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Date

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

$\triangleright$ $D_F = \{x \in R \mid F(x) \in R\}$

$= \{x \in R \mid \frac{1-x}{x} \in R\}$

$= \{x \in R \mid x \neq 0 \in R\}$

$= (-\infty, 0) \cup (0, \infty)$

$D_g = \{x \in R \mid g(x) \in R\}$

$= \{x \in R \mid \frac{x}{1+x} \in R\}$

$= \{x \in R \mid x \neq -1\}$

$= (-\infty, -1) \cup (-1, \infty)$

$\triangleright$ $D_{F \pm g} = D_F \cap D_g$

$= ((-\infty, 0) \cup (0, \infty)) \cap ((-\infty, -1) \cup (-1, \infty))$

$= (-\infty, -1) \cup (-1, 0) \cup (0, \infty)$

$\triangleright$ $D_{F \cdot g} = D_F \cap D_g = (-\infty, -1) \cup (-1, 0) \cup (0, \infty)$

$\triangleright$ $D_{\frac{F}{g}} = D_F \cap D_g - \{x \mid g(x) = 0\}$

$= D_F \cap D_g$, $g(x) \neq 0 \rightarrow x \neq 0, x \neq -1$

$= (-\infty, -1) \cup (-1, 0) \cup (0, \infty)$

2. Dik :

a. $F(x) = \sqrt{x-1}$

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

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

$g(x) = x^2$

c. $F(x) = \sqrt{16-x}$

$g(x) = x^4$

Dit :

$\triangleright$ $F \circ g(x)$

$\triangleright$ $D_{F \circ g}$

$\triangleright$ $R_{F \circ g}$

$\triangleright$ $g \circ F$

$\triangleright$ $F(g(x))$

Jwb :

a. $F(x) = \sqrt{x-1}$

$D_F = [1, \infty)$

$R_F = [0, \infty)$

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

$D_g = (-\infty, 0) \cup (0, \infty)$

$R_g = (0, \infty)$

$R_g \cap D_F = (0, \infty) \cap [1, \infty)$

$= [1, \infty) \neq 0$

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▷ $(f \circ g)(x) = f(g(x))$

$= \sqrt{\left(\frac{1}{x^2}\right) - 1}$

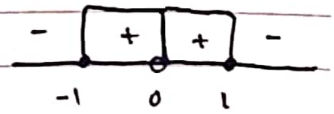
▷ $D_{f \circ g} = \{x \in R_g \mid g(x) \in D_f\}$

$= \{x \in (-\infty, 0) \cup (0, \infty) \mid \frac{1}{x^2} \in [1, \infty)\}$

$= \{x \in (-\infty, 0) \cup (0, \infty) \mid \frac{1}{x^2} \geq 1\}$

$= \{x \in (-\infty, 0) \cup (0, \infty) \mid \frac{1 - x^2}{x^2} \geq 0\}$

$= [-1, 0) \cup (0, 1]$



▷ $R_{f \circ g} = \{x \in R_f \mid y = f(t), t \in R_g\}$

$= \{y \geq 0 \mid y = \sqrt{t - 1}, t > 0\}$

$= \{y \geq 0 \mid y \geq 0\}$

$= [0, \infty)$

▷ $(g \circ f)(x) = g(f(x))$

$R_f \cap D_g = [0, \infty) \cap ((-\infty, 0) \cup (0, \infty))$

$= (0, \infty) \neq 0$

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

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

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

$g(x) = x^2$

$D_f = (-\infty, 1) \cup (1, \infty)$

$R_f = (-\infty, 1) \cup (1, \infty)$

$D_g = (-\infty, \infty)$

$R_g = [0, \infty)$

$R_g \cap D_f = [0, \infty) \cap ((-\infty, 1) \cup (1, \infty))$

$= [0, 1) \cup (1, \infty)$

▷ $(f \circ g)(x) = f(g(x))$

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

▷ $D_{f \circ g} = \{x \in D_g \mid g(x) \in D_f, x^2 - 1 \neq 0\}$

$= \{x \in R \mid x^2 \in (-\infty, 1) \cup (1, \infty), x \neq \pm 1\}$

$= (-\infty, -1) \cup (-1, 1) \cup (1, \infty)$

▷ $R_{f \circ g} = \{y \in R_f \mid y = f(t), t \in R_g\}$

$= \{y \in (-\infty, 1) \cup (1, \infty) \mid y = \frac{t}{t-1}, t \geq 0\}$

$= (-\infty, 0] \cup (1, \infty)$

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b. $R_F \cap D_g = ((-\infty, 1) \cup (1, \infty))$

$= (-\infty, 1) \cup (1, \infty) \neq 0$

$(g \circ f)(x) = g(f(x))$

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

c. $f(x) = \sqrt{16 - x}$

$D_F = (-\infty, 16)$

$R_F = [0, \infty)$

$g(x) = x^4$

$D_g = (-\infty, \infty)$

$R_g = [0, \infty)$

$R_g \cap D_F = [0, \infty) \cap (-\infty, 16)$

$= [0, 16) \neq \emptyset$

b. $(f \circ g)(x) = \sqrt{16 - x^4}$

b. $D_{f \circ g} = \{x \in D_g \mid g(x) \in D_F\}$

$= \{x \in R \mid x^4 \in (-\infty, 16)\}$

$= \{x \in R \mid x^4 \leq 16\}$

$= [-2, 2]$

b. $R_{f \circ g} = \{y \in R_F \mid y = f(t),\ t \in R_g\}$

$= \{y \geq 0 \mid y = \sqrt{16 - t},\ t \geq 0\}$

$= \{y \geq 0 \mid 0 \leq y \leq 4\}$

$= [0, 4]$