



d) Supply the system of linear inequalities for the constraints

e) Supply the objective function to be optimized.

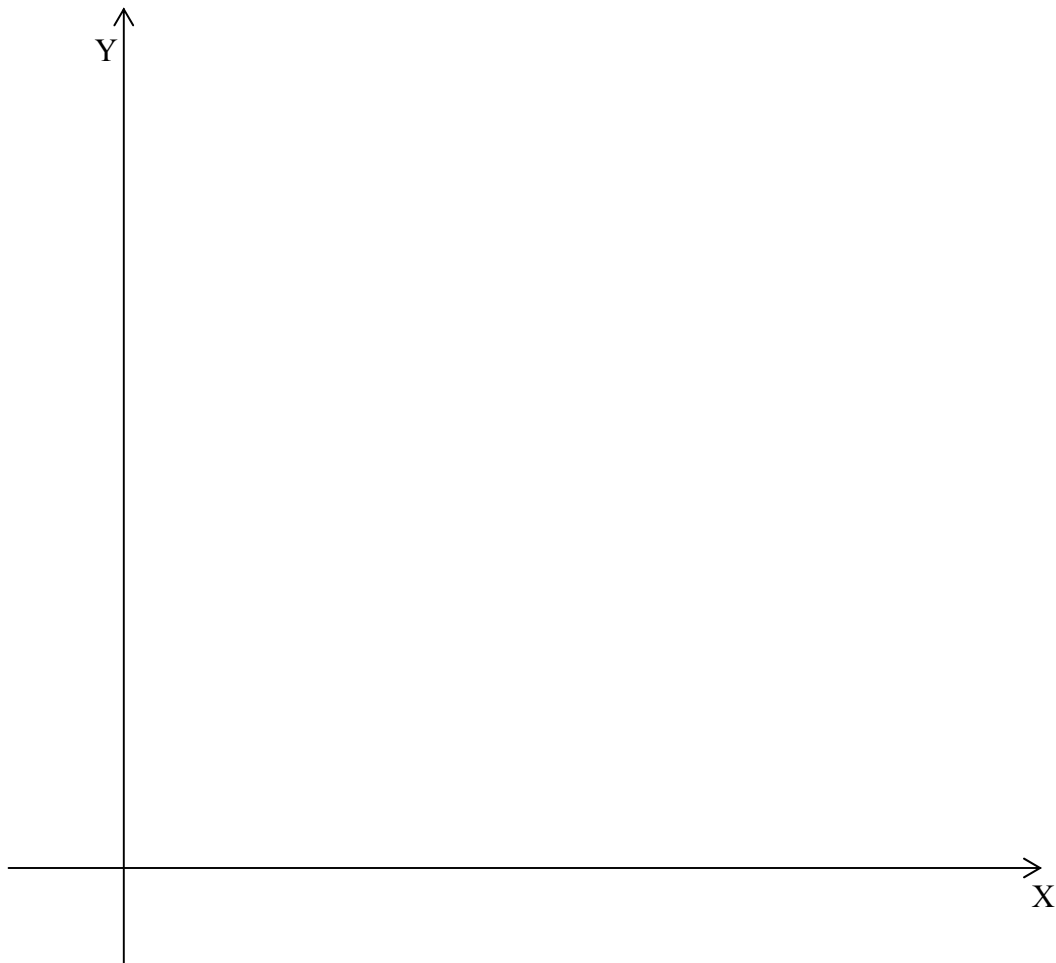
2. The owner of a sports store claims that he has at most 100 baseball mitts in stock, of which no more than 25 are catcher mitts. Moreover, he notices that the number of fielder mitts sold is at least as many as catcher mitts sold. For each catcher mitt he sells, he makes 30\$ and for each fielder mitt he sells, he makes 20\$. How many of each type of mitt must he sell to maximize his profit?

