Instructions: You may not use a calculator, notes, books or any other aids. Answer each of the questions thoroughly, justifying your responses and simplifying your final answers where appropriate. Justifying your responses means that you must show your work.  

Be sure that the notation you use makes mathematical sense and is mathematically correct.

1. Evaluate each of the following. Circle your final answers.

   a. \( \frac{d}{dx} \left( \int_3^x \sin(t^2) \, dt \right) \)

   b. \( \frac{d}{dx} \left( \int_2^x \tan(\cos(r^3)) \, dr \right) \)

   c. \( \frac{d}{dx} \left( \int_1^{x^2} \frac{\cos(s)}{s^2 + 1} \, ds \right) \)

   d. \( \frac{d}{dx} \left( \int_{\sin(x)}^{x^3} f(p) \, dp \right) \)

2. Evaluate each of the following. Simplify and circle your final answers.

   a. \( \int_{-1}^2 (3u^2 - 2u + 3) \, du \)

   b. \( \int_0^4 \frac{dy}{\sqrt{y}} \)

   c. \( \int_0^1 x \sin(\pi x^2) \, dx \)