Differentiability and Continuity Properties

A. If $f(x)$ is differentiable at $x = c$, then $f(x)$ is continuous at $x = c$.

B. If $f(x)$ is not continuous at $x = c$, then $f(x)$ is not differentiable at $x = c$.

C. The graph of f is continuous, but not differentiable at $x = c$ if:

I. The graph has a cusp or sharp point at $x = c$

II. The graph has a vertical tangent line at $x = c$

III. The graph has an endpoint at $x = c$

Differentiability
No cusps, corners, vertical tangents, or discontinuity

Basic Trig Integrals

1. $\displaystyle\int \sec x \tan x \ dx = \sec x + C$

2. $\displaystyle\int \cos x \ dx = \sin x + C$

3. $\displaystyle\int \sec^2 x \ dx = \tan x + C$

4. $\displaystyle\int \sin x \ dx = -\cos x + C$

5. $\displaystyle\int \csc^2 x \ dx = -\cot x + C$

6. $\displaystyle\int \csc x \cot x \ dx = -\csc x + C$

7. $\displaystyle\int \tan x \ dx = -\ln|\cos x| + C$

8. $\displaystyle\int \cot x \ dx = \ln|\sin x| + C$

9. $\displaystyle\int \sec x \ dx = \ln|\sec x + \tan x| + C$

10. $\displaystyle\int \csc x \ dx = -\ln|\csc x + \cot x| + C$