1. Evaluate \((1 + x)^n\) for \(n = 2\) and \(x = 0.01\) exactly and approximately (keep only two terms in the series expansion)

2. Simplify \(\sum_{i=0}^{\infty} \frac{x^i}{i!}\)

3. Evaluate the following:

\[
\frac{d}{dt}(3t^{-2})
\]

\[
\frac{d}{dx}(e^{-2x})
\]

\[
\int \frac{5}{T^2} dT
\]

\[
\int \sin(2x) dx
\]
Area under the function $y = x^2$ between $x=1$ and $x=2$

$$\int_{1}^{2} x^2 \, dx$$

4. Consider the ideal gas law: $PV = nRT$. Evaluate the following:

$$\left( \frac{\partial P}{\partial T} \right)_{V,n}$$

$$\left( \frac{\partial P}{\partial V} \right)_{T,n}$$