

§6.3 (PART 1): SENSITIVITY ANALYSIS

- 1.] GIAPETTO'S WORKSHOP: Suppose x_1 and x_2 are the number of soldiers and trains, respectively, that Giapetto's produces and sells from his workshop. He sells each toy for a profit but is limited by two types of skilled labor hours: finishing (constraint 1) and carpentry (constraint 2). The third constraint is a demand constraint. The LP is below along with the optimal tableau.

Maximize Profit: $z = 3x_1 + 2x_2$

Subject to: $2x_1 + x_2 \leq 100$

$x_1 + x_2 \leq 80$

$x_1 \leq 40$

$x_1, x_2 \geq 0$

Row	Basic	z	x_1	x_2	s_1	s_2	s_3	RHS
0	z	1	0	0	1	1	0	180
1	x_1	0	1	0	1	-1	0	20
2	x_2	0	0	1	-1	2	0	60
3	s_3	0	0	0	-1	1	1	20

- a.) Show that as long as soldiers (x_1) contribute between \$2 and \$4 to profit, the current basis remains optimal. If soldier's contribute \$3.50 to profit, find the new optimal solution to the Giapetto problem.

- b.) Show that as long as trains (x_2) contribute between \$1.50 and \$3.00 to profit, then the current basis remains optimal.

- c.) Show that if between 80 and 120 finishing hours are available, the current basis remains optimal. Find the new optimal solution to the Giapetto problem if 90 finishing hours are available.

- d.) Show that as long as the demand for soldiers is at least 20, the current basis remains optimal.