Coefficients,	2	−7	+5	−2	+6	−8
Products by 3,		6	−3	+6	+12	+54
First sums,		−1	+2	+4	+18	+46
Second products,		+6	+15	+51	+165	
Second sums,		+5	+17	+55	183	
Third products,		6	33	150		
Third sums,		11	50	205		
		6	51			
		17	101			
		6				
		23				

Result, $F(3+h) = 2h^5 + 23h^4 + 101h^3 + 205h^2 + 183h + 46.$

EXERCISES.

1. Compute $2h^5 + 23h^4 + 101h^3 + 205h^2 + 183h + 46$, when $h = x - 3$.

2. Compute $x^3 - 7x + 7$ for $x = -4 + h, -3 + h$, etc., to $+3 + h$.

Proof of the Preceding Process. If we develop the expression

$$a(h+r)^n + b(h+r)^{n-1} + c(h+r)^{n-2} + d(h+r)^{n-3} + \text{etc.},$$

and collect the coefficients of like powers of h, we shall find

$$\begin{aligned}
\text{Coef. of } h^n &= a,\\
h^{n-1} &= nar + b,\\
h^{n-2} &= \binom{n}{2} ar^2 + (n-1)br + c, \qquad (A)\\
h^{n-3} &= \binom{n}{3} ar^3 + \binom{n-1}{2} br^2 + (n-2)cr + d,\\
&\vdots\\
h^{n-s} &= \binom{n}{s} ar^s + \binom{n-1}{s-1} br^{s-1} + \binom{n-2}{s-2} cr^{s-2} + \text{etc.}
\end{aligned}$$

Now examining Ex. 2 preceding, it will be seen that we can make the computation by columns, first computing the whole left-hand column and thus obtaining the coefficient of h^{n-1}, then computing the next column, thus obtaining the coefficient of h^{n-2}, and so on. Commencing in this way, and using the literal coefficients, a, b, c, etc., and the literal factor r, we shall have the results: