

Show all your work. No credits for answers not supported by work.

1. Find the derivative of

a. $y = \tan^2 x + \csc \sqrt{x^2 + x}$

b. $y = \sin(\cos x)$

2. Evaluate the integrals:

a. $\int x^2 \ln x \, dx$

b. $\int \frac{1 + \sin x}{\cos^2 x} \, dx$

c. Use $\int \frac{du}{\sqrt{u^2 \pm a^2}} = \ln \left| u + \sqrt{u^2 \pm a^2} \right| + C$ to evaluate the integral $\int \frac{dx}{\sqrt{x^2 + 2x}}$

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