Recall our new derivative formula from Section 5.1:

Parallel Integration Formula:

-example- Evaluate each integral.

1. $\int (2x+3-\frac{5}{x}+\frac{6}{\sqrt{x}})dx$

2. $\int \frac{1}{4x-1}dx$

3. $\int \frac{t}{t^2+5}dt$

4. $\int \frac{1}{5-y}dy$

*4. IMPROPER FRACTION: $\int \frac{x^2+1}{x+1}dx$

5. $\int \tan x dx$

*New Trig Integration Formulas: (**MEMORIZE THESE!**)

$\int \tan u du$ $\int \cot u du$

$\int \sec u du$ $\int \csc u du$

-examples- Evaluate each DEFINITE integral

1. $\int_{\pi/4}^{\pi/2} \cot x dx$

2. $\int_{0}^{\pi/2} \sec\left(\frac{1}{2}x\right) dx$

3. $\int_{1}^{e} \frac{\ln^3 x}{x} dx$

APPLICATIONS:

1. Find the area of the region enclosed by the function $f(x) = \dfrac{2}{x \ln x}$, the x – axis, and the vertical lines $x = 2$ and $x = 4$.

2. Find the AVERAGE VALUE of the function $f(x) = \dfrac{8}{3 - 2x}$ on the interval [-2, 1].

3. Solve the differential equation: $\dfrac{dy}{dx} = \tan 2x$, given that $y(0) = 2$

SUMMARY of Derivative and Integral Formulas

Derivatives:

$\frac{d}{dx}u^n =$
$\frac{d}{dx}(\ln u) =$
$\frac{d}{dx}(\sin u) =$
$\frac{d}{dx}(\cos u) =$
$\frac{d}{dx}(\tan u) =$
$\frac{d}{dx}(\cot u) =$
$\frac{d}{dx}(\sec u) =$
$\frac{d}{dx}(\csc u) =$

Integrals:

1. $\int u^n du =$
2. $\int \frac{1}{u} du =$
3. $\int \sin u du =$
4. $\int \cos u du =$
5. $\int \sec^2 u du =$
6. $\int \csc^2 u du =$
7. $\int \tan u \sec u du =$
8. $\int \cot u \csc u du =$
9. $\int \tan u du =$
10. $\int \cot u du =$
11. $\int \sec u du =$
12. $\int \csc u du =$