

Name:

ID:

1. (6 marks)  $\int_1^{\sqrt{3}} \left( 6x - 2x^{-3} - \frac{4}{x^2+1} \right) dx =$

2. (8 marks) Use the definition of the integral to evaluate the integral  $\int_{-2}^0 (x^2 - x) dx$ .

3. (6 marks)  $\frac{d}{dx} \left( \int_0^x e^{2\sin^{-1}t} dt \right) - \int_0^x \frac{d}{dt} (e^{2\sin^{-1}t}) dt =$

4. (Bonus) (5 marks) If  $v(x) = \int_0^{\tan x} \sqrt{t + \sqrt{t}} dt$  and  $u(y) = \int_1^y v(x) dx$ , find  $u'' \left( \frac{\pi}{4} \right)$ .