1. Use logarithmic differentiation to find the derivative of \( y = (\cos 3x)^{\ln x} \).

\[
\frac{\ln y}{y} = \frac{1}{x} \ln (\cos 3x) + (\ln x) \cdot \frac{-3 \sin 3x}{\cos 3x}
\]

\[
y' = (\cos 3x)^{\ln x} \left( \frac{1}{x} \ln (\cos 3x) - 3(\tan 3x) \ln x \right)
\]

2. If $5000$ is invested at 2.5% interest, find the value of the investment after 5 years if the interest is compounded monthly.

\[
A = 5000\left(1 + \frac{0.025}{12}\right)^{60} \approx 5665
\]