

Homework of Further Mathematics

October 1, 2024

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CS/2403

1. What are domains of following functions? (I can't delete this otherwise it comes error)

(1) $y = \sin \sqrt{x}$

(2) $y = \arcsin(x - 3)$

(3) $y = \sqrt{3 - x} + \arctan \frac{1}{x}$

Ans:

(1) $x \in [0, +\infty)$

(2) $x \in [2, 4]$

(3) $x \in (-\infty, 3] \setminus \{0\}$

2. Let

$$f(x) = \begin{cases} 1 & \text{for } |x| < 1 \\ 0 & \text{for } |x| = 1 \\ -1 & \text{for } |x| > 1 \end{cases}, g(x) = e^x,$$

and answer following questions:

- (a) What are $f[g(x)]$ and $g[f(x)]$?
(b) Draw graphics of them.

Ans:

$$(a) f[g(x)] = \begin{cases} 1 & \text{for } x < 0 \\ 0 & \text{for } x = 0 \\ -1 & \text{for } x > 0 \end{cases},$$

$$g[f(x)] = \begin{cases} e & \text{for } -1 < x < 1 \\ 1 & \text{for } x = \pm 1 \\ e^{-1} & \text{for } x < -1 \text{ or } x > 1 \end{cases}$$

- (b) I have not learnt to draw with LaTeX yet, so I draw them by hands.