

Name

ID

1. (7 marks) Evaluate  $\int \tan^3 x \sec^3 x \, dx$ .

2. (9 marks) Solve the initial value problem

$$t \frac{dy}{dt} = \sqrt{t^2 - 1}, \quad t \geq 1, \quad y(1) = 2.$$

**3.** (9 marks) Evaluate  $\int \frac{1}{x(x^2+1)^2} dx$

**4. (Bonus)** (7 marks) Evaluate  $\int \frac{1}{x+\sqrt{1-x^2}} dx$