1. (3 points) Evaluate the integral \[ \int_{0}^{2} \frac{12x^2}{9 - x^3} \, dx \]

2. (3 points) Evaluate the integral \[ \int \sin x \cos x \, dx \]
3. (6 points) Consider the finite region bounded by the curves \( x = \frac{1}{4}y^2 \) and \( y = 2x - 4 \). In the following manner set up, but do not evaluate, definite integrals which represent the area of this region.

1. Integrate with respect to \( x \).

2. Integrate with respect to \( y \). (The integrands in parts (a) and (b) should be different.)