

1. Evaluate $\int \frac{x^3}{(1+x^4)^2} dx$.

2. Evaluate $\int_{\frac{\pi}{4}}^{\frac{\pi}{3}} \sec(1-x) \tan(1-x) dx$.

3. Give the equation of the tangent line to the graph of $y = \ln\left(x^{\frac{2}{3}}\right)$ at the point $x = 1$.

4. Find the derivative of $f(x)$.

(a) $f(x) = \ln\left(\frac{2x}{x^2 + 3}\right)$

(b) $f(x) = \ln\sqrt[3]{\frac{x-1}{x+1}}$

(c) $f(x) = \ln|\sec(x) - \tan(x)|$

(d) $f(x) = x^2e^{-x}$

(e) $f(x) = \int_0^{e^{2x}} \ln(t+1) dt$

5. Evaluate $\int \frac{x^2}{3-x^3} dx$.

6. Evaluate $\int \frac{\sqrt{x}}{\sqrt{x}-3} dx$.

7. Evaluate $\int \frac{5 - e^x}{e^{2x}} dx$.

8. Evaluate $\int \sin^{-1}(x) dx$.

Hint: Find the derivative of $f(x) = x \sin^{-1}(x) + \sqrt{1-x^2}$.