Let X: the number of catcher mitts  
 Y: The number of fielder mitts

Given the system of inequalities:

$$\begin{aligned} X + Y &\geq 100 \\ X &\leq 25 \\ Y &\geq X \end{aligned}$$

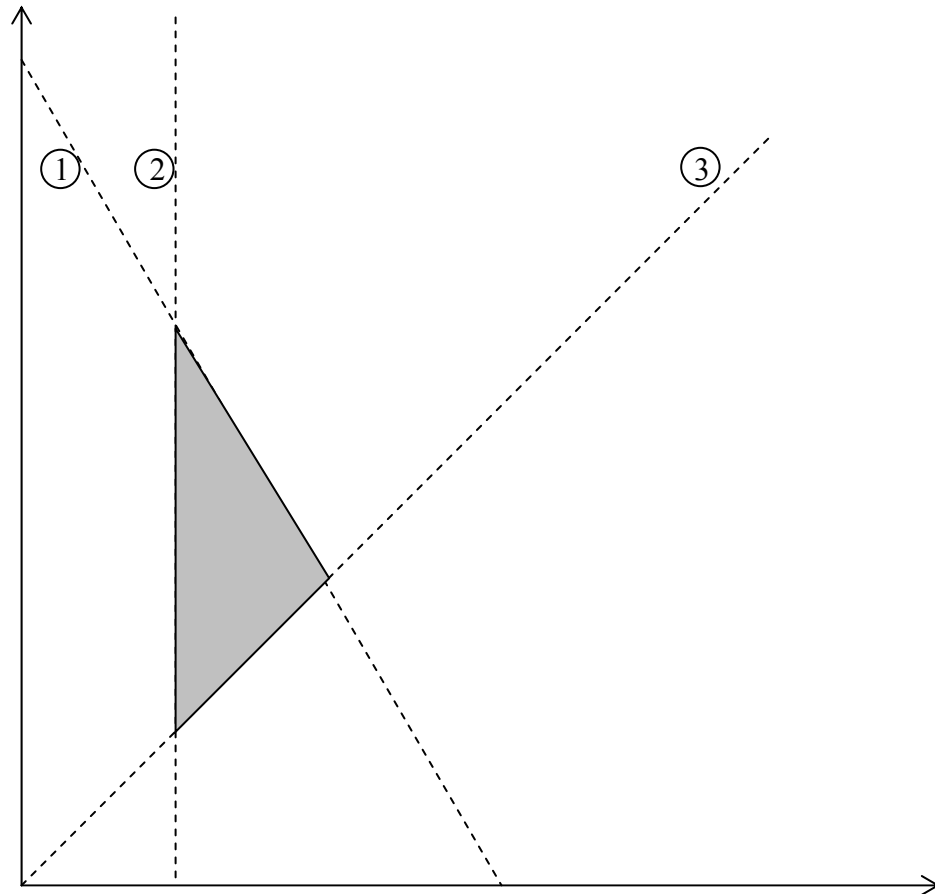
- a) Sketch the polygon of constraints indicated by this system of inequalities.



b) Complete the following table and replace the value of X and Y in each inequality with the given values. Indicate in the final column whether the points belong to the polygon of constraints.

Point	$Y \geq X$	$X \leq 25$	$X + Y \geq 100$	Belongs (Y or N)
(50, 50)				
(20, 60)				
(5, 99)				

