Problem 16

$f(x)$ is even, $g(x)$ is odd, and $\mathrm{D}_f = \mathrm{D}_g = \mathbb{R}$.

Also:

$g(2) = 0$ $f(0) = g(1) = -1$

$g(0) = -2$

Find:

$(f \circ f)(0) - (f \circ g)(-1) + (g \circ f)(0) - (g \circ g)(-2)$?

Answer

$\boxed{3}$

Explanation

$(f \circ f)(0) - (f \circ g)(-1) + (g \circ f)(0) - (g \circ g)(-2)$?

$f(f(0)) - f(g(-1)) + g(f(0)) - g(g(-2))$

$\Rightarrow f(-1) - f(g(-1)) + g(-1) - g(g(-2))$

Using the definition for even and odd functions, we have:

$\Rightarrow f(1) - f(-g(1)) - g(1) - g(-g(2))$

$\Rightarrow f(1) - f(-(-1)) - g(1) - g(-(0))$

$\Rightarrow f(1) - f(1) - (-1) - (-2)$

$\Rightarrow f(1) - f(1) + 1 + 2 = 3$