A Linear Programming Problem

Section 3.1-3.2

January 28, 2016

Manufacturing toys

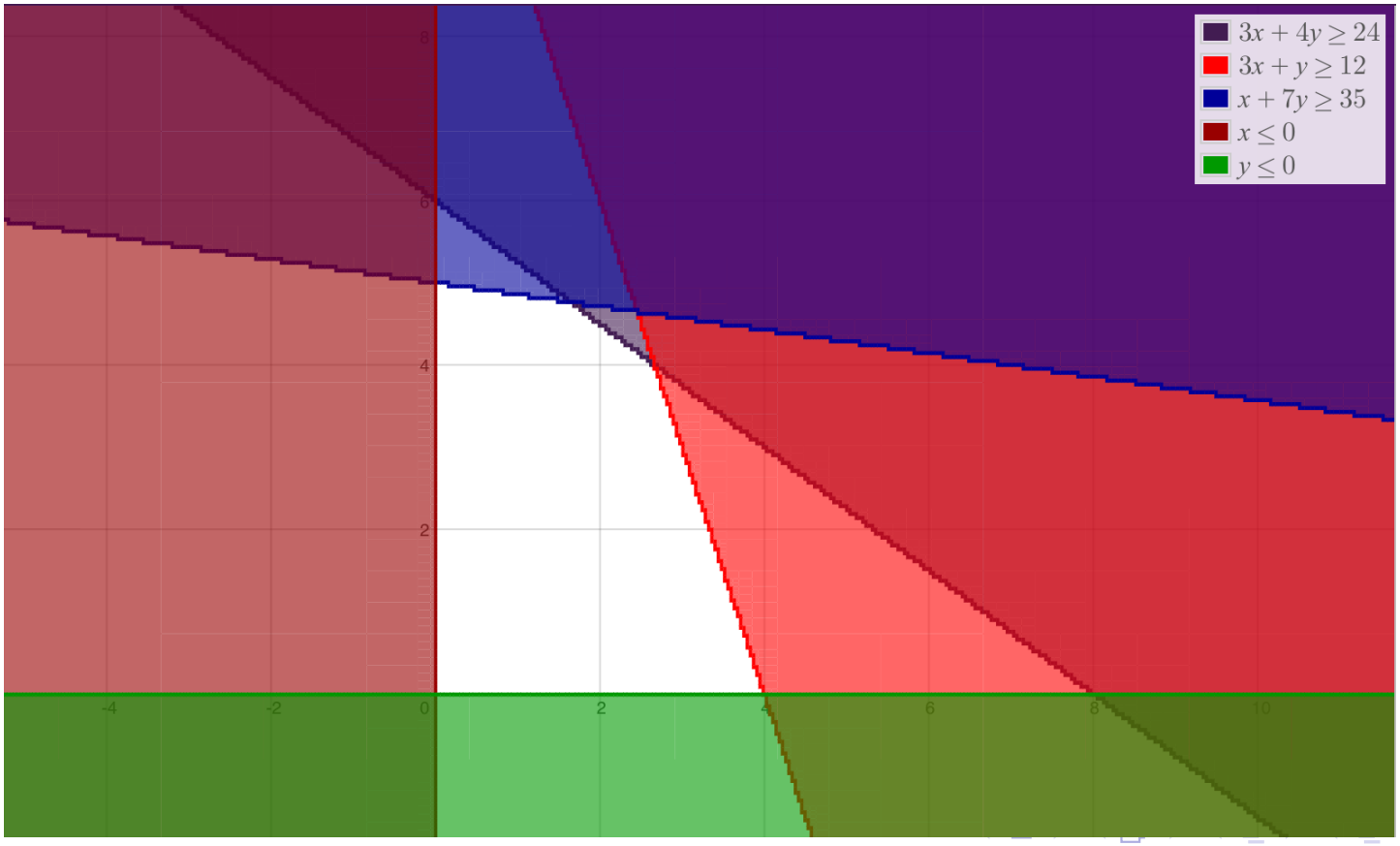
A toy manufacturer makes two types of toys, trains and jigsaw puzzles. Each needs some amount of carpentry, fitting and painting.

	Trains	**Puzzle**	**Available Time**
Carpentry	3 hours	4 hours	24 hours
Finishing	1 hour	7 hour	35 hours
Painting	3 hours	1 hour	12 hours

Suppose that the manufacturer earns a profit of \$1 for each train it produces and \$2 for each puzzle.

Graph of feasible set

$$\begin{cases} 3x + 4y \leqslant 24 \\ x + 7y \leqslant 35 \\ 3x + y \leqslant 12 \\ x, y \geqslant 0 \end{cases}$$



Example: Candy

An candy company has factories in Cleveland and Toledo that produce two different kinds of candies: chocolate bars and caramel bars. An order is received for 25 chocolate bars and 24 caramel bars.

- Each day, the Cleveland factory can produce 5 chocolate bars and the Toledo factory can produce 5 chocolate bars
- Each day, the Cleveland factory can produce 0 caramel bars and the Toledo factory can produce 8 caramel bars.
- It costs \$20 to operate the Cleveland factory and \$25 to operate the Toledo factory. How many days should each factory operate so that cost is minimize?

Example

A clothing manufacturer makes dresses and jackets.

- Each dress requires 2 hours for cutting and each jacket requires 1 hour for cutting, but there are only 42 hours available
- Each dress requires 2 hours of sewing and each jacket requires 4 hours of sewing, but there are only 16 hours available
- Each dress requires 3 hours of finishing and each jacket requires 1 hour of finishing, but there are only 9 hours available
- The manufacturer earns a profit of \$3 for each dress and \$7 for each jacket it produces.