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Kelas : A

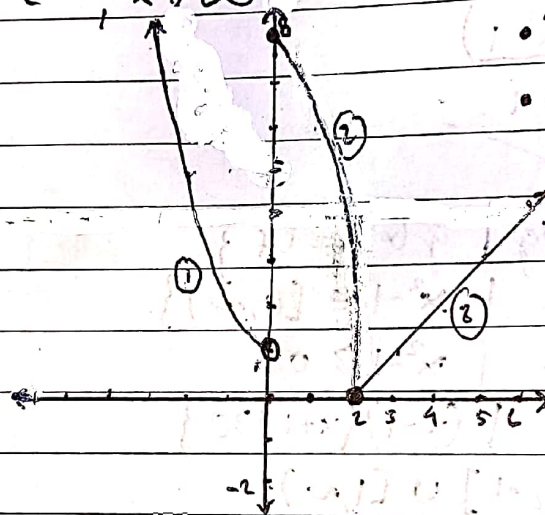
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Prodi : Teknik Informatika

Tugas 4 - Kalkulus 1

Tentukan D_f dan R_f serta gambarkan fungsinya!

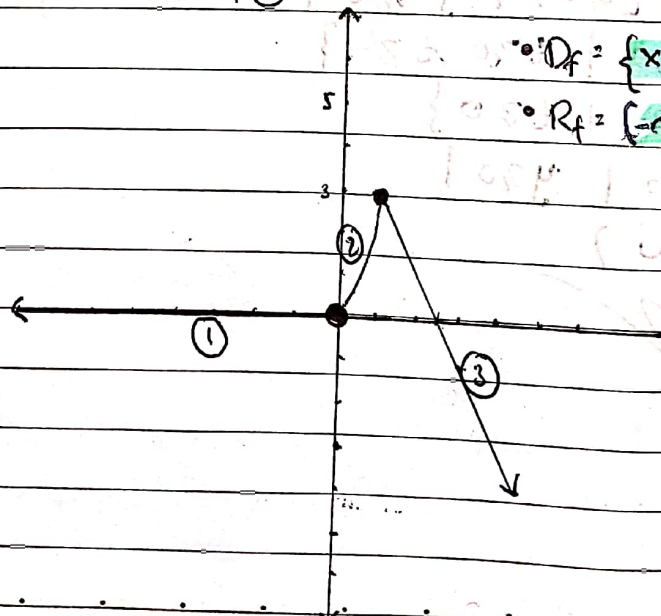
1. $f(x) = \begin{cases} x^2 + 1, & x < 0 \text{ (1)} \\ 8 - 2x^2, & 0 \leq x < 2 \text{ (2)} \\ x - 2, & x \geq 2 \text{ (3)} \end{cases}$



• $D_f = \{x | x \in \mathbb{R}\}$

• $R_f = \{y | y \geq 0\} \cup [0, \infty)$

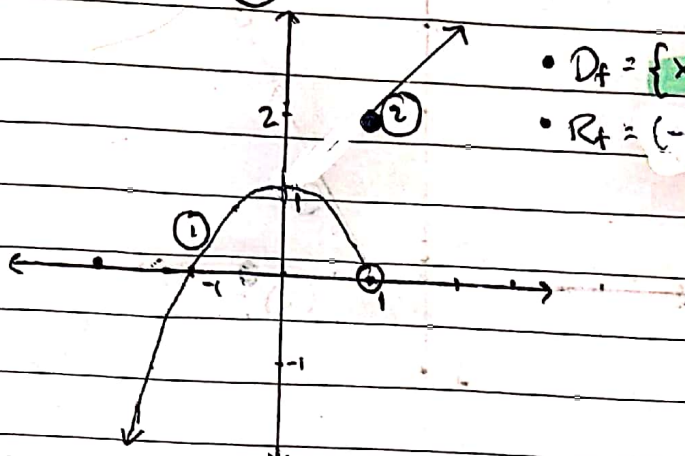
2. $f(x) = \begin{cases} 0, & x < 0 \text{ (1)} \\ 3x^2, & 0 \leq x \leq 1 \text{ (2)} \\ -2x + 5, & x > 1 \text{ (3)} \end{cases}$



