

Assignment-2

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	z	x	y	s_1	s_2	s_3	
	1	-3	-2	0	0	0	0
s_1	0	2	1	1	0	0	18
s_2	0	2	3	0	1	0	42
* s_3	0	3	1	0	0	1	24

	z	x	y	s_1	s_2	s_3	
	1	0	$-2 + 1 = -1$	0	0	$0 + 1 = 1$	$0 + 24 = 24$
* s_1	0	0	$1 - 1 \times \frac{2}{3} = \frac{1}{3}$	1	0	$0 - 1 \times \frac{2}{3} = -\frac{2}{3}$	$18 - 24 \times \frac{2}{3} = 2$
s_2	0	0	$3 - 1 \times \frac{2}{3} = \frac{7}{3}$	0	1	$0 - 1 \times \frac{2}{3} = -\frac{2}{3}$	$42 - 24 \times \frac{2}{3} = 26$
x	0	3	1	0	0	1	24

	z	x	y	s_1	s_2	s_3	
	1	0	0	$0 + 1 \times 3 = 3$	0	$1 + (-\frac{2}{3} \times 3) = -1$	$24 + 2 \times 3 = 30$
y	0	0	$\frac{1}{3}$	1	0	$-\frac{2}{3}$	2
* s_2	0	0	0	$0 - 1 \times 7 = -7$	1	$-\frac{2}{3} - (-\frac{2}{3}) \times 7 = 4$	$26 - 2 \times 7 = 12$
x	0	3	0	$0 - 1 \times 3 = -3$	0	$1 - (-\frac{2}{3}) \times 3 = 3$	$24 - 2 \times 3 = 18$

	z	x	y	s_1	s_2	s_3	
	1	0	0	$3 + (-4) \times \frac{1}{4} = 2$	$0 + 1 \times \frac{1}{4} = \frac{1}{4}$	0	$30 + 12 \times \frac{1}{4} = 33$
y	0	0	$\frac{1}{3}$	$1 + (-7) \times \frac{1}{6} = -\frac{1}{6}$	$0 + 1 \times \frac{1}{6} = \frac{1}{6}$	0	$2 + 12 \times \frac{1}{6} = 4$
s_3	0	0	0	-7	1	4	12
x	0	3	0	$-3 - (-7) \times \frac{3}{4} = \frac{9}{4}$	$0 - 1 \times \frac{3}{4} = -\frac{3}{4}$	$3 - 4 \times \frac{3}{4} = 0$	$18 - 12 \times \frac{3}{4} = 9$

$$\begin{pmatrix} 0 & \frac{1}{3} & 0 \\ 0 & 0 & 4 \\ 3 & 0 & 0 \end{pmatrix} \begin{pmatrix} x \\ y \\ s_3 \end{pmatrix} = \begin{pmatrix} 4 \\ 12 \\ 9 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \\ s_3 \end{pmatrix} = \begin{pmatrix} 3 \\ 12 \\ 3 \end{pmatrix}$$

$$\therefore x = 3, y = 12, \max(3x + 2y) = 33$$

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	z	x_1	x_2	x_3	s_1	s_2	s_3	
	1	1	-3	-1	0	0	0	0
s_1	0	3	-1	2	1	0	0	7
s_2	0	-2	4	0	0	1	0	12
s_3	0	-4	3	8	0	0	1	10

	z	x_1	x_2	x_3	s_1	s_2	s_3	
	1	$1 + (-2) \times \frac{3}{4} = -\frac{1}{2}$	0	-1	0	$0 + 1 \times \frac{3}{4} = \frac{3}{4}$	0	$0 + 12 \times \frac{3}{4} = 9$
s_1	0	$3 + (-2) \times \frac{1}{4} = \frac{5}{2}$	0	2	1	$0 + 1 \times \frac{1}{4} = \frac{1}{4}$	0	$7 + 12 \times \frac{1}{4} = 10$
s_2	0	-2	4	0	0	1	0	12
s_3	0	$-4 - (-2) \times \frac{3}{4} = -\frac{5}{2}$	0	8	0	$0 - 1 \times \frac{3}{4} = -\frac{3}{4}$	1	$10 - 12 \times \frac{3}{4} = 1$

	z	x_1	x_2	x_3	s_1	s_2	s_3	
	1	$-\frac{1}{2} + (-\frac{5}{2}) \times \frac{1}{8} = -\frac{13}{16}$	0	0	0	$\frac{3}{4} + (-\frac{3}{4}) \times \frac{1}{8} = \frac{21}{32}$	$0 + 1 \times \frac{1}{8} = \frac{1}{8}$	$9 + 1 \times \frac{1}{8} = \frac{73}{8}$
s_1	0	$\frac{5}{2} - (-\frac{5}{2}) \times \frac{1}{4} = \frac{25}{8}$	0	0	1	$\frac{1}{4} - (-\frac{3}{4}) \times \frac{1}{4} = \frac{7}{16}$	$0 - 1 \times \frac{1}{4} = -\frac{1}{4}$	$10 - 1 \times \frac{1}{4} = \frac{39}{4}$
s_2	0	-2	4	0	0	1	0	12
s_3	0	$-\frac{5}{2}$	0	8	0	$-\frac{3}{4}$	1	1

	z	x_1	x_2	x_3	s_1	s_2	s_3	
	1	0	0	0	$0 + 1 \times \frac{13}{50} = \frac{13}{50}$	$\frac{21}{32} + \frac{7}{16} \times \frac{13}{50} = \frac{77}{100}$	$\frac{1}{8} + (-\frac{1}{4}) \times \frac{13}{50} = \frac{3}{50}$	$\frac{73}{8} + \frac{39}{4} \times \frac{13}{50} = \frac{583}{50}$
x_1	0	$\frac{25}{8}$	0	0	1	$\frac{7}{16}$	$-\frac{1}{4}$	$\frac{39}{4}$
s_2	0	0	4	0	$0 + 1 \times \frac{16}{25} = \frac{16}{25}$	$1 + \frac{7}{16} \times \frac{16}{25} = \frac{32}{25}$	$0 + (-\frac{1}{4}) \times \frac{16}{25} = -\frac{4}{25}$	$12 + \frac{39}{4} \times \frac{16}{25} = \frac{456}{25}$
s_3	0	0	0	8	$0 + 1 \times \frac{4}{5} = \frac{4}{5}$	$-\frac{3}{4} + \frac{7}{16} \times \frac{4}{5} = -\frac{2}{5}$	$1 + (-\frac{1}{4}) \times \frac{4}{5} = \frac{4}{5}$	$1 + \frac{39}{4} \times \frac{4}{5} = \frac{44}{5}$

$$\begin{pmatrix} \frac{25}{8} & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 8 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} \frac{39}{4} \\ \frac{456}{25} \\ \frac{44}{5} \end{pmatrix}$$

$$\begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} \frac{78}{25} \\ \frac{144}{25} \\ \frac{11}{10} \end{pmatrix}$$

$$\therefore x_1 = \frac{78}{25}, x_2 = \frac{144}{25}, x_3 = \frac{11}{10}, \max(-x_1 + 3x_2 + x_3) = \frac{583}{50}$$

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