

Name: Key

Linear Programming Self-Assessment

1. You are screen-printing T-shirts and sweatshirts to sell at the Polk County Blues Festival. T-shirts take 10 minutes to make and sweatshirts take 30 minutes to make. You have at most 15 hours to make shirts. You have \$400 to spend on supplies. T-shirts cost \$5 to make and sweatshirts cost \$10 to make. You need to make at least 50 items. You will make a profit of \$6 on T-shirts and \$20 on sweatshirts.

a) Define your variables

$$X = \# \text{ of T-shirts}$$

$$Y = \# \text{ of sweatshirts}$$

b) Write the objective function

$$P = 6x + 20y$$

c) Write the constraints

$$x \geq 0$$

$$y \geq 0$$

$$10x + 30y \leq 900$$

$$5x + 10y \leq 400$$

$$x + y \geq 50$$

d) Graph the function.

$$y \geq -x + 50$$

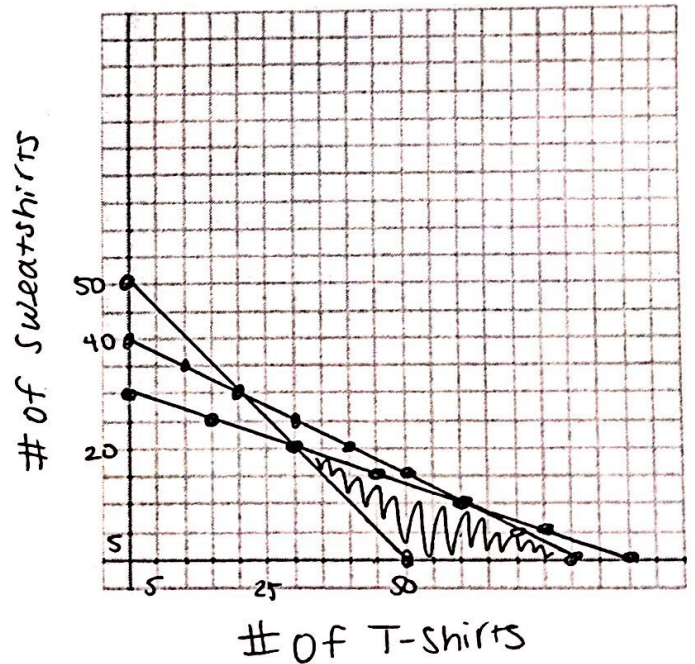
$$\frac{10y}{10} \leq \frac{-5x + 400}{10}$$

$$y \leq -\frac{1}{2}x + 40$$

$$10x + 30y \leq 900$$

$$30y \leq -10x + 900$$

$$y \leq -\frac{1}{3}x + 30$$



e) Find the coordinates of each vertex.

$$(50, 0) \quad (80, 0)$$

$$(30, 20) \quad (60, 10)$$

f) You should sell 30 T-Shirts and 20 sweatshirts to make a maximum profit of \$580.

$$P = 6(50) + 20(0) = \$300$$

$$P = 6(30) + 20(20) = \$580$$

$$P = 6(80) + 20(0) = \$480$$

$$P = 6(60) + 20(10) = \$560$$