Integral Calculus Test 2 Name:

Brewer 18 December 2012

$$\int \tan u\, du = -\ln|\cos u| + c$$

$$\int \cot u\, du = \ln|\sin u| + c$$

$$\int \sec u\, du = \ln|\sec u + \tan u| + c$$

$$\int \csc u\, du = -\ln|\csc u + \cot u| + c$$

$$\int \frac{du}{\sqrt{a^2 - u^2}} = \arcsin\frac{u}{a} + c$$

$$\int \frac{du}{a^2 + u^2} = \frac{1}{a}\arctan\frac{u}{a} + c$$

$$\int \frac{du}{u\sqrt{u^2 - a^2}} = \frac{1}{a}\operatorname{arcsec}\frac{|u|}{a} + c$$

1. Find the value(s) of c guaranteed by the Mean Value Theorem for Integrals for the function over the indicated interval.

$f(x) = 4 - x^2$, $[0,2]$

2. Find F as a function of x.

$$\int_{\pi}^{x} (2 + \cos t)dt$$

3. Find $F'(x)$.

$$F(x) = \int_{e^x}^{0} \sin^3 t\, dt$$

4. Evaluate the definite integral.

$$\int_{1}^{2} x\sqrt{x-1}dx$$

Find the indefinite integral.

5. $\int e^x\sqrt{1+e^x}dx$

6. $\int \frac{\sin x}{1+\cos^2 x}dx$

7. $\int 3^{\tan x}\sec^2 x\, dx$

8. $\int \frac{4\sin x}{\sqrt{25-\cos^2 x}}dx$

9. $\int \frac{dx}{x\ln x}$

10. $\int \sec 5x\, dx$

Bonus:

A. Find the indefinite integral. $\int \cos^3 x\, dx$

B. Evaluate the definite integral. $\int_2^3 \frac{2x-3}{\sqrt{4x-x^2}}dx$

C. The Fresnel function S is defined by $S(x) = \int_0^x \sin\left(\frac{\pi t^2}{2}\right)dt$. Locate (find the x-coordinates of) all relative extrema of S on the interval $(0,3)$.