

(1) Find the limit if it exists: $\lim_{x \rightarrow 0} \frac{\tan x + \sin 3x}{x}$

(2) Find the derivative of each function

a. $y = x \cos(x^4)$

b. $y = \sec(\tan x)$

(3) Evaluate the integrals

a. $\int x \sin x dx$

b. $\int (\ln x)^2 dx$

c. $\int \frac{dx}{x^2 - 4x + 3}$ (use the table)

d. $\int \frac{\sqrt{x^2 + 4}}{3x^2} dx$ (use the table)