• $D_f = \{x | x \in \mathbb{R}\}$

• $R_f = [-\infty, 3]$

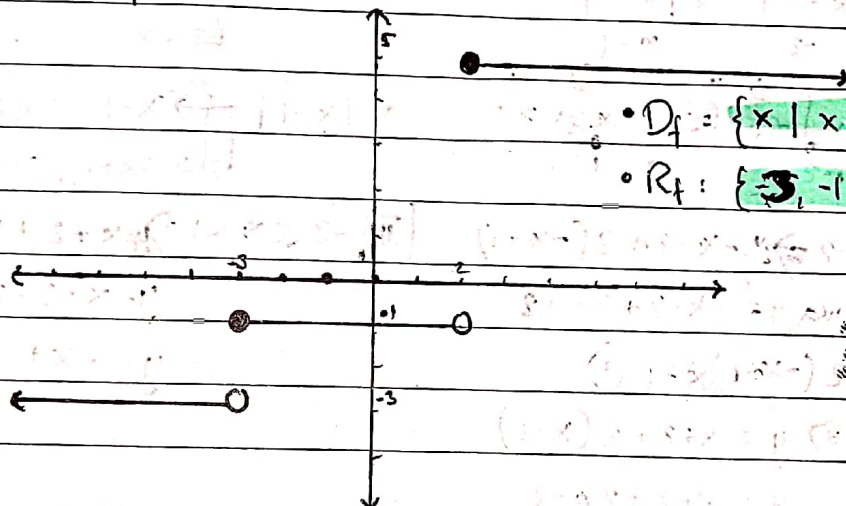
3 $f(x) = \begin{cases} 1-x^2, & x < 1 \text{ (1)} \\ 1+x, & x \geq 1 \text{ (2)} \end{cases}$



• $D_f = \{x | x \in \mathbb{R}\}$

• $R_f = (-\infty, 1] \cup [2, \infty)$

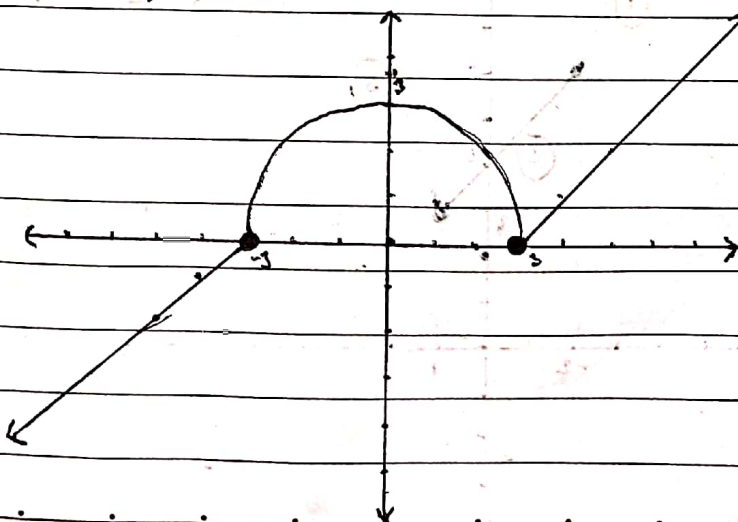
4 $f(x) = \begin{cases} -3, & x < -3 \\ -1, & -3 \leq x < 2 \\ 5, & x \geq 2 \end{cases}$



• $D_f = \{x | x \in \mathbb{R}\}$

• $R_f = \{-3, -1, 5\}$

5 $f(x) = \begin{cases} x+3, & x < -3 \\ \sqrt{9-x^2}, & -3 \leq x < 3 \\ x-3, & x \geq 3 \end{cases}$