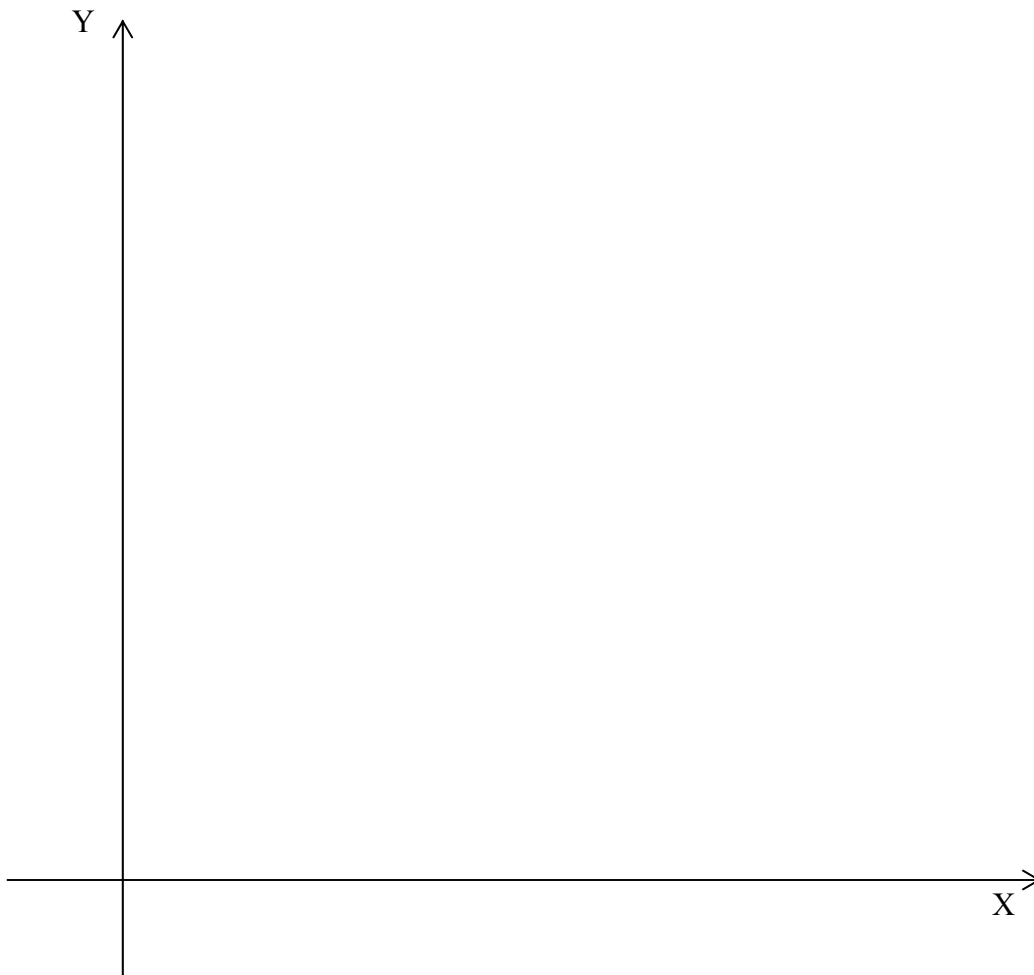
3. Algebraically determine the corner points of the polygon of constraints given below. The equations of the lines that determine the boundaries of the polygon are given below the figure.



1	$2x + y = 72$
2	$x = 15$
3	$y = x$

4. Solve the following problem and show all steps to your solution. Graph the results.

A bicycle design company produces at least 6 mountain bikes and at least 9 road bikes per week. The factory can produce up to a total of 35 bikes per week due to time constraints. Moreover, the factory produces at least 18 bikes per week due to demand. Each mountain bike costs 250\$ to produce, and each road bike costs 200\$ to produce. How many of each type of bikes must be produced to minimize production costs?



5. Solve the following problem and show all steps to your solution. Graph the results.

The organizers of a concert tour wish to manufacture at least 1000 concert tee-shirts in French for their tour stop in Montreal. There will be both long sleeve and short sleeve tee-shirts on sale. It is expected that they will sell at least twice as many short sleeve shirts as long sleeve shirts. The organizing committee has a maximum budget of 5000\$ to manufacture the shirts. A long sleeve shirt costs 7\$ to make and sells for 20\$, and a short sleeve shirt costs 3 dollars to make and sells for 10\$.

What is the maximum PROFIT that the organizers can expect to make if they sell all of their shirts?

