2) max $p_1 x_1 - p_2 x_2$

↳ x_1 - number of bike deliveries

↳ x_2 - number of car deliveries

$p_1, p_2 > 0$

$x_1 \le a$

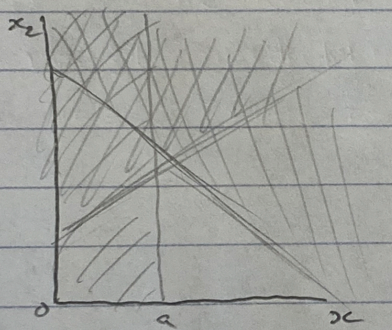
$x_1 + 2x_2 \ge b$

$2x_1 - 3x_2 \le c$

1.)

$$\boxed{\begin{aligned} \max\ & p_1 x_1 - p_2 x_2 \\ \text{S.T.}\ & x \le a \\ & x_1 + 2x_2 \ge b \\ & 2x_1 - 3x_2 \le c \\ & x_1, x_2 \ge 0 \end{aligned}}$$

2.



c could represent the feasible region

3. because the half-spaces interact to create a polyhedron, there is a finite optimal solution on an extreme point

4) max $x_1 - x_2$

S.T. $x_1 \le 3$

$x_1 + 2x_2 \ge 6 \rightarrow 2x_2 \ge 6 - x_1$

$2x_1 - 3x_2 \le 6 \rightarrow 2x_1 \le 6 + 3x_2 = x_1 \le \frac{6+3x_2}{2}$

$x_1, x_2 \ge 0$

because $x_1 \le 3$, test $x_1 = 3$

$(x_1, x_2) = (3, (6-3)/2) = 3, 1.5 \rightarrow 3 - 1.5 = 1.5$

$(x_1, x_2) = (3, 0) = 3 - 0 = 3$

↳ $x_1 = 3$, $x_2 = 0$ is optimal point