

Finite

§ 4.31

(65) (a)

$$\begin{array}{c}
 C \\
 A \\
 P
 \end{array}
 \begin{array}{ccc|c}
 2 & 4 & & \\
 0.5 & 1 & 1.5 & 380 \\
 0.6 & 0.9 & 1.2 & 330 \\
 0.2 & 0.3 & 0.5 & 120
 \end{array}
 \sim
 \begin{array}{ccc|c}
 1 & 2 & 3 & 760 \\
 6 & 9 & 12 & 3300 \\
 2 & 3 & 5 & 1200
 \end{array}$$

$10R_3 \rightarrow R_3$
 $10R_2 \rightarrow R_2$
 $2R_1 \rightarrow R_1$
 $-2R_1 + R_3 \rightarrow R_3$
 $-6R_1 + R_2 \rightarrow R_2$

$$\sim
 \begin{array}{ccc|c}
 1 & 2 & 3 & 760 \\
 0 & -3 & -6 & -1260 \\
 0 & -1 & -1 & -320
 \end{array}
 \sim
 \begin{array}{ccc|c}
 1 & 2 & 3 & 760 \\
 0 & 1 & 1 & 320 \\
 0 & -3 & -6 & -1260
 \end{array}
 \sim
 \begin{array}{ccc|c}
 1 & 2 & 3 & 760 \\
 0 & 1 & 1 & 320 \\
 0 & 0 & -3 & -300
 \end{array}$$

$-R_3 \rightarrow R_2$
 $3R_2 + R_3 \rightarrow R_3$
 $R_3 + R_1 \rightarrow R_1$
 $3R_2 + R_3 \rightarrow R_2$

$$\sim
 \begin{array}{ccc|c}
 1 & 2 & 0 & 460 \\
 0 & 3 & 0 & 660 \\
 0 & 0 & -3 & -300
 \end{array}
 \sim
 \begin{array}{ccc|c}
 1 & 2 & 0 & 460 \\
 0 & 1 & 0 & 220 \\
 0 & 0 & 1 & 100
 \end{array}
 \sim
 \begin{array}{ccc|c}
 1 & 0 & 0 & 20 \\
 0 & 1 & 0 & 220 \\
 0 & 0 & 1 & 100
 \end{array}$$

$-\frac{1}{3}R_3 \rightarrow R_3$ & $\frac{1}{3}R_2 \rightarrow R_2$
 $-2R_2 + R_1 \rightarrow R_1$

20 1-person boats
 220 2-person boats
 100 3-person boats

(b)

$$\begin{array}{ccc|c}
 0.5 & 1 & 1.5 & 380 \\
 0.6 & 0.9 & 1.2 & 330
 \end{array}
 \sim
 \begin{array}{ccc|c}
 1 & 2 & 3 & 760 \\
 6 & 9 & 12 & 3300
 \end{array}
 \sim
 \begin{array}{ccc|c}
 1 & 2 & 3 & 760 \\
 0 & -3 & -6 & -1260
 \end{array}$$

$2R_1 \rightarrow R_1$ $10R_2 \rightarrow R_2$
 $-6R_1 + R_2 \rightarrow R_2$
 $2R_2 + 3R_1 \rightarrow R_1$

$$\begin{array}{ccc|c}
 3 & 0 & -3 & -240 \\
 0 & -3 & -6 & -1260
 \end{array}
 \sim
 \begin{array}{ccc|c}
 1 & 0 & -1 & -80 \\
 0 & 1 & 2 & 420
 \end{array}$$

$\frac{1}{3}R_1 \rightarrow R_1$ & $-\frac{1}{3}R_2 \rightarrow R_2$

4 person = t
 2 person = 420 - 2t
 1 person = t - 80
 80 ≤ t ≤ 210

(c)

$$\begin{array}{ccc|c}
 0.5 & 1 & 1.5 & 380 \\
 0.6 & 0.9 & 1.2 & 330 \\
 0.2 & 0.3 & 0.5 & 120
 \end{array}
 \sim
 \begin{array}{ccc|c}
 1 & 2 & 3 & 760 \\
 6 & 9 & 12 & 3300 \\
 2 & 3 & 5 & 1200
 \end{array}
 \sim
 \begin{array}{ccc|c}
 1 & 2 & 3 & 760 \\
 0 & -3 & -6 & -1260 \\
 0 & -1 & -1 & -320
 \end{array}$$

$-2R_1 + R_3 \rightarrow R_3$
 $-6R_1 + R_2 \rightarrow R_2$

$$\sim
 \begin{array}{ccc|c}
 1 & 0 & 120 & \\
 0 & 0 & -300 & \\
 0 & -1 & -320 &
 \end{array}
 \sim
 \begin{array}{ccc|c}
 1 & 0 & 120 & \\
 0 & 0 & -300 & \\
 0 & 1 & 320 &
 \end{array}
 \sim
 \begin{array}{ccc|c}
 1 & 0 & 120 & \\
 0 & 1 & 320 & \\
 0 & 0 & -300 &
 \end{array}$$

