

Problem 1

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Problem 2

$$X < Y + Z$$

Let $Q = (n, n)$ such that $n \in R$

$$X < Q[0] + Q[1]$$

with constraints:

$$Q[0] = Y$$

$$Q[1] = Z$$

Problem 6

Part 1

x_1, x_2, x_3 are the weight of the respective items that we will select.

Table:

	Weight	Value	Density
x_1	5	2	$2/5$
x_2	3	3	1
x_3	1	1	1

Solution:

$$MAX(\frac{2}{5}x_1 + x_2 + x_3)$$

With constraints:

$$5x_1 + 3x_2 + x_3 \leq c$$

$$0 \leq x_1 \leq 5$$

$$0 \leq x_2 \leq 3$$

$$0 \leq x_3 \leq 1$$

Part 2

The four constraints that are missing are:

$$y_1 \geq 0, y_2 \geq 0, y_3 \geq 0, y_4 \geq 0$$

Part 3

I don't understand what duality is.