

高一高数第一学期考试复习

1. If  $A = \{2,8\}$ , function  $g: A \rightarrow R^+$  defined by  $g(x) = x + 3$ , find the domain, codomain and range of  $g$   
若  $A = \{2,8\}$ , 函数  $g: A \rightarrow R^+$  定义为  $g(x) = x + 3$ , 求  $g$  的定义域, 对应域和值域

$$D_g = \{2,8\}, R^+, R_g = \{5,11\}$$

2. If  $f(x) = x^2 + 4$  find the domain and range of  $f$   
已知  $f(x) = x^2 + 4$ , 求  $f$  的定义域和值域

$$D_f = \{x|x \in R\}, R_f = \{y|y \in R, y \geq 4\}$$

3. If function  $f: R^+ \rightarrow R$  defined by  $f(x) = 3x^2 + 2$ , find the domain and range of  $f$   
若函数  $f: R^+ \rightarrow R$  定义为  $f(x) = 3x^2 + 2$ , 求  $f$  的定义域和值域

$$D_f = R^+, R, R_f = [2, \infty)$$

4. If  $f(x) = \sqrt{x-2}$ , find the domain and range of  $f$   
已知  $f(x) = \sqrt{x-2}$ , 求  $f$  的定义域和值域

$$D_f = \{x|x \in R, x \geq 2\}, R_f = \{y|y \in R, y \geq 0\}$$

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5. If  $f(x) = \sqrt{x+3}$ , find the domain and range of  $f$   
已知  $f(x) = \sqrt{x+3}$ , 求  $f$  的定义域和值域

$$D_f = \{x|x \in \mathbb{R}, x \geq -3\}, R_f = \{y|y \in \mathbb{R}, y \geq 0\}$$

6. If  $f(x) = \frac{1}{x-2}$ , find the domain and range of  $f$   
已知  $f(x) = \frac{1}{x-2}$ , 求  $f$  的定义域和值域

$$D_f = \{x|x \in \mathbb{R}, x \neq 2\}, R_f = \{y|y \in \mathbb{R}, y \neq 0\}$$

7. If  $g(x) = \frac{3}{2x+1}$ , find the domain and range of  $f$   
已知  $g(x) = \frac{3}{2x+1}$ , 求  $f$  的定义域和值域

$$D_g = \left\{x \mid x \in \mathbb{R}, x \neq \frac{1}{2}\right\}, R_g = \{y|y \in \mathbb{R}, y \neq 0\}$$

8. If  $f: [2, \infty) \rightarrow \mathbb{R}, f(x) = \sqrt{x-2}, f: \mathbb{R}^+ \cup \{0\} \rightarrow \mathbb{R}^+, g(x) = x^2 + 1$   
a. Find  $gf$  and the range of  $gf$   
b. Show that  $fg$  does not exist

若  $f: [2, \infty) \rightarrow \mathbb{R}, f(x) = \sqrt{x-2}, f: \mathbb{R}^+ \cup \{0\} \rightarrow \mathbb{R}^+, g(x) = x^2 + 1$

- a. 求函数  $gf$  和  $gf$  的值域  
b. 试证明函数  $fg$  不存在

$$a. x = 1, R_{gf} = [1, 0)$$

9.  $f\left(\frac{1+x}{1-x}\right) = \frac{2+x}{2-x}$ , find  $f\left(\frac{1}{2}\right)$   
 $f\left(\frac{1+x}{1-x}\right) = \frac{2+x}{2-x}$ , 求  $f\left(\frac{1}{2}\right)$

10. Given  $f(x) = x^2 - 4x + 9, x \in A$ . Find
- Set A such that  $f^{-1}$  exist
  - The domain of  $f^{-1}$
  - The inverse function of  $f(x)$
  - Sketch the graph of  $f(x)$  and  $y = f^{-1}(x)$
  - State the relationship between  $y = f(x)$  and  $y = f^{-1}(x)$

已知  $f(x) = x^2 - 4x + 9, x \in A$ . 求

- 集合 A 若反函数  $f^{-1}$  存在
- $f^{-1}$  的定义域
- $f(x)$  的反函数
- 试绘图  $f(x)$  和  $y = f^{-1}(x)$
- 说明  $y = f(x)$  和  $y = f^{-1}(x)$  的关系

a.  $\{x|x \in R, x \geq 2\}$ , b.  $D_{f^{-1}} = \{x|x \in R, x \geq 5\}$ , c.  $f^{-1}(x) = 2 + \sqrt{x-5}, x \geq 5$ , e. reflection in line  $y = x$

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11. Function  $f$  and  $g$  defined by  $f(x) = x + 4$ ,  $g(x) = 3x$ , find

- a.  $fg(x)$
- b.  $gf(x)$
- c.  $f^2(x)$
- d.  $g^2(x)$

函数  $f$  和  $g$  定义为  $f(x) = x + 4$ ,  $g(x) = 3x$ , 求

- a.  $fg(x)$
- b.  $gf(x)$
- c.  $f^2(x)$
- d.  $g^2(x)$

a.  $3x + 4$ , b.  $3x + 12$ , c.  $x + 8$ , d.  $9x$

12. Given  $g(x) = x + 4$ , find  $gf(x) = x^2 + 3x + 5$ , find  $f(x)$

已知  $g(x) = x + 4$ , 求  $gf(x) = x^2 + 3x + 5$ , 并求  $f(x)$

$$x^2 + 3x + 1$$

13. Given  $f(x) = x + 3$  and  $gf(x) = x^2 - 4x - 5$ , find  $g(x)$

已知  $f(x) = x + 3$  和  $gf(x) = x^2 - 4x - 5$ , 求  $g(x)$

$$x^2 - 10x + 16$$

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14. Function  $f$  and  $g$  are defined by  $f: x \rightarrow 3x + p, g: x \rightarrow 2x - 7$  where  $p$  is a constant. Find the value of  $p$  if

