Introductory mathematics for Kf & Kb, 2000.

Project 3 - summation/integration

1. Consider the table

4	3	5	7	5	6
4	7	12	19	24	30

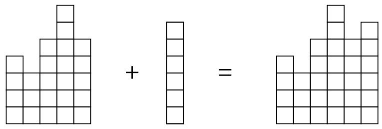

Figure 1:

Try to find the pattern in the table and fill out the following four tables according to the same system.

3	1	0	2	4	1
3					

In the next three tables, find the ? without computing the X's.

2	3	0	4	9	2	7	X
X	X	X	X	X	X	?	X

X	X	X	X	X	2	X	X
X	X	X	X	15	?	X	X

X	X	X	X	?	X
X	X	X	9	16	X

Explain the principles of the tables to a friend.

2. Verify that the following table is built up according to the same system

n	1	2	3	4	5	6	7
$\frac{n^2+n}{2}$	1	3	6	10	15	21	28

then find out what is the sum $1 + 2 + 3 + \cdots + n$.

3. One way to find the convenient formula $\frac{n^2+n}{2}$ could be to start by filling out the table

$2n-1$	1	3					
n^2	1	4	9	16	25	36	49

giving a formula for $1+3+5+\cdots+n$, and to combine this with the (trivial) formula $n = 1 + 1 + \cdots + 1$ obtained from the table

	1	1	1				
n	1	2	3	4	5	6	7

Try in a similar way to find the formula for $1+4+9+\cdots+n^2$. Then discuss what is the number of stone blocks in the Cheops pyramid.

4. Consider the connection to integration as discussed in the book.