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 \( g(2) = 5 \).