$$yA^2 - c_2 = (-1/3\ \ 0\ \ 0)\begin{pmatrix} 4 \\ -2 \\ 4 \end{pmatrix} + 3 = \frac{5}{3}, \qquad z^*A^2 = -(-1\ \ 3\ \ -1)\begin{pmatrix} 4 \\ -2 \\ 4 \end{pmatrix} = 14,$$

$$yA^4 - c_4 = (-1/3\ \ 0\ \ 0)\begin{pmatrix} 1 \\ -1 \\ 1 \end{pmatrix} + 1 = \frac{2}{3}, \qquad z^*A^4 = -(-1\ \ 3\ \ -1)\begin{pmatrix} 1 \\ -1 \\ 1 \end{pmatrix} = 5,$$

so

$$\theta^+ = \min\left\{\frac{5}{42}, \frac{2}{15}\right\} = \frac{5}{42},$$

and we conclude that the new feasible solution for (D) is

$$y^+ = (-1/3\ \ 0\ \ 0) + \frac{5}{42}(-1\ \ 3\ \ -1) = (-19/42\ \ 5/14\ \ -5/42).$$

When we substitute y^+ into (D), we discover that the first two constraints are equalities, and that the new J is $J = \{1, 2\}$. The new Reduced Primal $(RP2)$ is

$$\begin{aligned} &\text{Maximize} && -(\xi_1 + \xi_2 + \xi_3) \\ &\text{subject to} && \begin{pmatrix} 3 & 4 & 1 & 0 & 0 \\ 3 & -2 & 0 & 1 & 0 \\ 6 & 4 & 0 & 0 & 1 \end{pmatrix}\begin{pmatrix} x_1 \\ x_2 \\ \xi_1 \\ \xi_2 \\ \xi_3 \end{pmatrix} = \begin{pmatrix} 2 \\ 1 \\ 4 \end{pmatrix} \ \text{and}\ x_1, x_2, \xi_1, \xi_2, \xi_3 \geq 0. \end{aligned}$$

Once again, we solve $(RP2)$ via the simplex algorithm, where $\hat{c} = (0, 0, -1, -1, -1)$, $(x_1, x_2, \xi_1, \xi_2, \xi_3) = (1/3, 0, 1, 0, 2)$ and $K = (3, 1, 5)$. The initial tableau is obtained from the final tableau of the previous $(RP1)$ by adding a column corresponding the the variable x_2, namely

$$\widehat{A}_K^{-1}A^2 = \begin{pmatrix} 1 & -1 & 0 \\ 0 & 1/3 & 0 \\ 0 & -2 & 1 \end{pmatrix}\begin{pmatrix} 4 \\ -2 \\ 4 \end{pmatrix} = \begin{pmatrix} 6 \\ -2/3 \\ 8 \end{pmatrix},$$

with

$$\overline{c}_2 = c_2 - z^*A^2 = 0 - \begin{pmatrix} -1 & 3 & -1 \end{pmatrix}\begin{pmatrix} 4 \\ -2 \\ 4 \end{pmatrix} = 14,$$

and we get

	x_1	x_2	ξ_1	ξ_2	ξ_3
3	0	14	0	-4	0
$\xi_1 = 1$	0	6	1	-1	0
$x_1 = 1/3$	1	$-2/3$	0	$1/3$	0
$\xi_3 = 2$	0	8	0	-2	1

.