172 Homework 1 Name: ______________________________

1. State as precisely as you can, the Fundamental Theorem of Calculus:

2. Use the Fundamental Theorem of calculus to find following derivatives:

   (a) $g(x) = \int_0^x \sqrt{t^2 + t^4} dt$
   $g'(x) =$

   (b) $g(x) = \int_1^x e^{t^2+1} dt$
   $g'(x) =$

   (c) $g(x) = \int_1^{\tan(x)} \sqrt{t^2 + t^4} dt$
   $g'(x) =$

   (d) $g(x) = \int_x^1 \sqrt{t^2 + t^4} dt$
   $g'(x) =$

3. Compute the definite integrals:

   (a) $\int_1^3 \left(x^2 + 2x - 5\right) dx$

(b) $\int_1^9 \sqrt{t}dt$

(c) $\int_1^{\frac{\pi}{4}} \sec^2(\theta)d\theta$

(d) $\int_1^3 \left(\frac{1}{x^2} - \frac{1}{x^3}\right) dx$

4. Find the following anti-derivatives. Use C for the constant of integration:

   (a) $\int e^x\sqrt{1+e^x}dx$

(b) $\int e^{\cos(3t)} \sin(3t)dt$

(c) $\int \sin(2\pi\theta)d\theta$

(d) $\int \frac{dx}{3-2x}$