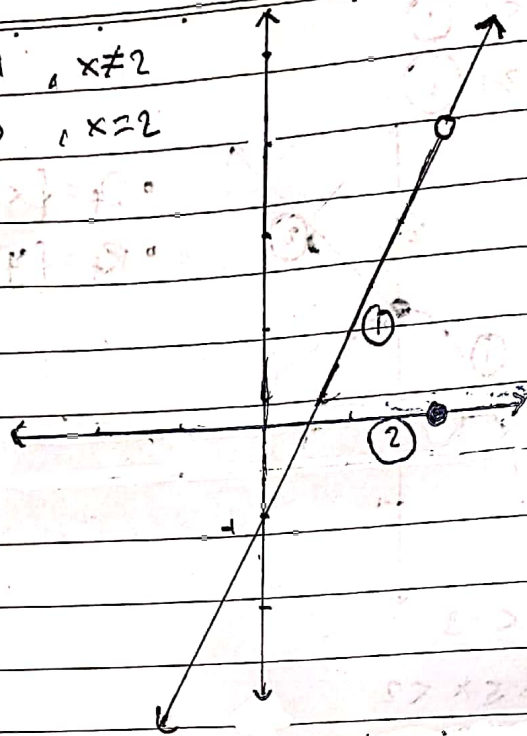


• $D_f = \{x | x \in \mathbb{R}\}$

• $R_f = \{y | y \in \mathbb{R}\}$

6

$$f(x) = \begin{cases} 2x-1, & x \neq 2 \\ 0, & x = 2 \end{cases}$$



$$D_f = \{x | x \in \mathbb{R}\}$$

$$R_f = \{y | y \in \mathbb{R}\}$$

7

$$f(x) = |x+2| + 2|x-1|$$

$$x = -2$$

$$x = 1$$

$$\text{I } x < -2 \quad \text{II } -2 \leq x < 1 \quad \text{III } x \geq 1$$

$$|x+2| \rightarrow \begin{cases} x+2, & x \geq -2 \\ -x-2, & x < -2 \end{cases}$$

