Math 241 Quiz 15

1. Use the Fundamental Theorem of Calculus to find the following.
   (a) Find \( \int_1^2 (x + \frac{1}{x^2}) \, dx \)
   
   \[
   = \left. \frac{1}{2} x^2 + \frac{x^{-1}}{-1} \right|_1^2 
   \]
   \[
   = \left( \frac{1}{2} \cdot 2^2 - \frac{1}{2} \right) - \left( \frac{1}{2} \cdot 1^2 - 1 \right) 
   \]
   \[
   = 2 - \frac{1}{2} - \frac{1}{2} + 1 = \boxed{2} 
   \]

(b) Given \( g(x) = \int_1^{x^3} \cos(t^2) \, dt \), find \( g'(x) \).

\[
\begin{align*}
g'(x) &= \cos((x^3)^2) \cdot \frac{d}{dx} x^3 \\
&= \cos(x^6) \cdot 3x^2
\end{align*}
\]