Antiderivatives

Given a function $f(x)$, its antiderivative is a function $F(x)$ such that $F'(x) = f(x)$.

The antiderivatives have the following properties:

1. The antiderivatives of x^n ($n \neq -1$) are $\dfrac{x^{n+1}}{n+1} + c$ where c is an arbitrary constant.

2. If an antiderivative of $f(x)$ is $F(x)$ then the antiderivatives of $k\,f(x)$ are $k\,F(x) + c$ where c is some arbitrary constant.

3. If some antiderivatives of $f(x)$ and $g(x)$ are $F(x)$ and $G(x)$ respectively, then the antiderivatives of $f(x) + g(x)$ are $F(x) + G(x) + c$, with c being an arbitrary constant.

Example 1. Find the antiderivatives of $f(x) = 3x^4 + x + 2$.

Example 2. Find the antiderivatives of $f(x) = 2x^2 + x^3$.

Example 3. Find the antiderivatives of $f(x) = \sqrt{x} - \dfrac{2}{x^2} - 6$.

Example 4. Find the antiderivatives of $g(x) = x^2 \sqrt{x} - \dfrac{1}{\sqrt[3]{x}}$.