$$|x-1| \rightarrow \begin{cases} x-1, & x \geq 1 \\ -x+1, & x < 1 \end{cases}$$

$$\text{I } x < -2 \Rightarrow y = -x-2 + 2(-x+1)$$

$$\text{II } -2 \leq x < 1 \Rightarrow y = x+2 + 2(-x+1)$$

$$y = -x-2+2x+2$$

$$y = x+2-2x+2$$

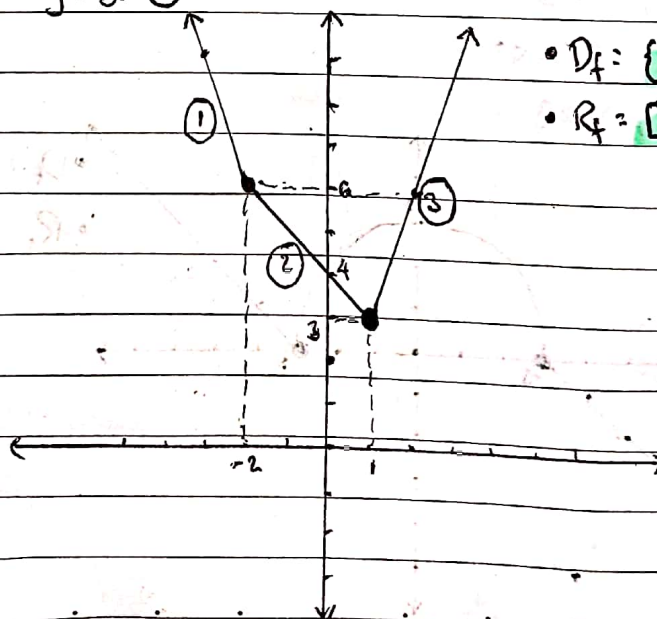
$$y = -3x \quad (1)$$

$$y = -x+4 \quad (2)$$

$$\text{III } x \geq 1 \Rightarrow y = x+2 + 2(x-1)$$

$$y = x+2+2x-2$$

$$y = 3x \quad (3)$$



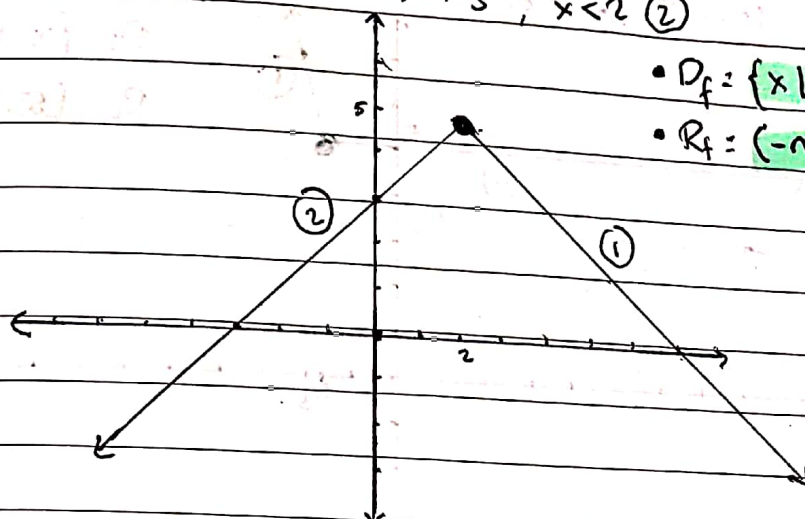
$$D_f = \{x | x \in \mathbb{R}\}$$

$$R_f = [3, \infty)$$

8

$$f(x) = 5 - |x-2|$$

$$y \rightarrow \begin{cases} 5 - (x-2), & x \geq 2 \rightarrow -x + 7, & x \geq 2 \quad (1) \\ 5 - (-x+2), & x < 2 \rightarrow x + 3, & x < 2 \quad (2) \end{cases}$$

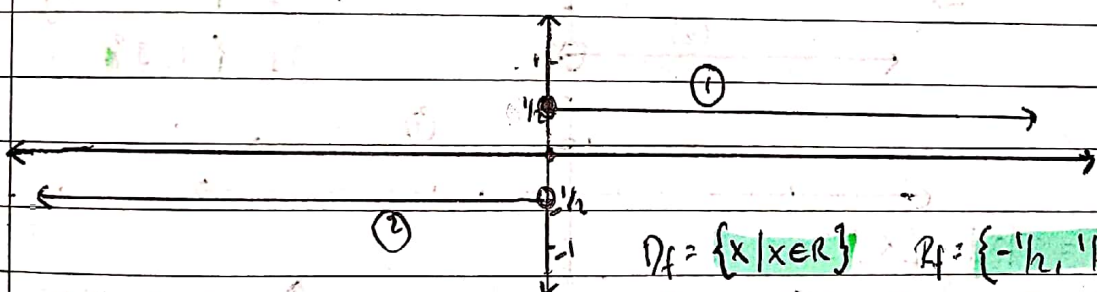


$$\begin{aligned} D_f &= \{x | x \in \mathbb{R}\} \\ R_f &= (-\infty, 5] \end{aligned}$$

9

$$f(x) = \frac{|x|}{2x}$$

$$y \rightarrow \begin{cases} \frac{x}{2x}, & x > 0 \rightarrow \frac{1}{2}, & x > 0 \quad (1) \\ \frac{-x}{2x}, & x < 0 \rightarrow -\frac{1}{2}, & x < 0 \quad (2) \end{cases}$$

