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Pertemuan 4

No 1. Untuk $f(x) = 1 - x^2$, carilah masing-masing nilai berikut

$$a. F(1)$$

$$e. F(1/4)$$

$$b. F(2)$$

$$f. F(1+h)$$

$$c. F(0)$$

$$g. F(1+h)$$

$$d. F(h)$$

$$h. F(2+h) - F(2)$$

Jawab:

$$a. F(1) = 1 - 1^2 = 1 - 1 = 0$$

$$b. F(2) = 1 - 2^2 = 1 - 4 = -3$$

$$c. F(0) = 1 - 0^2 = 1 - 0 = 1$$

$$d. F(h) = 1 - h^2$$

$$e. F(1/4) = 1 - (1/4)^2 = 1 - 1/16 = 15/16$$

$$f. F(1+h) = 1 - (1+h)^2 = 1 - (1^2 + 2h + h^2) = 1 - 1 - 2h - h^2 = h^2 - 2h$$

$$g. F(1+h) - F(1) = (1 - (1+h)^2) - (1 - 1^2)$$

$$= (1 - (1+2h-h^2)) - (0)$$

$$= 1 - 1 - 2h - h^2 - 0$$

$$= -h^2 - 2h$$

$$h. F(2+h) - F(2) = (1 - (2+h)^2) - (1 - 2^2)$$

$$= (1 - (4+4h+h^2)) - (-3)$$

$$= (1 - 4 - 4h - h^2) - (-3)$$

$$= -h^2 - 4h - 3 + 3$$

$$= -h^2 - 4h$$

No 2 nyatakan fungsi dibawah ini dalam bentuk Y sebagai fungsi dari X

$$a. x^2 + y^2 = 1$$

$$\text{Jwb: } x^2 + y^2 = 1$$

$$y^2 = 1 - x^2$$

$$y = \sqrt{1-x^2}$$

$$d. x = \frac{y}{y+1}$$

$$y+1$$

$$\text{Jwb: } x(y+1) = y$$

$$xy + x = y$$

$$xy - y = -x$$

$$y(x-1) = -x$$

$$y = \frac{-x}{x-1}$$

$$b. xy + y + 3x$$

$$\text{Jwb: } xy + y + 3x = y$$

$$xy + y = y - 3x$$

$$y = y - 3x$$

$$x+1$$

$$c. x = \sqrt{2y+1}$$

$$\text{Jwb: } x = \sqrt{2y+1}$$

$$x = (\sqrt{2y+1})^2$$

$$x^2 - 1 = 2y$$

$$y = \frac{x^2 - 1}{2}$$

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No. 3 cari dan sederhanakan $F(a+h) - F(a)$ untuk fungsi berikut

a. $F(x) = 2x^2 - 1$

b. $F(t) = 4t^3$

c. $F(x) = \frac{3}{x}$

d. $F(t) = \frac{t}{t+4}$

Jwb: a. $F(x) = 2x^2 - 1$

$= F(a+h) - F(a)$

$= (2(a+h)^2 - 1) - (2a^2 - 1)$

$= 2(a^2 + 2ah + h^2) - 1 - (2a^2 - 1)$

$= \frac{2a^2 + 4ah + 2h^2 - 1 - 2a^2 + 1}{h}$

$= \frac{4ah + 2h^2}{h}$

$= h \frac{(4a + 2h)}{h}$

$= 4a + 2h$

b. $F(t) = 4t^2$

$= F(a+h) - F(a)$

$= 4(a^2 + 3ah + h^2) - 4a^2$

$= 4a^2 + 12ah + 4h^2 - 4a^2$

$= 12ah + 4h^2$

$= h(3a + 4h)$

$= 3a + 4h^2$

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c. $P(X) = \frac{3}{x}$

Jwb: $F(x) = \frac{3}{x}$

$$= \frac{3}{(a+h)-a}$$

$$= \frac{3}{ah-a}$$

$$= \frac{3}{\frac{h}{h}} = \frac{3}{1} = 3$$

d. $F(t) = \frac{t}{t+4}$

Jwb: $F(t) = \frac{t}{t+4}$

$$= \frac{t}{(a+h)-a+4}$$

$$= \frac{t}{ah-a+4}$$

$$= \frac{h}{ht+4}$$

nomor 4. carilah daerah asal alami masing-masing fungsi berikut

a. $F(x) = \sqrt{2x+3}$

b. $F(z) = \frac{1}{z}$

c. $h(x) = \sqrt{x^2 - 9}$

d. $K(u) = \frac{u-x^2}{x^2-x-6}$

e. $F(u) = |2u+3|$

f. $F(t) = \sqrt{\frac{1}{t+1}}$

Jawab:

