

① $\int \cos xy \, dx = \int x \, dx$

$+ \sin xy + C_1 y \quad \frac{x^2}{2} + 2C_2$

$= \frac{2 \sin xy + 2C_1}{x^2 + 2C_2} = y \Rightarrow \text{None of them}$

② $\lim_{x \rightarrow -\frac{1}{2}} x(x-1)$

$= \lim_{x \rightarrow -\frac{1}{2}} x(1-x) = -\frac{1}{2} \left(1 + \frac{1}{2}\right)$

$= -\frac{1}{2} \cdot \frac{3}{2}$

$= -\frac{3}{4}$

③ $f(y) = y$

$f'(x) = 2x^3 \rightarrow \int 2x^3 \, dx = \frac{x^4}{2} + C$

④ $\ln(x-1) > 0$

$x-1 > 0$

$x > 1$

$x-3 \neq 0$

$x \neq 3$

$(1, \infty) - \{3\}$

⑤ $y' = \frac{-1}{(1-x^2) - (1-\sin^2 \cos^{-1}(x))}$

⑥ $\frac{x}{x^2+1} \rightarrow x=0$
 $x^2+1=0 \rightarrow x$

$1-x^2=0$

$x^2=1$

$x=1$

$\frac{x^2+1-2x^2}{(x^2+1)^2} = \frac{-1-x^2}{(x^2+1)^2} \rightarrow$

$x=-1$