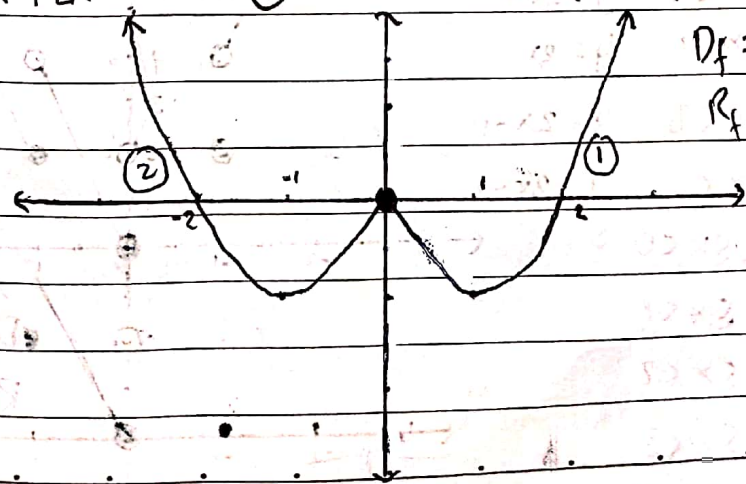


$$D_f = \{x | x \in \mathbb{R}\} \quad R_f = \{-1/2, 1/2\}$$

10

$$y = x^2 - 2|x|$$

$$y \rightarrow \begin{cases} x^2 - 2x, & x \geq 0 \quad (1) \\ x^2 + 2x, & x < 0 \quad (2) \end{cases}$$



$$\begin{aligned} D_f &= \{x | x \in \mathbb{R}\} \\ R_f &= [-1, \infty) \end{aligned}$$

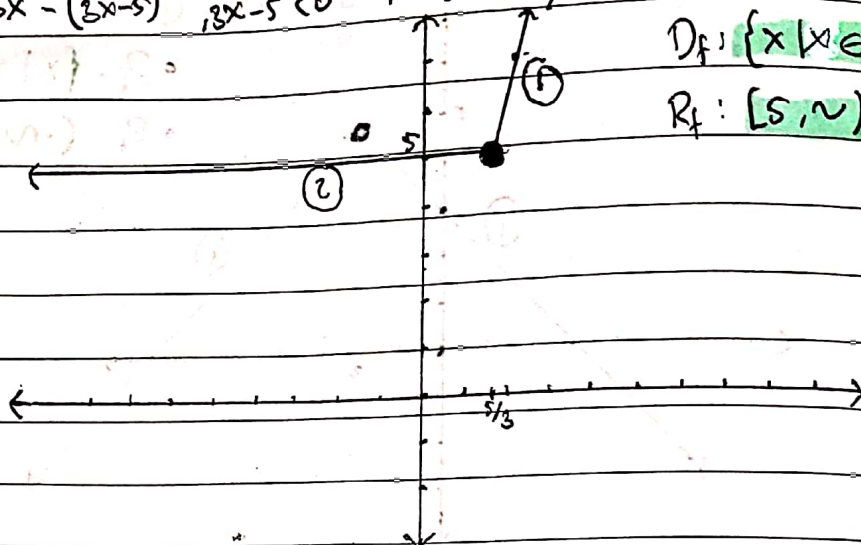
11

$$f(x) = 3x + |3x - 5|$$

$$y \rightarrow \begin{cases} 3x + (3x - 5), & 3x - 5 \geq 0 \rightarrow 6x - 5, & x \geq 5/3 & (1) \\ 3x - (3x - 5), & 3x - 5 < 0 \rightarrow 5, & x < 5/3 & (2) \end{cases}$$

$$D_f: \{x | x \in \mathbb{R}\}$$

$$R_f: [5, \infty)$$



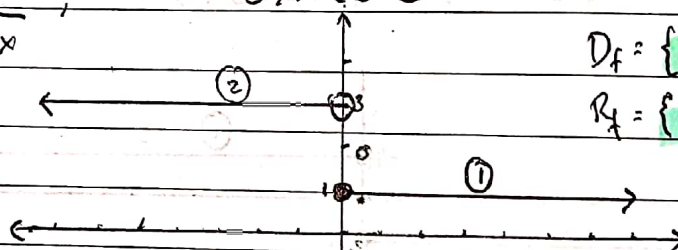
12

$$f(x) = 2 - \frac{x}{|x|}$$

$$y \rightarrow \begin{cases} 2 - \frac{x}{x}, & x \geq 0 \rightarrow 1, & x \geq 0 & (1) \\ 2 - \frac{x}{-x}, & x < 0 \rightarrow 3, & x < 0 & (2) \end{cases}$$

