$$\sum_{n=0}^{\infty} 3 \cdot 2^n x^n = \frac{3}{1-2x}$$

$$\sum_{n=0}^{\infty} a_n x^n = f(x)$$

$$\sum_{n=1}^{\infty} a_n \cdot n \cdot x^{n-1} = f'(x)$$

$$a_1 \cdot 1 \cdot x^0 + a_2 \cdot 2 \cdot x^1 + \dots$$

$$f(0) = a_0$$

$$f'(0) = a_1$$

$$f''(0) = 2a_2$$

$$f'''(0) = 6a_3$$

$$f^{IV}(0) = 24 a_4$$

$$f^{(n)}(0) = n! \, a_n$$

$$f(x) = a_0 + a_1 x + a_2 x^2 + a_3 x^3 + a_4 x^4 + \dots$$

$$f'(x) = \quad a_1 + 2a_2 x + 3a_3 x^2 + 4a_4 x^3 + \dots$$

$$f''(x) = \qquad 2a_2 + 6a_3 x + 12a_4 x^2$$