2.4.2、习题汇编

(一) 基本习题

1. 判断题

(3)
$$= \begin{cases} x = \ln t - 1 \\ y = t^5 + 3 \end{cases}$$
, $y = \frac{dy}{dx} = \frac{y'(t)}{x'(t)} = 5t^5$, $x = \frac{d^2y}{dx^2} = \left(5t^5\right)' = 25t^4$.

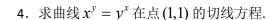
2. 填空题

设 y = f(x) 由方程 $y - 2x = e^{x(1-y)}$ 所确定的隐函数,则 $\lim_{n \to \infty} n(f(\frac{1}{n}) - 1) = \underline{\qquad}$.

3. 求下列方程所确定的隐函数的导数 $\frac{dy}{dx}$

$$(1) \ y^3 + 3y = \ln y - x$$

$$(2) xy = \tan(x+y).$$





5. 求下列函数的导数.

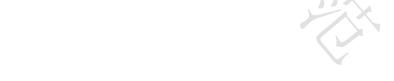
(1)
$$y = \frac{x \sin^3 x}{(x-1)^4} \sqrt{\ln x}$$

$$(2) \quad y = (\cos x)^{\csc x}.$$

6. 求下列方程或方程组所确定的函数的二阶导数 $\frac{d^2y}{dx^2}$.

(1)
$$y = 1 + xe^y$$
.

(2)
$$\arctan \frac{y}{x} = \ln \sqrt{x^2 + y^2}$$
.



7. 求下列参数方程所确定的函数 y = f(x) 的一阶和二阶导数.

(1)
$$\begin{cases} x = 2 - t^3, \\ y = t^3 - t^2; \end{cases}$$

(2)
$$\begin{cases} x = f'(t), \\ y = tf'(t) - f(t), \end{cases}$$
 设 $f''(t)$ 存在且不为零.

