1.
$$1(1)y = \frac{x^{3} + 2x + 1}{x - 1} = x^{2} + x + 3 + \frac{4}{x - 1}$$

$$\frac{1}{1 - x} = 1 + \sum_{k=1}^{n} x^{k} + o(x^{k}), \quad x \to 0 \text{ M}$$

$$\Rightarrow y = x^{2} + x + 5 - 4 (1 + \sum_{k=1}^{n} x^{k}) + o(x^{n})$$

$$= -1 - 3x - 3x^{2} - 4 \sum_{k=3}^{n} x^{k} + \alpha x^{n}, \quad \gamma \to o \text{ pd}. (n \to 3)$$

3.
$$\cos x = 1 - \frac{x^{2}}{2!} + \frac{x^{4}}{4!} - \frac{x^{4}}{6!} + \cot x^{6}$$

$$= 1 - \frac{1}{2}x^{2} + \cot x^{4} - \frac{1}{7}x^{6} + b(x^{6}), \quad x \to 0 \text{ m}$$

$$\ln(Hx) = x - \frac{1}{2}x^2 + \frac{1}{3}x^3 + o(x^5), \quad x \rightarrow 0$$

$$= \left(-\frac{1}{2}x^{2} + \frac{1}{24} - \frac{1}{72}x^{6} + o(x^{6})\right) - \frac{1}{2}\left(-\frac{1}{2}x^{4} + \frac{1}{24}x^{4} + o(x^{4})\right)^{2} + \frac{1}{3}\left(-\frac{1}{2}x^{6} + o(x^{6})\right)^{3} + o(x^{6})$$

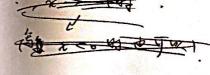
$$= \left(-\frac{1}{2}x^{2} + \frac{1}{14}x^{4} - 7\frac{1}{12}x^{6} + o(x^{6})\right) + \left(-\frac{1}{8}x^{4} + \frac{1}{48}x^{6} + \alpha(x^{6})\right) + \left(\frac{1}{12}x^{6} + o(x^{6})\right) + o(x^{6})$$

$$= -\frac{1}{2} x^{2} + \left(-\frac{1}{8} + \frac{1}{14}\right) x^{4} + \left(-\frac{1}{710} + \frac{1}{48} - \frac{1}{14}\right) x^{6} + o(x^{6})$$

$$= -\frac{1}{2}x^{2} - \frac{1}{12}x^{4} - \frac{1}{45}x^{6} + o(x^{6}), \quad x \to o \text{ mat}.$$

$$y = x^{-1} \implies y^{(n)} = (-1)^n \cdot n! \ x^{-(n+1)} = (-1)^n \cdot x^{-(n+1)} = (-1)^n \cdot x^{-(n+1)} = -1.$$

(h+1)!
$$x=$$
 = (-1)"+1 = -(n+2)



$$= \frac{1}{4!} - \frac{1}{2!} \times \left(-\frac{1}{2}\right)^{2} = -\frac{1}{12}.$$

=
$$\lim_{x\to\infty} \left(x - x^{2} \left(\frac{1}{x} - \frac{1}{2} \left(\frac{1}{x} \right)^{2} + 20 \left(\left(\frac{1}{x} \right)^{2} \right) \right) \right)$$
 (13) $\frac{1}{x} \to 0$).

$$= \lim_{x \to \infty} (x - x + \frac{1}{2} + \infty) = \frac{1}{2},$$

$$f(x) = f(x) + f(x)(-x) + \frac{1}{2}f''(\xi_1) \cdot \chi^2 \qquad (0 = \xi_1 < x)$$

$$-f(2) = f(x) + f(x) \cdot (2-x) + \frac{1}{2}f''(\xi_1) \cdot (2-x)^2 \qquad (\pi = \xi_1 = 2)$$

$$\Rightarrow \pi_{x}^{\infty} = |f(0) - f(1)| + \frac{1}{2} \int_{0}^{\infty} (x_{1}) \cdot x^{2} - \frac{1}{2} \int_{0}^{\infty} (x_{1}) |_{(2-x)^{2}} |_{(2-$$

$$\Rightarrow |f'(x)| \leq 2, \quad \forall x \in (0, 2).$$

由于有血性 > | 「1111 = 2, 日本 e [0, 2]





$$9. \quad 0. \quad \frac{f(x) - f(0)}{x - 0} = \frac{f(x)}{\pi} = \begin{cases} x^n, & x \in \mathbb{Q} \\ 0, & x \notin \mathbb{Q} \end{cases}$$

$$\frac{1}{x^{2}} \left| \frac{f(x) - f(x)}{x - o} \right| = o \Rightarrow \lim_{x \to o} \frac{f(x) - f(o)}{x - o} = o.$$

○· + xo to, Till f(xo) 不存在.

$$\frac{f(x_n) - f(x_n)}{x_n - x_n} = \frac{6 - f(x_n)}{x_n - x_n} = \frac{-x_n^{n+1}}{x_n - x_n}$$

$$\Rightarrow \infty, \quad \xi_n \to \infty \text{ M}$$

$$\frac{|f(x_n) - f(x_n)|}{|x_n - x_n|} = \frac{|x_n|^{n+1} - o}{|x_n - ox_n|} = \frac{|x_n|^{n+1} - o}{|x_n - ox_n|}$$

Chap 3.

2.
$$f(x) = -f(-x)$$
 \Rightarrow $f(x) = f(-x)$ \Rightarrow $f(x) = -f''(-x)$ \Rightarrow



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