Name: [1 pt]

Problem 1. Find the domain of the function $f(x) = \dfrac{x}{\sqrt{1-x^2}}$. [5 pts]

$1-x^2 \geq 0$ (because it is inside radical)

Also, $\sqrt{1-x^2}$ cannot be zero since it is in the denominator.

$\Rightarrow$ $1-x^2$ cannot be zero.

Thus, we must have $1-x^2 > 0$

$\Rightarrow x^2 - 1 < 0$

$\Rightarrow (x-1)(x+1) < 0$

$\Rightarrow -1 < x < 1$

$\Rightarrow$ Domain of $f = (-1, 1)$

Problem 2. Let $f(x) = \sqrt{x}$, $g(x) = x^2 + 1$. Find $(f \circ g)(x)$, $(g \circ f)(x)$ and $g(x+h)$. [5 pts]

$(f \circ g)(x) = f(g(x)) = f(x^2+1) = \sqrt{x^2+1}$

$(g \circ f)(x) = g(f(x)) = g(\sqrt{x}) = (\sqrt{x})^2 + 1 = x+1$

$g(x+h) = (x+h)^2 + 1 = x^2 + 2xh + h^2 + 1$