

1a. Perform the substitution $u = e^{3t}$ for the integral $\int \frac{e^{3t}}{\sqrt{1 - e^{6t}}} dt$.

Do NOT perform the integration. Fill in your answer here: \int _____ du

1b. Perform the integral you obtained in (a). What function in u did you get? _____

1c. Using (b), $\int \frac{e^{3t}}{\sqrt{1 - e^{6t}}} dt \stackrel{?}{=} \underline{\hspace{2cm}}$

2a. Perform the substitution $u = \ln(x^2)$ for the integral $\int_1^{e^{\pi/4}} \frac{\sin(\ln(x^2))}{x} dx$.

Be sure to change the integration limits. Fill in your answer below:

$$\int_{\underline{\quad}}^{\overline{\quad}} \underline{\quad} du$$

2b. Perform the integral you obtained in (a) to evaluate $\int_1^{e^{\pi/4}} \frac{\sin(\ln(x^2))}{x} dx$.

3a. Perform the substitution $u = x - 1$ for the integral $\int \frac{x(x-2)}{(x-1)^3} dx$.

Do NOT perform the integration. Fill in your answer here: \int _____ du

3b. Perform the integral you obtained in (a). What function in u did you get? _____

3c. Using (b), $\int \frac{x(x-2)}{(x-1)^3} dx \stackrel{?}{=} \underline{\hspace{2cm}}$

4a. Perform the substitution $u = 5x^2 + 1$ for the integral $\int_0^1 xe^{5x^2+1} dx$.

Be sure to change the integration limits. Fill in your answer below:

$$\int_{\underline{\quad}}^{\underline{\quad}} \underline{\hspace{2cm}} du$$

4b. Perform the integral you obtained in (a) to evaluate $\int_0^1 xe^{5x^2+1} dx$.