

Lesson 7: Modeling a Problem Situation

To model a situation means to write all inequalities and solve the equation. If there is no negative numbers allowed the first two inequalities are $x \geq 0$, $y \geq 0$. The other inequalities must be determined by dissecting the paragraphs.

Example 1: Jesse likes to swim and play racquetball. In one hour Jesse burns 700 calories swimming and 550 calories playing racquetball. Swimming costs \$5/hr and racquetball costs \$7/h. In one week, Jesse wishes to burn at least 4500 calories exercising and spend no more than 8 h exercising. He is willing to pay up to \$50 per week. Describe a possible program for Jesse using inequalities and solve the system.

let $x = \#$ of ~~hours~~ playing racquetball
 $y = \#$ of hours swimming

Cost	$7x + 5y \leq 50$
Time	$x + y \leq 8$
Calories	$550x + 700y \geq 4500$

Example 2: Marie likes to swim and play tennis. In 1 h Marie burns 600 calories swimming or 450 calories playing tennis. Swimming costs \$4/h and tennis costs \$6/h. In one week, Marie wishes to burn at least 5000 calories and spend no more than 10 h exercising. She is willing to pay up to \$48 per week.

let $x = \#$ of hours swimming
 $y = \#$ of hours playing tennis

Calories	$600x + 450y \geq 5000$
Cost	$4x + 6y \leq 48$
Time	$x + y \leq 10$

Example 3: A sporting goods manufacturer makes fleece pullovers and vests. To make a pullover requires 4 min on the cutting machine and 3 min on the stitching machine. A vest requires 2 min on the cutting machine and 4 min on the stitching machine. How many pullovers and vests can be made in 1 h or less?

let $x = \#$ of vests
 $y = \#$ of pullovers

Cutting	$2x + 4y \leq 60$
Stitching	$4x + 3y \leq 60$