

Chemistry 163C

Some problems to practice Mathematica, Maple, Maxima, Sagemath, or just your own talents.

1) $\frac{d}{dx} e^{-ax^2}$

2. $\frac{d}{da} e^{-ax^2}$

3. $\frac{d}{dx} \frac{1}{1 - e^{ax}}$

4. $\frac{d}{dx} \frac{e^{ax}}{1 - e^{ax}}$

5. $\frac{d}{dx} \ln(1 - e^{ax})$

6. $\frac{d}{dx} x^2 e^{-ax}$

7. For $x \geq 0$, find the maximum of the function in problem 6.

8. $\frac{d}{da} \sum_{i=1}^{\infty} e^{-ax_i}$

9. $\frac{d}{da} \ln(1 + e^{ax})^N$

10. $\lim_{x \rightarrow 0} \frac{x}{1 - e^{ax}}$

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

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

13. $\int_0^a \frac{dx}{(2a - x)^3}$

14. $\int_0^{\infty} e^{-\alpha x^2} dx$

15. $\int_0^x e^{-\alpha y^2} dy$