a. $(P(x) = \sqrt{2x+3})$

daerah asal fungsi $F(x) = \sqrt{a}$

$$a > 0$$

$$2x+3 \geq 0$$

$$2x \geq -3$$

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$$2x^2 - 3 \\ x = \frac{-3}{2} \quad \frac{-3}{2}$$

$$Y = \sqrt{F(x)} \rightarrow DF; F(x) \geq 0 \\ Y = \frac{1}{g(x)} \Rightarrow DF = g(x) \neq 0$$

$$Y = P(x) \Rightarrow DF: g(x) > 0$$

$$D = \{x | x \geq -\frac{3}{2}, x \in \mathbb{R}\}$$

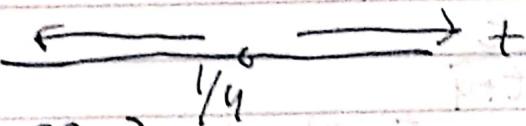
$$b. F(x) = \frac{1}{4x-1}$$

daerah asal fungsi $F(x) = \frac{a}{b} \Rightarrow b \neq 0$

$$4 \neq 0 \neq 0$$

$$4 \neq 1$$

$$2 \neq \frac{1}{4}$$



$$D = \{x | x \neq \frac{1}{4}, x \in \mathbb{R}\}$$

$$c. h(x) = \sqrt{x^2 - 9}$$

daerah asal fungsi $F(x) = \sqrt{y} \rightarrow a \geq 0$

$$x^2 - 9 \geq 0$$

$$(x-3)(x+3) \geq 0$$

$$d. e. F(u) = 2u + 3$$

$$F(u) = 2u + 3$$

$$2u + 3 = 0$$

$$2u = -3$$

$$u = \frac{-3}{2}$$

$$f. F(t) = \sqrt{\frac{t}{t+1}}$$

$$t+1 \neq 0$$

$$t \neq -1$$

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$$x=3 \quad 4x=-3 \quad + \boxed{3} \quad +$$

$$D = \{x | -3 < x < 3, x \in \mathbb{R}\}$$

$$d. h(x) = \frac{4-x^2}{x^2-x-6} \Rightarrow b \neq 0$$

$$x^2-x-6$$

$$x^2-x-6 \neq 0$$

$$(x-3)(x+2) \neq 0$$

$$x \neq 3 \quad x \neq -2$$

$$D \{x | x \neq 3, x \neq -2, x \in \mathbb{R}\}$$

$$e. F(u) = (2u+3)$$

$$F(u) = 2u+3$$

$$2u+3=0$$

$$2u = -3$$

$$u = \frac{-3}{2}$$

$$f. F(t) = \sqrt{t}$$

$$t+1$$

$$t+1 \neq 0$$

$$t \neq -1$$

nomor 5 Diantara fungsi berikut mana yg ganjil yg genap
tidak ganjil maupun tidak genap

$$a. F(x) = -4$$

$$b. F(x) = 3x$$

$$c. F(x) = 2x+1$$

$$d. F(x) = 3x^2+2x-1$$

$$e. g(x) = \frac{x}{x^2-4}$$

$$f. h(x) = x^3 - x$$

$$g. u(z) = \frac{2z+1}{z-1}$$

Jawab:

