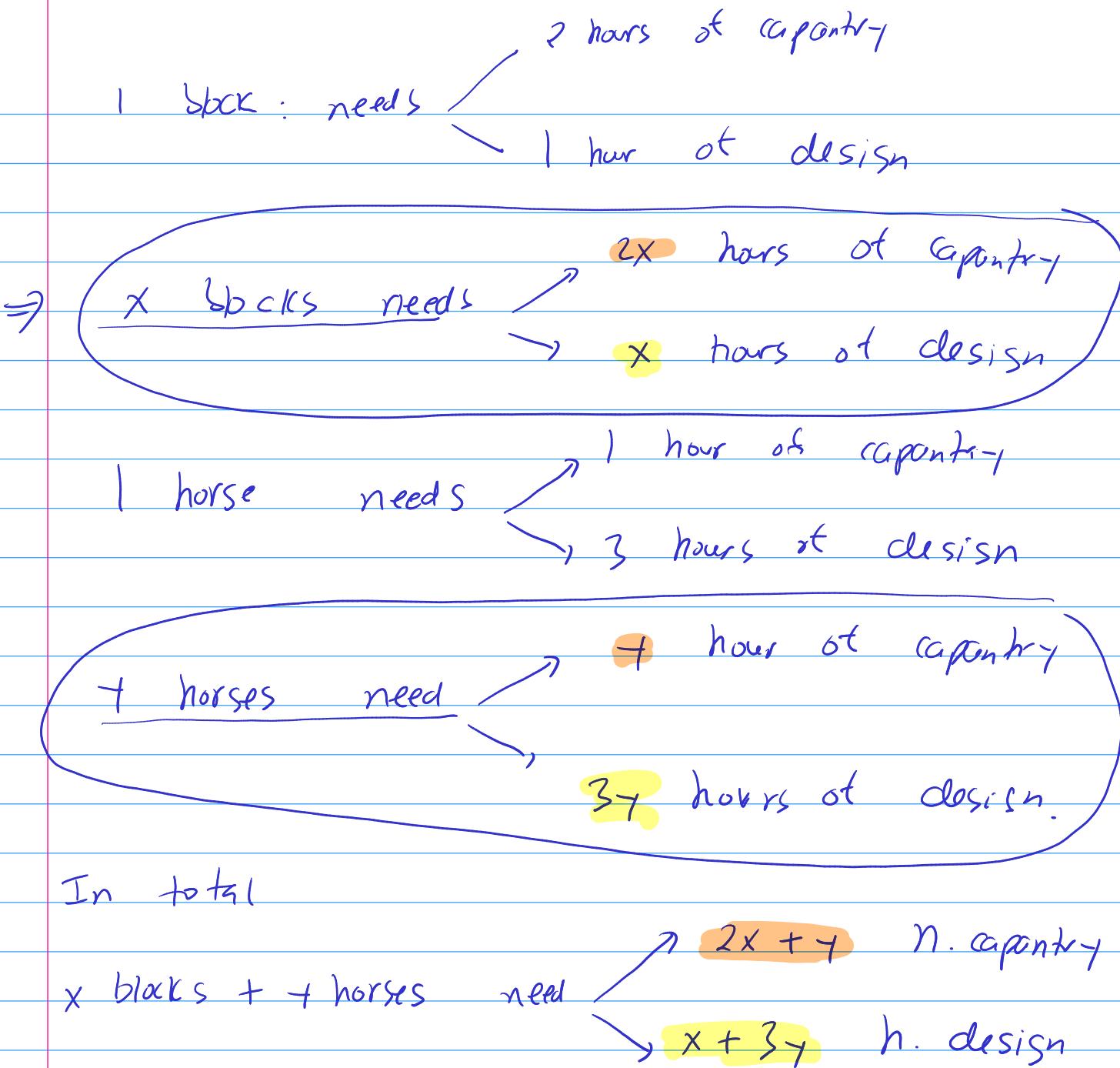
y : number of horses

Profit:

$$10x + 14y$$

constraint 1:

To produce x blocks and y horses, how many carpentry hours do we need?



constraint.

$$\begin{cases} 2x + y \leq 10 \\ x + 3y \leq 15 \end{cases}$$

maximize

$$10x + 14y$$

under the constraints:

$$\begin{cases} 2x + y \leq 10 \\ x + 3y \leq 15 \end{cases}$$

Step 2