

Antiderivative problems

1. Find the most general antiderivative $F(x)$ for the function $f(x) = \sin(x) + \frac{x^2 + 1}{x^3}$ (assume $x > 0$).
2. Find the most general antiderivative $G(x)$ for the function $g(x) = \frac{x^2 + 2}{x^2 + 1}$.
3. Find $f(t)$ given that $f''(t) = 12t$, $f(1) = 7$, and $f'(1) = 3$.
4. Find $g(x)$ given $g''(x) = 2 - 8x^{-3}$, $g(1) = -2$, and $g(2) = 5$.