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Nama : Muhammad Ridho Renaldi

Nim : 24552010 48

A.) Matematika diskrit

1) $F(x) = x^2 - 4$, $g(x) = x + 3$ (A) tentukan $(Fog)(x)$, $(gof)(1)$ !

$= Fog(x) = F(g(x)) = F(x+3)$

$= (x+3)^2 - 4$

$= (x^2 + 6x + 9) - 4$

$= x^2 + 6x + 5$ //

$= gof(1) = g(F(1)) = g(1^2 - 4)$

$= g(-3)$

$= -3 + 3 = 0$ //

2) $F(x) = x^2 - x - 6$, $g(x) = x^2 + 2$

$= Fog(x) = F(g(x)) = F(x^2+2)$

$= (x^2+2)^2 - (x^2+2) - 6$

$= x^4 + 4x^2 + 4 - x^2 - 2 - 6$

$= x^4 + 3x^2 - 4$ //

$= gof(1) = g(F(1)) = g(1^2 - 1 - 6)$

$= g(-6)$

$= (-6)^2 + 2$

$= 36 + 2 = 38$ //

3) $F(x) = \frac{x-1}{3x+5}$, $g(x) = 2x - 6$

$= Fog(x) = F(2x-6) = \frac{(2x-6)-1}{3(2x-6)+5}$

$= \frac{2x-7}{6x-18+5} = \frac{2x-7}{6x-13}$ //

$= gof(1) = g\left(\frac{x-1}{3x+5}\right) - 6$

$= 2\left(\frac{1-1}{3(1)+5}\right) - 6$

$= 2\left(\frac{0}{8}\right) - 6$

$= 2 \cdot 0 - 6 = -6$ //

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4) $F(x) = \frac{x-6}{2x+2}$, $g(x) = \frac{5}{1-2x}$

$= FOG(x) = F\left(\frac{5}{1-2x}\right) = \frac{\frac{5}{1-2x} - 6}{2\left(\frac{5}{1-2x}\right)+2}$

$= \frac{5-6(1-2x)}{10+2(1-2x)}$

$= \frac{5-6+12x}{10+2-4x} = \frac{-1+12x}{12-4x}$

$GOF(1) = g\left(\frac{x-6}{2x+3}\right)$

$= g\left(\frac{1-6}{2(1)+2}\right)$

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

$= \frac{-5}{1-2\left(-\frac{5}{4}\right)}$

$= \frac{-5}{1+\frac{10}{4}}$

$= \frac{5}{\frac{14}{4}} = \frac{5 \cdot 4}{14} = \frac{20}{14} = \frac{10}{7}$

5) $F(x) = \sqrt{x+3}$, $g(x) = x^2+6x+6$

$= FOG(x) = \sqrt{g(x)+3}$

$= \sqrt{x^2+6x+6+3}$

$= \sqrt{x^2+6x+9} = \sqrt{(x+3)^2} = x+3$

$= GOF(1) = g(F(1)) = g(\sqrt{1+3})$

$= g(2) = 2^2 + 6(2) + 6$

$= 4+12+6 = 22$

6). $F(x) = \sqrt{x+3}$, $g(x) = \frac{2x+1}{1-x}$

$= FOG(x) = F\left(\frac{2x+1}{1-x}\right) = \sqrt{\left(\frac{2x+1}{1-x}\right)+3} = \sqrt{\frac{2x+1+3(1-x)}{1-x}}$

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

$= \sqrt{\frac{-x+4}{1-x}}$

$= GOF(1) = g(\sqrt{x+3})$

$= g(\sqrt{1+3})$

$= g\sqrt{4}$

$= g(2)$

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

$= \frac{4 \times 1}{1} = \frac{5}{-1} = -5$

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B. Tentukan $F(x-2)$ jika!

1). $F(x) = 3x+7$

$= F(x-2) = 3(x-2)+7 = 3x-6+7 = 3x+1$

2). $F(x) = x^2 + x - 12$

$= F(x-2) = (x-2)^2 + (x-2) - 12$

$= x^2 - 4x + 4 + x - 2 - 12$

$= x^2 - 3x - 10$

C. Tentukan $F(x)$ jika

1.) $F(x+3) = 6-5x$

$= F(u) = 6-5(u-3)$

$= 6 - 5u + 15$

$= -5u + 21$

$F(x) = -5x + 21$

2) $F(2x-7) = 4x-3$

$= F(u) = 4\left(\frac{u+7}{2}\right) - 3$

$= 2(u+7) - 3$

$= 2u + 14 - 3$

$= 2u + 11$

$F(x) = 2x + 11$

3). $F(2-x) = x^2 - 10$

$= F(u) = (2-u)^2 - 10$

$= 4 - 4u + u^2 - 10$

$= u^2 - 4u - 6$

$F(x) = x^2 - 4x - 6$