



Thứ ngày

◊ Homework:

$$\text{Ex 1: } a) f(x) = \sqrt{x+2}$$

$$D: x \in [-2; +\infty)$$

$$b) f(x) = \frac{1}{x^2 - x}$$

$$x^2 - x > 0 \Rightarrow \begin{cases} x \neq 0 \\ x \neq 1 \end{cases} D: x \in \mathbb{R} \setminus \{0, 1\}$$

$$c) f(x) = \ln(x^2 - 1) - \frac{x}{\sqrt{x-1}}$$

$$x^2 - 1 > 0 \Rightarrow (x+1)(x-1) > 0 *$$

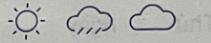
$$x-1 > 0 \rightarrow x > 1 \quad ①$$

$$\sqrt{x-1} \neq 0 \rightarrow x \neq 1 \quad ②$$

$$*(1) \begin{array}{l} x+1 > 0 \rightarrow x > -1 \\ x-1 > 0 \rightarrow x > 1 \end{array} \rightarrow x > 1 \quad \left\{ \begin{array}{l} x \in (-\infty, -1) \cup (1, +\infty) \\ ③ \end{array} \right.$$

$$*(2) \begin{array}{l} x-1 < 0 \rightarrow x < 1 \\ x+1 < 0 \rightarrow x < -1 \end{array} \rightarrow x < -1$$

$$(1|2|3) \rightarrow D: x \in (-\infty, -1)$$



~~$\frac{x+1}{x-1} = 2^{-x}$~~

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Ex₂: a) $f(x) = \sqrt{x-1}$

D: $\sqrt{x-1} \geq 0 \rightarrow x \geq 1$

R: $[1; +\infty)$

b) $f(x) = x^2 - 2x$

D: ~~$x \neq 0$~~ $x(x-2) \neq 0$

R: ~~(0, +\infty)~~

$x = \frac{-b}{2a} = \frac{-(-2)}{2 \cdot 1} = 1$

$f(1) = 1 - 2 \cdot 1 = -1$

$\rightarrow R = [-1; +\infty)$

c) $f(x) = \sin(3x-2)$

$3x-2 \in [-1; 1]$

$-3x^2 > -1 \quad 3x-2 < 1$

$\rightarrow x > \frac{1}{3} \quad x < 1$

$0,3 \rightarrow 1 \quad D: x \in (0,3; 1) \setminus X$

$\rightarrow R = [1; 1]$

Ex₃:

a) $f(x) = \frac{n}{x^2+1}$

D: $x^2+1 \neq 0$

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

$x \neq 1$

D: $x \in \mathbb{R}$

\rightarrow This is odd function

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5

10

15

20

HONG HA



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b) $f(x) = \frac{x^2}{x^4 + 1}$. $x \in \mathbb{R}$
D: $x \in \mathbb{R}$

$$f(-x) = -\frac{x^2}{x^4 + 1} = \frac{-x^2}{x^4 + 1}$$

\rightarrow This is even function.

c) $f(x) = \frac{x}{x+1}$ D: $x \neq -1, x \in \mathbb{R} \setminus \{-1\}$

$$f(-x) = \frac{-x}{-x+1}$$

D: $x \in \mathbb{R} \setminus \{-1\}$, set $x=1$ cannot have -1 , so:
neither odd nor even function.

Ex 4: $f(x) = \frac{x^2 + x + 1}{x}$

$$\therefore f(2x-1)$$

$$\therefore \frac{(2x-1)^2 + 2x-1 + 1}{2x-1} = \frac{4x^2 - 2x + 1}{2x-1}$$

$$2x(2x-1) + 1$$

$$\frac{t^2 + t + 1}{t}$$

$$\Delta = \frac{1^2 - 4 \cdot 1 \cdot 1}{4} = -3$$

NO math

$\therefore f(2x-1) = \frac{4x^2 - 2x + 1}{2x-1}$ with D: $x \neq \frac{1}{2}$

$$\hookrightarrow f(x + \frac{1}{x})$$

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

$$A : x^2 + 2x\frac{1}{x} + 1 + x + \frac{1}{x} + 1$$

$$x^3 + x^2 + 3x + \frac{1}{x^2} + \frac{1}{x} + 1$$

$$x^4 + x^3 + 3x^2 + x + 1$$

$$D : x + \frac{1}{x}$$

$$x^2 + 1$$

$$x^3 + x$$

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fraction: $\frac{x^4 + x^3 + 3x^2 + x + 1}{x^3 + x}$

So $f(x + \frac{1}{x})$ is $\frac{x^4 + x^3 + 3x^2 + x + 1}{x^3 + x}$ with $x \neq 0$

Ex 5:

as $f(x) = \frac{x^2 - x}{x - 1} - g(x) = x$

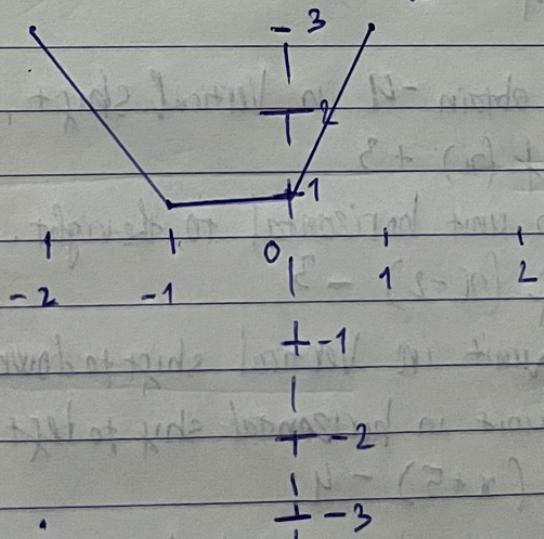
$f(x) = \frac{x(x-1)}{x-1}$

$f(x) = x$; D f : $x \in \mathbb{R} \setminus \{1\}$

$g(x) = x$; D g : $x \in \mathbb{R}$.

So: $f = g$ is wrong.

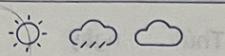
b, $f = |2x+1|$
D: $x \in \mathbb{R}$



$f(x)$
 y

$|2x+1|$

$y(0)=3; y(2)=5; y(0)=1; y(-1)=1; y(-2)=3$



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Ex 6: (b)

C wrong; a not have Range.

Ex 7:

a) $f(-4) = -3 \quad g(3) \approx 1$

b) Add graph if $x = \pm 2$ $f(x) = g(x)$ c) If $x = -3; x = 4$ can get solution for equation $f(x) = 1$

d) D: $[-9; 9]$ R: $[-2; 3]$

e) D: $[-9; 3]$ R: $[\frac{5}{2}; 4]$

Ex 8

a) $f(x-4)$

- To obtain -4 in Vertical shift, down.

b) $f(x) + 3$

- To 3 unit horizontal to the right.

c) $f(x-2) - 3$

- To 2 unit in Vertical shift to down

and to 3 unit in horizontal shift to left.

d) $f(x+5) - 4$

- To 5 unit in vertical shift to up

and to 4 unit in horizontal shift to left.



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$$\text{Ex g: } f(x) = \sqrt{x} \quad g(x) = \sqrt{x-1} + 2$$

For change $g(x)$ by $f(x)$:

Vertical shift to 1 unit for down

Horizontal shift to 2 unit for right.