LINEAR ALGEBRA REFRESHER

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Single subscript

NumChairs$_i$

Student (i)	Height
1	5' 7"
2	⋮
3	⋮
⋮	⋮
300	6'

x_i

$x_{300} = 6'$

Double subscript

x_{ij}: number of chairs type i to produce in factory j

Factory \ Type of chair	1	2
1		
2	40	
3		

x_{12}

$x_{22,31}$ $i = 22$ $j = 31$

Factory	Type	x
1	1	10
1	2	15
2	1	40
2	2	30
3	1	20
3	2	10

Single summation

Student i	Pets x
1	0
2	3
3	1
4	0

$$\sum_{i=1}^{N} x_i \qquad \sum_{i}^{N} x_i$$

$$0 + 3 + 1 + 0$$

$$x_1 + x_2 + x_3 + x_4 = \sum_{i=1}^{4} x_i$$

Summation Constant Rules

$$\sum_{i=1}^{N} a = Na$$

$$\sum_{i=1}^{N} ax_i = a\sum_{i=1}^{N} x_i$$

$a = 3 \quad N = 2$

$$\sum_{i=1}^{2} 3 = 3+3 = 6 = 3 \cdot 2$$

Type	cost
1	10
2	12

$a = 3$

Distributive Rule

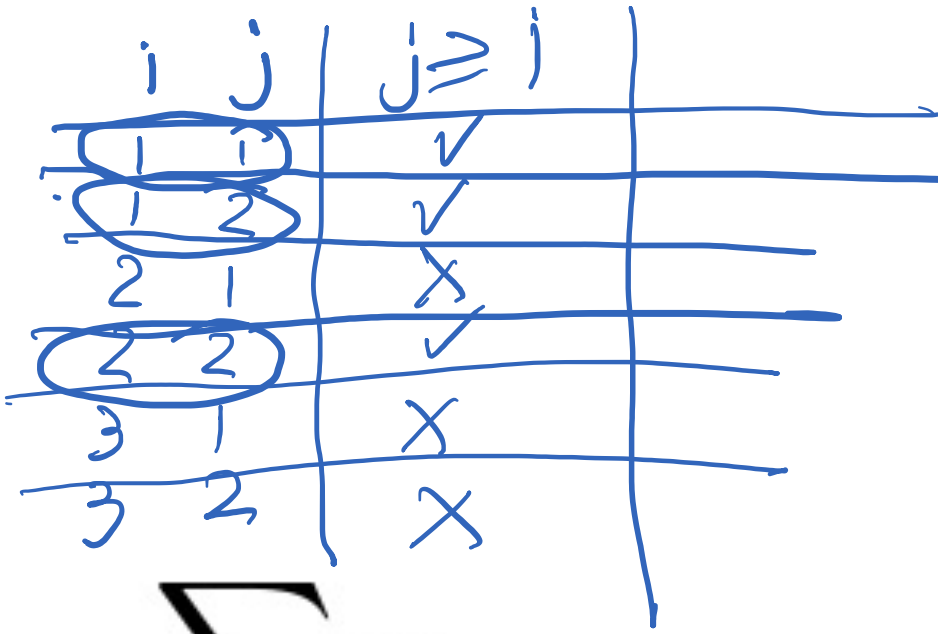
$x_i \rightarrow$ number of chairs to prod. on line i

$y_i \rightarrow$ number of tables to produce on line i

$$\sum_{i=1}^{N}(x_i + y_i) = \sum_{i=1}^{N} x_i + \sum_{i=1}^{N} y_i$$

Double summation

$$\sum_i \sum_j (x_{ij} + y_{ij}) = \sum_{i,j} x_{ij} + \sum_{i,j} y_{ij}$$



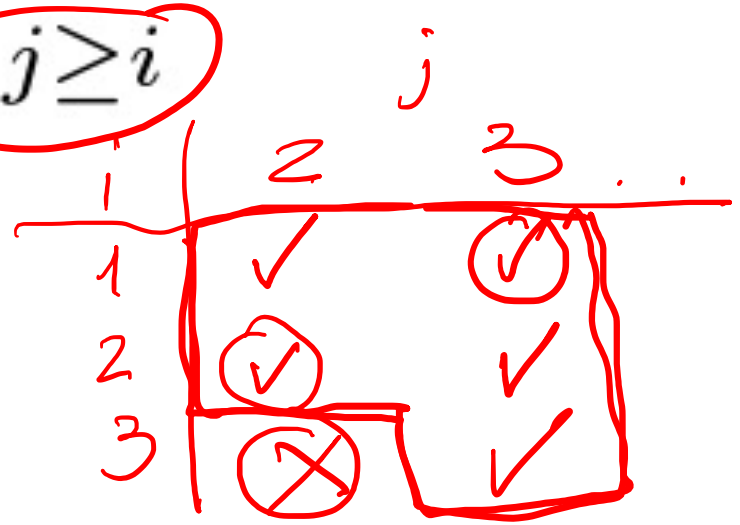
$$\sum_{i=1}^{2} \sum_{j=1}^{3} x_{ij}$$

$$x_{11} + x_{12} + x_{22} = \sum_{j \geq i} x_{ij}$$

Type (i)	Line (j)	x_{ij}
A	1	x_{A1}
B	1	x_{B1}
A	2	x_{A2}
B	2	x_{B2}

$i = 1, \ldots, 3$

$j = 2, \ldots, 3$



Total amount of calories from the following meal: grilled salmon (40 cal.), two sides of asparagus (8 cal. each) and one side of potatoes (5 cal.)

Amt_i : amount of calories in food i

$$\sum_{i=1}^{3} Amt_i = Amt_1 + Amt_2 + Amt_3$$

$$= 40 + 2(8) + 5$$

Food	Amt	Num
1	40	1
2	8	2
3	5	1

$$\sum_{i=1}^{3} Num_i \cdot Amt_i = Num_1 \cdot Amt_1 + Num_2 \cdot Amt_2 + Num_3 \cdot Amt_3$$

How many physician-hours are required for one day with the following procedures scheduled: six appendectomies (2 hr. each), five skin biopsies (30 mins. each), two fracture cares (2.5 hr. each) and three catheters' placements (1 hr. each)