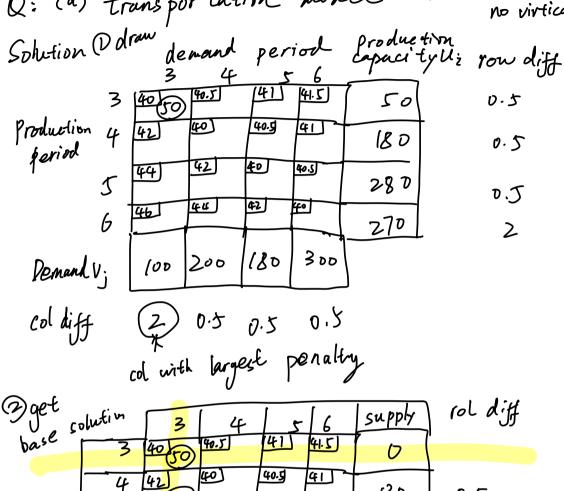
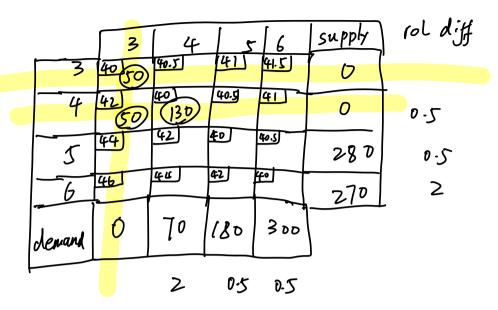
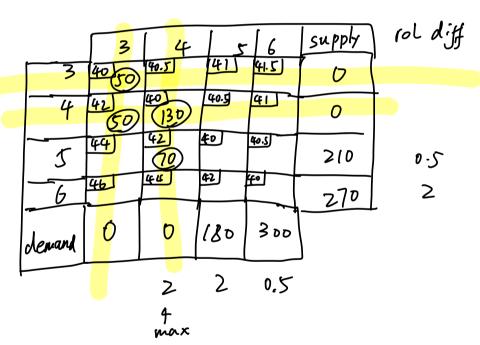
Q: (a) transportation model

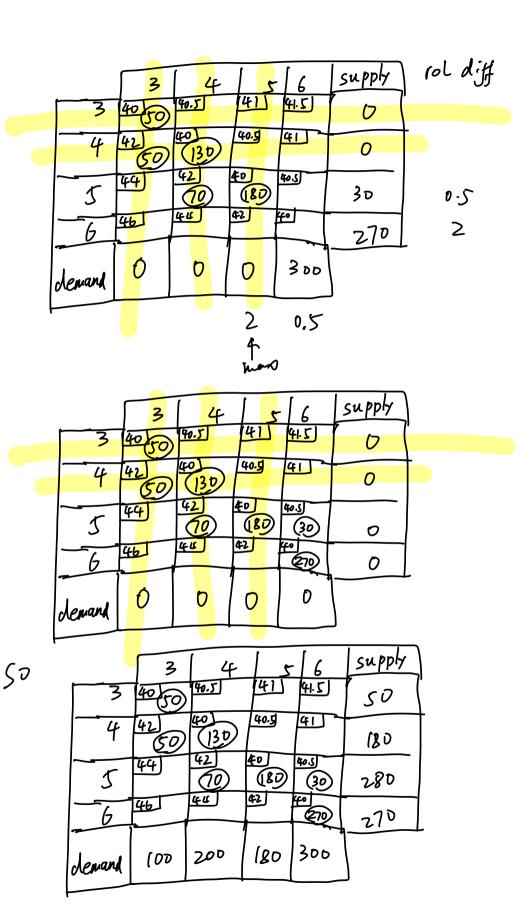
(on + 200 + 180 + 3 on = 780 no virtical supply



130 0.5 42 **40** 44 40.5 28 D 0.5 ५८ 42 40 46 2 270 300 180 200 demand 2 0.5 2 0.5 mark







3 fest optimal

. +	- april	3	1 4	1 0	- 6	supply	Wi
	3	4050	40.5	415	41.5) S	50	" -4
	4	42 50	(130)	40.g 2.5	2.5	(80	-2
	5	44) O	(10)	(80)	30	280	D
	6	46 2.5	7.7	2.5	#0 E70	270	-0-5
	demand	(O)	200	180	300		
-	Vi	44	42	40	40.5	-	

So, the solution is optimal

Cb) L?

Solution

$$0 = \pi_1^2 + x_2^2 + x_3^2 + \lambda_1(x_1 + x_2 + 3x_3 - 2) + \lambda_2(5x_1 + 2x_2 + x_3 - 5)$$

$$\frac{\partial L}{\partial x_1} = 2X_1 + \lambda_1 + J\lambda_2 = 0 \tag{1}$$

$$\frac{\partial L}{\partial x_2} = 2X_2 + \lambda_1 + 2\lambda_2 = 0$$
 (2)

$$\frac{\partial L}{\partial x_3} = 2x_3 + 3\lambda_1 + \lambda_2 = 0 \qquad (3)$$

$$\frac{\partial L}{\partial \lambda_1} = \chi_1 + \chi_2 + 3\chi_3 - 2 = 0 \tag{4}$$

$$\frac{\partial L}{\partial \lambda_2} = \int X_1 + 2X_2 + X_3 - J = 0$$
 (5)

Solve the equation using casio only 47 \$\frac{1}{2}\$ from (3)
$$\lambda_2 = 2X_2 + 3\lambda_1$$
 ft $\lambda(1)$ (2) $2X_1 + \lambda_1 + 5(2X_2 + 3\lambda_1) = 2X_1 + 10X_3 + 16\lambda_1 = 0$ $2X_2 + \lambda_1 + 2(2X_2 + 3\lambda_1) = 2X_2 + \lambda_1 + 4X_3 + 6\lambda_1$ $= 2X_2 + 4X_3 + 7\lambda_1 = 0$ (asio solve

$$\begin{bmatrix} 2 & 0 & 10 & 16 \\ 2 & 0 & 4 & 7 \\ 1 & 1 & 3 & 0 \\ 5 & 2 & 1 & 0 \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ 2 \\ 5 \end{bmatrix}$$

$$\lambda_2 = ZX_2 + 3\lambda_1$$

$$= 2x(-\frac{1}{4}) + 3x_6^{\perp}$$

$$\nabla h_i(x) = [1 \] \ 3]$$

 $\nabla h_i(x) Y = y_i + y_2 + 3y_3 = 0$

Casio solve
$$\begin{bmatrix}
2 & 0 & 10 & 16 \\
2 & 0 & 4 & 7 \\
1 & 1 & 3 & 0 \\
5 & 2 & 1 & 0
\end{bmatrix}
\begin{bmatrix}
0 \\
0 \\
2 \\
5
\end{bmatrix}$$

$$\begin{cases}
x_1 = -\frac{1}{12} = -0.08333 \\
x_2 = \frac{17}{6} = 2.8333 \\
x_3 = -\frac{1}{4} = -0.25 \\
\lambda_1 = \frac{1}{6} = 0.667 \\
\lambda_2 = 2x(-\frac{1}{6}) + 3x \\
\end{bmatrix}$$

$$= 2x(-\frac{1}{6}) + 3x \\$$

$$X = \left[-\frac{1}{12} \quad \frac{17}{6} \quad -\frac{1}{4} \right]$$

$$Z = \chi_1^2 + \chi_2^2 + \chi_3^2 = \frac{583}{72}$$

= 8,0972

$$\frac{\partial^{2}L}{\partial x_{0}}(x,\lambda) = \begin{bmatrix}
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