

Long Integral Equation

A long integral expression is broken into two lines, with the continuation indented for clarity.

$$\int_0^{\infty} e^{-x^2} dx = 1 + 2x - 3x^3 + 4x^4 - \\ 5x^5 + 6x^6 - 7x^7 + \dots \quad (1)$$

Equation with Functions and Multiple Alignments

The function is split into three lines, each part aligned at the equal sign for consistency.

$$f(x) = \sin(x) + \cos(x) + \tan(x) + \\ \cot(x) + \sec(x) + \csc(x) + \\ \arcsin(x) + \arccos(x) + \arctan(x) \quad (2)$$

Summation and Product

This complex equation combines summation and product symbols, breaking down the summation into its components and then showing its relationship to a product.

$$S_n = \sum_{i=1}^n (a_i + b_i) \\ = a_1 + b_1 + a_2 + b_2 + a_3 + b_3 + \dots + \\ a_{n-1} + b_{n-1} + a_n + b_n \\ = \prod_{j=1}^n c_j + \sum_{k=1}^n d_k \quad (3)$$

Nested Fractions and Functions

This equation features nested fractions and trigonometric functions, carefully broken into two lines for clarity.

$$f(x) = \frac{1}{2} \left[\frac{3x^2 - 2x + 1}{x^3 - x + 4} + \right. \\ \left. \frac{\sin(x) - \cos(x)}{\sqrt{x^2 + 1}} \right] \quad (4)$$

Integral with Limits and Series Expansion

This equation shows an integral with its limits and its corresponding series expansion, broken into two lines for detailed explanation.

$$\int_a^b e^{x^2} dx = \frac{e^{x^2}}{2x} \Big|_a^b - \int_a^b x e^{x^2} dx \\ = \sum_{n=0}^{\infty} \frac{(b^{2n+1} - a^{2n+1})}{n!(2n+1)} \quad (5)$$