1. How quickly a leaf grows is proportional to how big it is (in its surface area). If the area of the leaf grows from $2 \text{ cm}^2$ to $3 \text{ cm}^2$ in 5 days, how long will it take to grow to $5 \text{ cm}^2$?

2. Find.
   a) $\frac{d}{dx} (\sin x + \cos x)^2$
   b) $\frac{d}{dx} \left( \frac{x^2 + 1}{e^x} \right)$
   c) $\int \sin \left( \frac{\pi}{3} x \right) \, dx$

3. $y' = e^{2t} + t^2$.
   a) Find the general solution of the differential equation.
   b) If $y(0)=7$, what is the particular solution?

4. Find any local minima and maxima of the function $f(x) = e^{-x}(x + 1)^2$.

5. A cup of tea was made at a temperature of $80^\circ C$, and it cools according to Newton’s law of cooling. The room temperature is $20^\circ C$, and it takes 15 minutes for the tea to cool down to $40^\circ C$.
   a) How long will it take the tea to cool down to $30^\circ C$?
   b) What will be the tea temperature after 1 hour?