$$a. F(x) = -4$$

$$F(x) = -4$$

$$F(-x) = 4$$

$$F(x) = F(-x) \\ = \text{genap}$$

$$b. F(x) = 3x$$

$$F(-x) = 3x (-x)$$

$$F(-x) = -3x$$

$$F(-x) = -F(x)$$

$$= \text{ganjil}$$

$$c. F(x) = 2x+1$$

$$F(x) = 2x (-x) - 1$$

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

$$= \text{tidak ganjil maupun genap}$$

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

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

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

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

$$\begin{aligned} g(-x) &= -g(x) \\ &= \text{ganjil} \end{aligned}$$

$$F. h(x) = x^3 - x$$

$$h(-x) = (-x)^3 - (-x)$$

$$h(-x) = -x^3 + x$$

$$h(-x) = -(x^3 - x)$$

$$h(-x) = -h(x)$$

$$= \text{ganjil}$$

$$g. k(z) = \frac{2z+1}{z-1}$$

$$k(z) = \frac{2z(-z)+1}{-2-1}$$

$$k(z) = \frac{-2z+1}{-(z+1)}$$

$$k(-z) = \frac{-2z+1}{z+1}$$

$$k(-z) = \frac{2z+1}{z+1}$$

= Tidak ganjil maupun genap

$$h. f(x) = \sqrt{x^2 - 4}$$

$$f(-x) = \sqrt{(-x)^2 - 4}$$

$$f(-x) = \sqrt{x^2 - 4}$$

$$f(-x) = f(x)$$

= genap

no. 6 Diketahui Fungsi berikut:

$$F(x) \begin{cases} 1 & x \leq 0 \\ x+1 & 0 < x < 2 \\ x-1 & x \geq 2 \end{cases}$$

Hitunglah:
a. $F(-1), F(1/2), F(0,9)$ dan $F(2,1)$
b. Sketsalah grafik Fungsi $F(x)$ tersebut

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Jawab:

- a. $F(-1)$, $F(1/2)$, $F(0,9)$ dan $F(2,1)$
 $\Rightarrow F(-1)$

Karena $-1 \leq 0$ maka menggunakan rumus 1

$$F(x) = |x|$$

$$F(-1) = |-1|$$

$$\Rightarrow F(-1) = 1$$

Karena $1/2 < 2$ dan $0 < 1/2 < 2$ atau karena $1/2$ ada di antara 0 dan 2 maka menggunakan rumus

