1. A colony of bacteria grows exponentially. At 1pm, there are 12,000 bacteria. At 2pm, there are 18,000. How many bacteria were there at noon?

Note: If you do this correctly, you do not need a calculator.

2. Find and simplify the derivative of \( y = (1 + x^4) \tan^{-1}(x^2) \).

3. Find the exact value of \( \int_0^{1/\sqrt{3}} \frac{dx}{\sqrt{1 - 3x^2}} \).