3) $f\left(\frac{1}{n}\right) = \frac{n^2}{n^2+1}$

Let $n = \frac{1}{k}$.

$$f(k) = \frac{1/k^2}{1/k^2+1} = \frac{1}{1+k^2}.$$

$$f'(k) = \frac{-2k}{(1+k^2)^2}.$$

$$f''(k) = \frac{-2(1+k^2)^2 + 2k \cdot 2(1+k^2)2k}{(1+k^2)^4}$$

at $k = 0$.

$$\boxed{f''(0) = -2}$$