Problem 8: Let $f(x) = \dfrac{x^6 + x^4}{x+1}$. What is $f(i-1)$?

First let's plug in $(i-1)$ for x.

$$f(i-1) = \frac{(i-1)^6 + (i-1)^4}{(i-1)+1}$$

Now let's calculate $(i-1)^2$, $(i-1)^4$, and $(i-1)^6$.

$$\begin{aligned}
(i-1)^2 &= i^2 - 2i + 1 = -1 - 2i + 1 = -2i \\
(i-1)^4 &= (-2i)^2 = 4i^2 = -4 \\
(i-1)^6 &= (i-1)^2(i-1)^4 = (-2i)(-4) = 8i
\end{aligned}$$

So

$$\begin{aligned}
f(i-1) &= \frac{(i-1)^6 + (i-1)^4}{(i-1)+1} \\
&= \frac{8i + -4}{i} \\
&= \frac{8i + -4}{i} \cdot \frac{i}{i} \\
&= \frac{8i^2 - 4i}{i^2} \\
&= \frac{-8 - 4i}{-1} \\
&= \boxed{8 + 4i}
\end{aligned}$$