

109 學年度第一學期資工系 B 班微積分(一)第一次演習課題目
上課時間:2020/10/05(一) 17:30~18:45

1. Determine whether the function is even, odd, or neither.

- (a) $f(x) = x \sin(x)$ (b) $f(x) = x^3 + 2x^2$
(c) $f(x) = x^2 \sin(3x)$ (d) $f(x) = x \cos(2x)$

2. Find the following inverse function on the following interval.

- (a) $f(x) = e^{(2x^3+5)}, (-\infty, \infty)$
(b) $f(x) = \sqrt[3]{\ln(5x^2+7)}, [0, \infty)$

3. Use the function $f(x) = \sqrt[3]{x^3+7}$ and $g(x) = e^{(2x^3+5)}$ to find the indicated value.

- (a) $(g^{(-1)} \circ f^{(-1)})(2)$ (b) $(f^{(-1)} \circ g^{(-1)})(e)$

4. In following function, solve for x.

- (a) $\ln(x^2-x) - \ln(x) = 3$
(b) $e^{(2x+1)} = 3\sqrt{e^3}$

5. Complete the following table:

quadrant	$\sin(\theta)$	$\cos(\theta)$	$\tan(\theta)$	$\cot(\theta)$	$\sec(\theta)$	$\csc(\theta)$
	$\frac{4}{9}$			$\frac{-\sqrt{65}}{4}$		
I		$\frac{24}{25}$				
III	$\frac{-6}{13}$					

1. (a) even (b) neither (c) odd (d) odd

(a) 奇 \times 奇 = 偶 (b) 奇 + 偶 通常為 neither

(c) 偶 \times 奇 = 奇 (d) 奇 \times 偶 = 偶

2. (a.) $x = e^{2y^3+5}$

$$\ln(x) = 2y^3 + 5$$

$$y = \sqrt[3]{\frac{\ln(x) - 5}{2}}$$

$$\therefore f^{-1}(x) = \sqrt[3]{\frac{\ln(x) - 5}{2}}$$

(b.) $x = \sqrt[3]{\ln(5y^2+7)}$

$$x^3 = \ln(5y^2+7) \quad y = \sqrt{\frac{e^{x^3}-7}{5}}$$

$$\therefore f^{-1}(x) = \sqrt{\frac{e^{x^3}-7}{5}}$$

$$3. f^{-1}(x) = \sqrt[3]{x^3 - 7} \quad , \quad g^{-1}(x) = \sqrt[3]{\frac{\ln(x) - 5}{2}}$$

$$(g^{-1} \circ f^{-1})(2) = g^{-1}(1) = \sqrt[3]{-\frac{5}{2}}$$

$$(f^{-1} \circ g^{-1})(e) = f^{-1}(\sqrt[3]{-2}) = \sqrt[3]{-9}$$

$$4. (a) \ln(x^2 - x) - \ln(x) = 3$$

$$\ln\left(\frac{x^2 - x}{x}\right) = 3 \quad x - 1 = e^3 \quad x = 1 + e^3$$

$$(b.) e^{2x+1} = 3\sqrt{e^3} = 3e^{\frac{3}{2}}$$

$$2x+1 = \frac{3}{2} + \ln(3) \quad 2x = \frac{1}{2} + \ln(3) \quad x = \frac{1}{4} + \frac{\ln(3)}{2}$$

5.

quadrant	$\sin(\theta)$	$\cos(\theta)$	$\tan(\theta)$	$\cot(\theta)$	$\sec(\theta)$	$\csc(\theta)$
II	$\frac{4}{9}$	$-\frac{\sqrt{65}}{9}$	$-\frac{4}{\sqrt{65}}$	$\frac{-\sqrt{65}}{4}$	$-\frac{9}{\sqrt{65}}$	$\frac{9}{4}$
I	$\frac{7}{25}$	$\frac{24}{25}$	$\frac{7}{24}$	$\frac{24}{7}$	$\frac{25}{24}$	$\frac{25}{7}$
III	$-\frac{6}{13}$	$-\frac{\sqrt{133}}{13}$	$\frac{6}{\sqrt{133}}$	$\frac{\sqrt{133}}{6}$	$-\frac{13}{\sqrt{133}}$	$-\frac{13}{6}$