a) $f(x) = \dfrac{x^2}{x+1}$

$$f'(x) = \frac{2x(x+1) - x^2}{(x+1)^2} = \boxed{\frac{x^2 + 2x}{(x+1)^2}}$$

b) $f(x) = \dfrac{x^4 + 1}{x^2}$

$$f'(x) = \frac{4x^3 \cdot x^2 - (x^4+1)\cdot 2x}{x^4} = \frac{4x^5 - 2x^5 - 2x}{x^4}$$

$$= \frac{2x^5 - 2x}{x^4} = \boxed{2x - \frac{2}{x^3}}$$

c) $f(x) = \dfrac{\sin(x)}{x}$

$$\boxed{f'(x) = \frac{\cos(x)\cdot x - \sin(x)}{x^2}}$$