$$2, F(x) = x + 1$$

$$F(1/2) = \frac{1}{2} + 1 = \frac{3}{2} = 1,5$$

$$\Rightarrow F(2,1)$$

Karena $2,1 > 2$ maka menggunakan rumus 3

$$F(x) = x^2 - 1$$

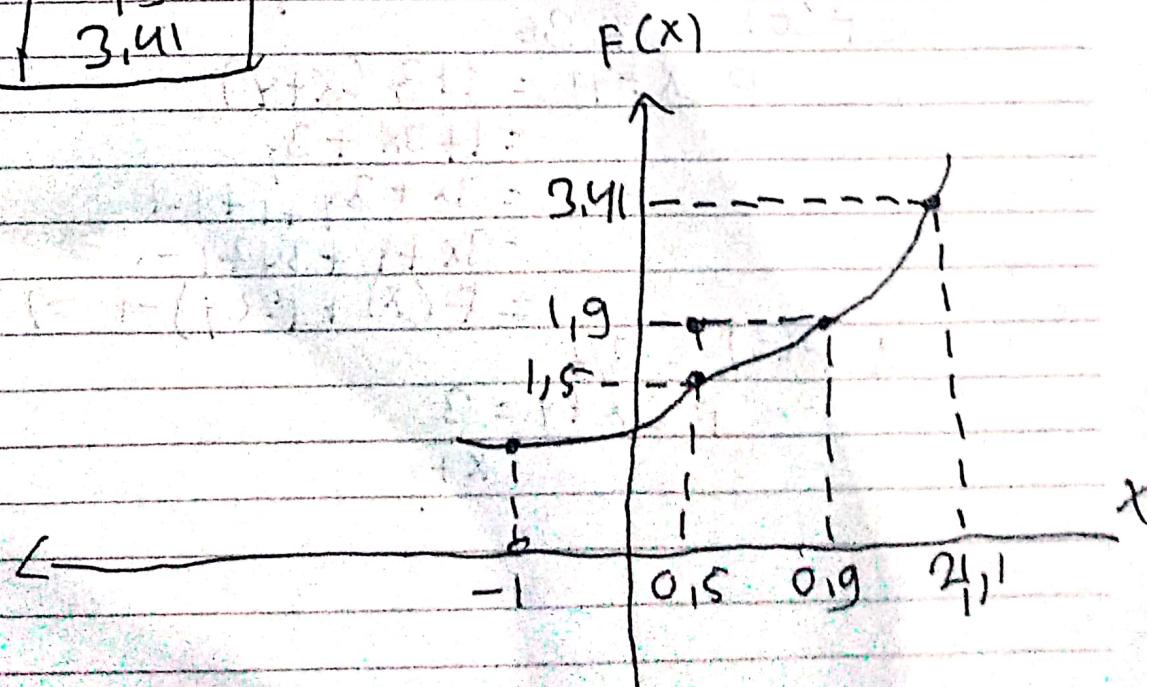
$$F(2,1) = (2,1)^2 - 1$$

$$= 4,41 - 1$$

$$= 3,41$$

b. Sketsalah grafik fungsi $F(x)$ tsb

x	$F(x)$
-1	1
0,5	1,5
0,9	1,9
2,1	3,41



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no.7 sebuah silinder lingkaran tegar berjari-jari dililitan didalam sebuah locta jari-jari $2r$. cari rumus untuk $V(r)$ yaitu volume tabung dinyatakan dalam r
jawab: $V = \pi \cdot r^2 \cdot t$

dengan: $V = \text{volume}$

$$\pi = (2\pi/7 \text{ atau } 3,14)$$

$r = \text{jari-jari}$

no.8 manakah

$t = \text{Tinggi}$

no.8 manakan dari fungsi berikut yg memenuhi

$$F(x+y) = F(x) + F(y) \text{ untuk semua } x \text{ dan } y$$

a. $F(t) = 2t$

b. $F(t) = t^2$

c. $F(t) = 1+3t$

d. $F(t) = 3/t$

jawab:

a. $F(t) = 2t$

$$F(x+y) = 2(x+y)$$

$$= 2x + 2y$$

$$= F(x) + F(y) \Rightarrow \text{memenuhi}$$

b. $F(t) = t^2$

$$F(x+y) = (x+y)^2$$

$$= x^2 + 2xy + y^2$$

$$< F(x) + 2xy + F(y) \Rightarrow \text{tdu memenuhi}$$

c. $F(t) = 1+3t$

$$F(x+y) = 1+3(x+y)$$

$$= 1+3x + 3y$$

$$= 3x + 3y + 1 + 1 - 1$$

$$= 3x + 1 + 3y + 1 - 1$$

$$= F(x) + F(y) - 1 \Rightarrow \text{tdu memenuhi}$$

d. $F(t) = 3/t$

$$F(x+y) = \frac{3}{x+y}$$

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no. 9 untuk $F(x) = x^2 + x$, dan $g(x) = \frac{2}{x+3}$ carilah

masing-masing nilai berikut:

a. $(F+g)(2)$

e. $g_2(3)$

b. $(F-g)(2)$

f. $F(Fog)(1)$

c. $(F \cdot g)(1)$

g. $(g \circ F)(1)$

d. $(F/g)(1)$

h. $(gog)(3)$

Jawab:

$$a. (F+g)(2) = (x^2 + x) + \left(\frac{2}{x+3}\right)$$

$$= (2^2 + 2) + \left(\frac{2}{2+3}\right)$$

$$= (4+2) + \left(\frac{2}{5}\right)$$

$$= \frac{6+2}{5}$$

$$= \frac{30+2}{5}$$

$$= \frac{32}{5}$$

$$= 6 \frac{2}{5}$$

$$b. (F-g)(2) = (x^2 + x) - \left(\frac{2}{x+3}\right)$$

$$= (2^2 + 2) - \left(\frac{2}{2+3}\right)$$

$$= (4+2) - \left(\frac{2}{5}\right)$$

$$= \frac{6-2}{5}$$

$$= \frac{30-2}{5}$$

$$= \frac{28}{5}$$

$$= 5 \frac{3}{5}$$

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$$c. (F \circ g)(1) = (x^2 + x) \cdot \left(\frac{2}{x+3} \right)$$

