

$$1. \int \frac{3x}{\sqrt{4x^2 + 5}} dx$$

$$2. \int \frac{dx}{x^2 + 100}$$

$$3. \int \frac{x^5 dx}{x^6 + 1}$$

$$4. \int x^2 e^{-2x} dx$$

$$5. \int x \ln(x) dx$$

$$6. \frac{dy}{dx} = \frac{2x + 1}{2y} \quad y(0) = -1$$