$$D_f: \{x | x \in \mathbb{R}\}$$

$$R_f: \{1, 3\}$$



13

$$f(x) = 2|x| - \lfloor x \rfloor$$

① Buka $\lfloor x \rfloor$ ② Buka $|x|$

$$n = -2 \quad -2 \leq x < -1 \quad y = -2x + 2$$

$$n = -1 \quad -1 \leq x < 0 \quad y = 2x + 1$$

$$n = 0 \quad 0 \leq x < 1 \quad y = 2x$$

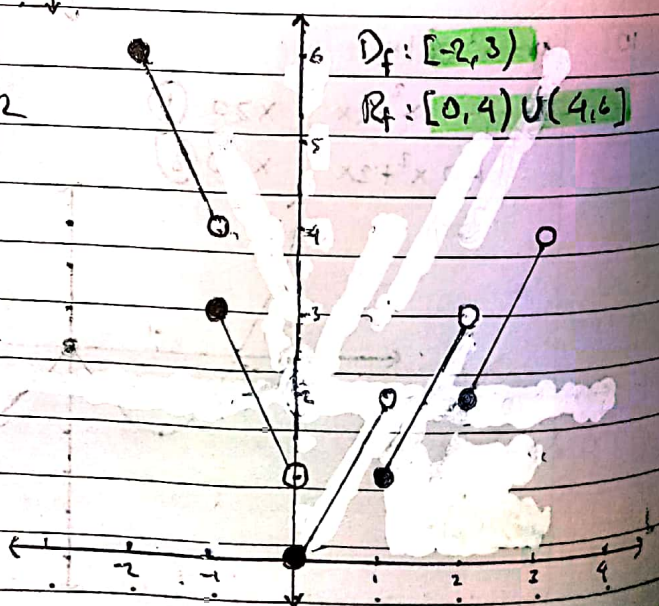
$$n = 1 \quad 1 \leq x < 2 \quad y = 2x - 1$$

$$n = 2 \quad 2 \leq x < 3 \quad y = 2x - 2$$

$$③ \quad y = \begin{cases} -2x + 2, & -2 \leq x < -1 \\ -2x + 1, & -1 \leq x < 0 \\ 2x, & 0 \leq x < 1 \\ 2x - 1, & 1 \leq x < 2 \\ 2x - 2, & 2 \leq x < 3 \end{cases}$$

$$D_f: [-2, 3)$$

$$R_f: [0, 4) \cup (4, 6]$$



14

$$f(x) = \lfloor x \rfloor + 3|x+1|$$

(1) Buka $\lfloor x \rfloor$

(2) Buka $|x+1|$

$n = -2 \quad -2 \leq x < -1 \quad y = -2 + 3(x+1) \quad y = -3x - 5$

$n = -1 \quad -1 \leq x < 0 \quad y = -1 + 3(-(x+1)) \rightarrow y = -3x - 4$

$n = 0 \quad 0 \leq x < 1 \quad y = 3(x+1) \quad y = 3x + 3$

$n = 1 \quad 1 \leq x < 2 \quad y = 1 + 3(x+1) \quad y = 3x + 4$

$n = 2 \quad 2 \leq x < 3 \quad y = 2 + 3(x+1) \quad y = 3x + 5$

(3)

$$y = \begin{cases} -3x - 5, & -2 \leq x < -1 \\ -3x - 4, & -1 \leq x < 0 \\ 3x + 3, & 0 \leq x < 1 \\ 3x + 4, & 1 \leq x < 2 \\ 3x + 5, & 2 \leq x < 3 \end{cases}$$

$D_f = [-2, 3]$

$R_f = (-2, 2) \cup [3, 6) \cup [7, 10) \cup [11, 14)$

