

LINEAR PROGRAMMING

AGENDA

~ GO OVER HOMEWORK

~ EXAMPLE PROBLEM

~ PROJECT!

EXAMPLE PROBLEM

A school is preparing a trip for 400 students. The company who is providing the transportation has 10 buses of 50 seats each and 8 buses of 40 seats each, but only has 9 drivers available. The rental cost for a large bus is \$800 and \$600 for the small bus. Calculate how many buses of each type should be used for the trip. What is the minimum cost?

Step 1: Define the Variables

$X = \text{Big Bus}$
 $Y = \text{Small Bus}$

Step 2: Write a system of Inequalities

$$X \leq 10$$

$$Y \leq 8$$

$$50X + 40Y \geq 400$$

$$X + Y \leq 9$$

Step 3: Graph the Inequalities

$$X \leq 10$$

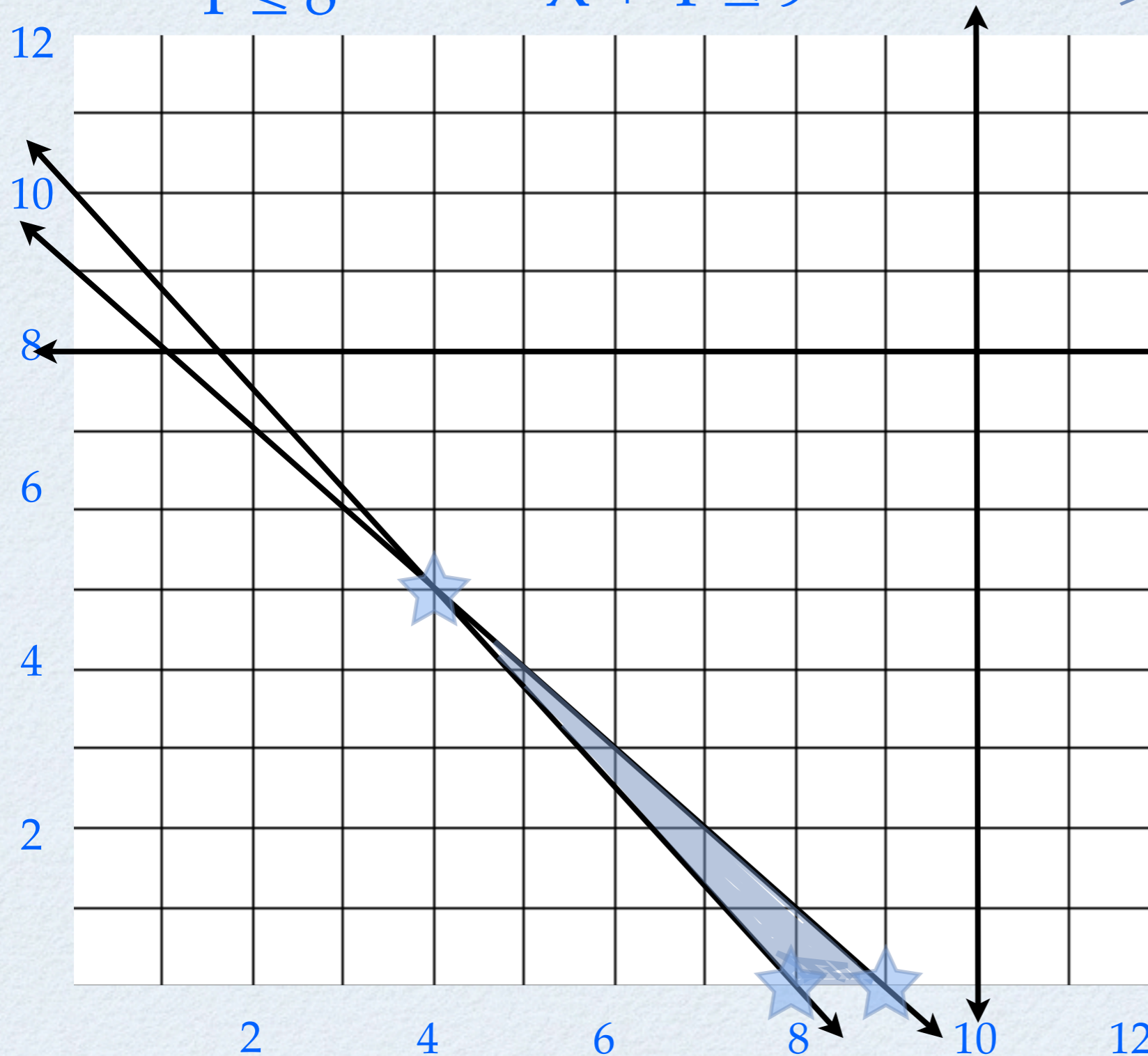
$$50X + 40Y \geq 400$$

$$\text{-----} \rightarrow Y \geq -\left(\frac{5}{4}\right)X + 10$$

$$Y \leq 8$$

$$X + Y \leq 9$$

$$\text{-----} \rightarrow Y \leq -X + 9$$



Step 4: Find the coordinates of the vertices

$$(4, 5)$$

$$(8, 0)$$

$$(9, 0)$$

Step 5: Write a function to be maximized or minimized

“The rental cost for a large bus is \$800 and \$600 for the small bus.”

$$F(X, Y) = 800X + 600Y$$

Step 6: Substitute the coordinates for the vertices into the function

Vertices	$F(X, Y) = 800X - 600Y$	Values
(4, 5)	$800(4) - 600(5)$	7200
(8, 0)	$800(8) - 600(0)$	6400
(9, 0)	$800(9) - 600(0)$	6200

-----> Minimum

Step 7: Find the greatest or least result and answer the problem

If the school rents 4 big buses and 5 small buses, they will spend \$6,200 which is the minimum amount required to go on the trip.

THE

END