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No. \_\_\_\_\_

Date: \_\_\_\_\_

### Soal latihan OS Aplikasi Turunan (1)

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

a) Asimtot tegak:  $x=1$ , karena

$$\lim_{x \rightarrow 1^-} \frac{1}{x-1} = -\infty \quad \text{dan} \quad \lim_{x \rightarrow 1^+} \frac{1}{x-1} = \infty$$

b) Asimtot datar

$$\lim_{x \rightarrow \infty} \frac{1}{x-1} = 0 \quad (\text{ada})$$

c) Asimtot miring

$$a = \lim_{x \rightarrow \pm \infty} \frac{1}{x-1} \cdot \frac{1}{x}$$

$$= \lim_{x \rightarrow \pm \infty} \frac{1}{x^2-x} = 0$$

$$b = \lim_{x \rightarrow \pm \infty} \frac{1}{x-1} - 0 \cdot x$$

$$= \lim_{x \rightarrow \pm \infty} \frac{1}{x-1} = 0, \quad \text{Asimtot miring } y=x$$

2)  $f(x) = x + \frac{1}{x-3}$

$$= x \cdot \frac{(x-3)}{(x-3)} + \frac{1}{x-3}$$

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



a) Asimtot tegak:  $x=3$ , karena

$$\lim_{x \rightarrow 3^-} \frac{x^2 - 3x + 1}{x - 3} = -\infty \quad \text{dan} \quad \lim_{x \rightarrow 3^+} \frac{x^2 - 3x + 1}{x - 3} = \infty$$

b) Asimtot datar

$$\lim_{x \rightarrow \infty} \frac{x^2 - 3x + 1}{x - 3} = \infty \quad (\text{tidak ada})$$

c) Asimtot Miring

$$q = \lim_{x \rightarrow \pm \infty} \frac{x^2 - 3x + 1}{x - 3} \cdot \frac{1}{x}$$

$$= \lim_{x \rightarrow \pm \infty} \frac{x^2 - 3x + 1}{x^2 - 3x} = 1$$

$$b = \lim_{x \rightarrow \pm \infty} \frac{x^2 - 3x + 1 - x}{x - 3}$$

$$= \lim_{x \rightarrow \pm \infty} \frac{x^2 - 4x + 1}{x - 3} = \infty$$

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

a) Asimtot tegak:  $x=1$

$$\lim_{x \rightarrow 1^-} \frac{x^2 + 2x}{x^2 - 1} = -\infty \quad \text{dan} \quad \lim_{x \rightarrow 1^+} \frac{x^2 + 2x}{x^2 - 1} = \infty$$

Asimtot tegak  $x=-1$

$$\lim_{x \rightarrow -1^-} \frac{x^2 + 2x}{x^2 - 1} = -\infty \quad \text{dan} \quad \lim_{x \rightarrow -1^+} \frac{x^2 + 2x}{x^2 - 1} = \infty$$

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## Soal latihan Aplikasi Turunan (2)

1)  $f(x) = 2x^5 - 15x^4 + 30x^3 - 6$

Selang kemonotonan

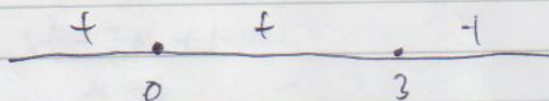
$$f'(x) = 10x^4 - 60x^3 + 90x^2$$

$$0 = x^2(10x^2 - 60x + 90)$$

$$0 = (x^2)(10x - 30)(x - 3)$$

$$x^2 = 0 \quad \vee \quad 10x - 30 = 0 \quad \vee \quad x - 3 = 0$$

$$x = 0 \quad \quad \quad 10x = 30 \quad \quad \quad x = 3$$



$$f'(x) > 0 \Rightarrow \text{Semua } x$$

Naik terus, titik ekstrim tak ada

$$(x | x \in \mathbb{R}, -\infty \leq x \leq \infty, x \neq 0, 3)$$



$$2) f(x) = \frac{x^2 - 3x + 1}{x - 3}$$

$$f'(x) = \frac{(2x-3)(x-3) - (x^2-3x+1) \cdot 1}{(x-3)^2}$$

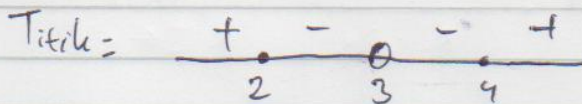
$$= \frac{2x^2 - 6x - 3x + 9 - x^2 + 3x - 1}{x^2 - 6x + 9}$$

$$= \frac{x^2 - 6x + 8}{(x-3)^2}$$

$$= \frac{(x-4)(x-2)}{(x-3)^2}$$

Titik maks  $\rightarrow x=2$   
 $= \frac{4 - 6 + 1}{-1} = 1$   
 $(2, 1)$

Titik min  $\rightarrow x=4$   
 $= \frac{16 - 24 + 1}{1} = -5$   
 $(4, -5)$



$(-\infty, 2)$  Monoton naik

$(2, 4)$  Monoton turun

$(4, \infty)$  Monoton naik

$$3) f(x) = \frac{x^2 - 2x + 1}{x - 2}$$

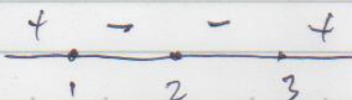
$$f'(x) = \frac{(2x-2)(x-2) - (x^2-2x+1) \cdot 1}{(x-2)^2}$$

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

$$= \frac{x^2 - 4x + 3}{(x-2)^2}$$

$$= \frac{(x-3)(x-1)}{(x-2)^2}$$

Titik:



Monoton naik  $= (-\infty, 1) \cup (3, \infty)$

Monoton turun  $= (1, 3)$

titik maks  $= (1, 0)$

titik min  $= (3, 4)$