a.  $f^2(2) = 10$

b.  $gf(1) = 9$

函数  $f$  和  $g$  定义为  $f: x \rightarrow 3x + p, g: x \rightarrow 2x - 7$ , 且  $p$  是系数. 求  $p$  值若

a.  $f^2(2) = 10$

b.  $gf(1) = 9$

a. -2, b. 5

15. Given the function  $f: x \rightarrow \frac{12}{(ax+b)}$ , that  $f(0) = -3$  and  $f(2) = -6$ , find

a. The values of  $a$  and  $b$

b. The values of  $x$  for which  $f(x) = x$

已知函数  $f: x \rightarrow \frac{12}{(ax+b)}$ , 且  $f(0) = -3$  和  $f(2) = -6$ , 求

a.  $a$  和  $b$  值

b. 求  $x$  值若  $f(x) = x$

a.  $a = 1, b = -4, b. x = -2, x = 6$

16. The function  $f$  is defined by  $f: x \rightarrow \frac{1+x}{1-x}$ . Express in their simplest form  $f^2(x), f^4(x), f^{37}(x)$

已知函数  $f$  定义为  $f: x \rightarrow \frac{1+x}{1-x}$ . 化简  $f^2(x), f^4(x), f^{37}(x)$

$-\frac{1}{x}, x, \frac{1+x}{1-x}$

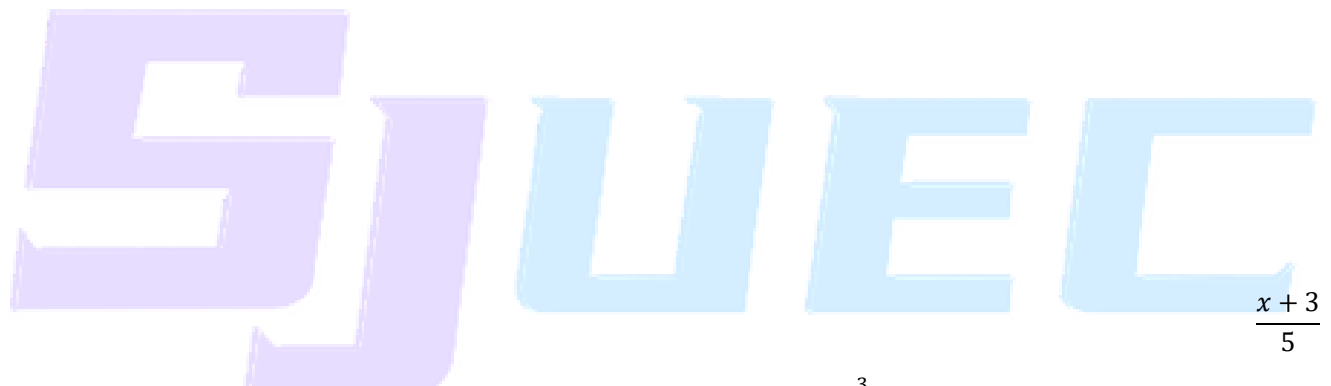
17. Given  $f(x) = 3x + 4$ , find  $f^{-1}(-5)$

已知  $f(x) = 3x + 4$ , 求  $f^{-1}(-5)$

-3

18. Given  $g(x) = 5x - 3$ , find  $f^{-1}(x)$

已知  $g(x) = 5x - 3$ , 求  $f^{-1}(x)$



19. Function  $f$  and  $g$  are defined on the set of real numbers by  $f: x \rightarrow \frac{3}{x-2}, x \neq k$  and  $g: x \rightarrow 4x + 5$ .

- State the value of  $k$
- Express in similar form
  - $gf$
  - $f^{-1}$
- Evaluate  $fg^{-1}(9)$

函数  $f$  和  $g$  被定义为实数  $f: x \rightarrow \frac{3}{x-2}, x \neq k$  和  $g: x \rightarrow 4x + 5$ .

- 求  $k$  值
- 求
  - $gf$
  - $f^{-1}$
- 计算  $fg^{-1}(9)$

$$a. k = 2, b. i. \frac{5x+2}{x-2}, ii. \frac{3+2x}{x}, c. -3$$

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20. A function is defined by  $f: x \rightarrow \frac{a}{x} + 1, x \neq 0$ , where  $a$  is constant. Given that  $6f^2(-1) + f^{-1}(2) = 0$ , calculate the possible values of  $a$

一函数定义为  $f: x \rightarrow \frac{a}{x} + 1, x \neq 0$ , 且  $a$  为系数, 已知  $6f^2(-1) + f^{-1}(2) = 0$ , 求  $a$  的可能值

$$a = -2, 3$$

21. Given that  $g(x) = |4x - 7|$ , find the objects if the image is 5.

已知  $g(x) = |4x - 7|$ , 求函数的物若像为 5

22. Sketch the graph  $g(x) = |x - 1| + 2$  for domain  $-3 \leq x \leq 6$ . Hence, find the range of  $g(x)$

绘图  $g(x) = |x - 1| + 2$ , 范围定义  $-3 \leq x \leq 6$ , 据此, 求  $g(x)$  的值域

$$x = 3. x = \frac{1}{2}$$

$$2 \leq g(x) \leq 7$$