$$= (1^2 + 1) \cdot \left(\frac{2}{1+3} \right)$$

$$= 2 \cdot \frac{2}{4} = \frac{4}{4} = 1$$

$$d. (F/g)(1) = \frac{x^2 + x}{\frac{2}{x+3}}$$

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

$$= \frac{2}{2/4} = \frac{8}{2} = 4$$

$$e. g^2(3) = \left(\frac{2}{x+3} \right) \left(\frac{2}{x+3} \right)$$

$$= \frac{4}{x^2 + 3x + 3x + 9}$$

$$= \frac{4}{3^2 + 6 \cdot (3) + 9}$$

$$= \frac{4}{9 + 18 + 9}$$

$$= \frac{4}{36} = \frac{1}{9}$$

$$f. (F \circ g)(1) = \left(\frac{2}{x+3} \right)^2 + \frac{2}{x+3}$$

$$= \frac{4}{x^2 + 6x + 9} + \frac{2}{x+3}$$

$$= \frac{4}{1^2 + 6 \cdot (1) + 9} + \frac{2}{1+3}$$

$$= \frac{4}{16} + \frac{2}{4} = \frac{4+8}{16} = \frac{12}{16} = \frac{3}{4}$$

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$$g(gof)(1) = \frac{2}{(x^2+1)+3}$$

$$= \frac{2}{(1^2+1)+3} = \frac{2}{5}$$

$$H(gog)(3) = \frac{2}{\frac{(2)}{(x+3)}+3} = \frac{2}{\frac{2}{6}+3} = \frac{2}{\frac{2+18}{6}} \\ = \frac{2}{\frac{20}{6}} = 2 \left(\frac{6}{20} \right)$$

$$= \frac{12}{20} = \frac{3}{5}$$

nomor 10 untuk $F(x) = \sqrt{x^2-1}$, dan $g(x) = \frac{2}{x}$ carilah rumus

Berikut :

- a. $(F.g)(x)$
- b. $F^u(x) + g^u(x)$
- c. $(Fog)(x)$
- d. $(gof)(x)$

Jawab:

a. $(F.g)(x)$

b. $F^u(x) + g^u(x)$

c. $(Fog)(x)$

d. $(gof)(x)$

a. $(F.g)(x)$ jawab $= F(x) \cdot g(x)$
 $= \sqrt{x^2-1} \cdot \frac{2}{x} = \frac{2\sqrt{x^2-1}}{x}$

b. $F^u(x) + g^u(x) = (\sqrt{x^2-1})^4 + \left(\frac{x}{2}\right)^4$
 $= (x^2-1)^2 + \frac{16}{x^4}$
 $= x^4 - 2x^2 + 1 + \frac{16}{x^4}$

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$$\begin{aligned} c. (F \cdot g)(x) &= F(g(x)) \\ &= \sqrt{\frac{2}{x^2-1}} \\ &= \sqrt{\frac{4}{x^2}-1} \end{aligned}$$

$$\begin{aligned} d. (g \cdot F)(x) &= g(F(x)) \\ &= \frac{2}{\sqrt{x^2-1}} \cdot \frac{\sqrt{x-1}}{\sqrt{x^2-1}} \\ &= \frac{2\sqrt{x^2-1}}{x^2-1} \end{aligned}$$

no 11. carilah F dan g sedemikian rupa sehingga $H = g \circ F(x)$
dan $P(F \circ g)(x)$

$$a. H(x) = \sqrt{x+7}$$

$$b. H(x) = (x^2+x)^{15}$$

$$c. P(x) = \frac{2}{(x^2+x+1)^3}$$

$$d. P(x) = \frac{1}{x^3+3x}$$

Jawab

$$a. H(x) = \sqrt{x+7}$$

$$(g \circ F)(x) = \sqrt{x+7}$$

$$g((F)) = \sqrt{x+7}$$

$$F(x) = x+7 \quad g(x) = \sqrt{x}$$

$$b. H(x) = (x^2+x)^{15}$$

$$(g \circ F)(x) = (x^2+x)^{15}$$

$$(g \circ F)^{-1}(x) = (x^2+x)^{15} \quad g(x) = x^{15}$$

$$c. P(x) = \frac{2}{(x^2+x+1)^3}$$

$$(P \circ g)(x) = \frac{2}{(x^2+x+1)^3}$$

$$F(g(x)) = \frac{2}{(x^2+x+1)^3}$$

$$F(x) = \frac{2}{x^3} \quad g(x) = x^2+x+1$$