← No solution

Finite

§4.3 p. 203 #65 & 75, §4.4 p. 215 #67, 69 & 71

§4.4 (65)

$$A = \begin{bmatrix} 47 & 39 \\ 90 & 125 \end{bmatrix} \begin{matrix} M \\ L \end{matrix}$$

$$\text{Ave Cost} = \frac{1}{2}(A+B)$$

$$B = \begin{bmatrix} 56 & 42 \\ 84 & 115 \end{bmatrix}$$

$$A+B = \begin{bmatrix} 47+56 & 39+42 \\ 90+84 & 125+115 \end{bmatrix} = \begin{bmatrix} 103 & 81 \\ 174 & 240 \end{bmatrix}$$

$$\frac{1}{2}(A+B) = \begin{bmatrix} \frac{1}{2} \cdot 103 & \frac{1}{2} \cdot 81 \\ \frac{1}{2} \cdot 174 & \frac{1}{2} \cdot 240 \end{bmatrix} = \begin{bmatrix} \frac{103}{2} & \frac{81}{2} \\ 87 & 120 \end{bmatrix}$$

(67)

$$M = \begin{matrix} \text{Basic} & \text{Air} & \text{Radio} & \text{C.C.} \\ \text{retail} & & & \\ \begin{bmatrix} 35075 & 2560 & 1070 & 640 \\ 39045 & 1840 & 770 & 460 \\ 45835 & 3400 & 1415 & 850 \end{bmatrix} & \begin{matrix} A \\ B \\ C \end{matrix} \end{matrix}$$

$$\text{Markup} = M - N$$

M increased by 10% 1.1

N increased by 15% 1.15

$$N = \begin{matrix} \text{invoice} \\ \begin{bmatrix} 30996 & 2050 & 890 & 510 \\ 34857 & 1585 & 600 & 395 \\ 41667 & 2890 & 1200 & 725 \end{bmatrix} & \begin{matrix} A \\ B \\ C \end{matrix} \end{matrix}$$

$$1.1M - 1.15N$$

$$1.1M = \begin{bmatrix} 38582.5 & 2816 & 1177 & 704 \\ 42949.5 & 2024 & 847 & 506 \\ 50088.5 & 3740 & 1556.5 & 935 \end{bmatrix}$$

$$1.15N = \begin{bmatrix} 35645.4 & 2357.5 & 977.5 & 586.5 \\ 40085.95 & 1822.75 & 759 & 454.25 \\ 47917.05 & 3323.5 & 1380 & 833.75 \end{bmatrix}$$

$$\text{New Mark} = \begin{bmatrix} 2937.1 & 458.5 & 199.5 & 117.5 \\ 2862.95 & 201.25 & 88 & 51.75 \\ 2171.45 & 416.5 & 176.5 & 101.25 \end{bmatrix}$$

$$\approx \begin{bmatrix} \$2937 & \$459 & \$200 & \$118 \\ \$2864 & \$201 & \$88 & \$52 \\ \$2171 & \$417 & \$177 & \$101 \end{bmatrix}$$

84.4 (69)

$$M = \begin{bmatrix} \text{Cut} & \text{Assem} & \text{Pack} \\ 0.6 & 0.6 & 0.2 \\ 1 & 0.9 & 0.3 \\ 1.5 & 1.2 & 0.4 \end{bmatrix} \begin{matrix} 1\text{-p} \\ 2\text{p} \\ 4\text{-p} \end{matrix}$$

$$N = \begin{bmatrix} \text{MA} & \text{VA} \\ \$17.30 & \$14.65 \\ \$12.22 & \$10.29 \\ \$10.63 & \$9.60 \end{bmatrix} \begin{matrix} \text{Cut} \\ \text{Assem} \\ \text{Pack} \end{matrix}$$

- (a) Labor cost for 1-p in MA (r1xc1 so MN a₁₁) = \$19.84
- (b) Labor cost for 4-p in VA (r3xc2 so MN a₃₂) = \$38.19
- (c) MN product are the labor costs for 1-p in MA & VA, 2-p in MA & VA & 4-p in MA & VA

NM isn't possible

(d) MN =

	Total MA			Total VA						
1 p	10.38	7.332	2.126	0.4(14.65) + 0.6(10.29) + 0.2(9.60)	6.174	1.932	\$19.84	\$16.90		
2 p	1(7.3) + 0.9(12.22) + 0.3(10.63)	17.3	10.498	3.184	14.65	9.261	2.898	\$31.49	\$26.81	
4 p	1.5(17.3) + 1.2(12.22) + 0.4(10.63)	27.45	14.664	4.252	1.5(14.65) + 1.2(10.29) + 0.4(9.60)	21.975	12.348	3.864	\$46.37	\$38.19

(71) M =

	A	B	
Protein	4	2	X
Carbs	20	16	Y
Fat	3	1	Z

N =

	X	Y	Z	
A	15	10	5	
B	5	10	15	

- (a) Protein in mix X (MN r1xc1 so a₁₁) = 70g
 - (b) Fat in mix Z (MN r3xc3 so a₃₃) = 30g
 - (c) MN gives protein, carbs & fat in each of the 3 mixes of cereals A & B
- NM the diagonal (primary) would have meaning but other 2 cereals would not. Diagonal would mean total g. in each type of cereal

across mixes

(d) MN =

4(15) + 2(5)	4(10) + 2(10)	4(5) + 2(15)
= 60 + 10 = 70	= 40 + 20 = 60	= 20 + 30 = 50
20(15) + 16(5)	20(10) + 16(10)	20(5) + 16(15)
= 300 + 80 = 380	= 200 + 160 = 360	= 100 + 240 = 340
3(15) + 1(5)	3(10) + 1(10)	3(5) + 1(15)
= 45 + 5 = 50	= 30 + 10 = 40	= 15 + 15 = 30