Basic Properties of	Derivatives	
Addition: dx [fw+	g(x)] = [f(x) + g(x)]' = f'(x) + g(x)	$g'(x) = \frac{d}{dx} f(x) + \frac{d}{dx} g$
Subtraction: dx [fix]	-g(x)] = [f(x) - g(x)]' = f(x)	$(3) - g'(x) = \frac{d}{dx} f(x) - \frac{d}{dx} g$
Coefficient: dx [c.f	$(x)] = [c \cdot f(x)]' = c \cdot f'(x) = c$	· dx f(x)
Product: dx [f(x)·g(x	$3 = [f(x) \cdot g(x)]' = f'(x) \cdot g(x) +$	$g'(x) \cdot f(x) = \frac{d}{dx} f(x) \cdot g(x) + \frac{d}{dx} g(x) \cdot f(x)$
Quotient: dx [f(x)]=	$= \left[\frac{f(x)}{g(x)}\right]' = f'(x) \cdot g(x) - g'(x) \cdot f(x)$	$\frac{d}{dx} f(x) \cdot g(x) - \frac{d}{dx} g(x) \cdot f(x)$
	(g(x)) <sup>2</sup>	(g(x)) <sup>2</sup>
Chain: dx [f(g(x))] =	$f(g(x))]' = f'(g(x)) \cdot g'(x) =$	$\frac{d}{dx} f(g(x)) \cdot \frac{d}{dx} g(x)$
Basic Properties of	Integrals:	
Addition: SEf(x)+glx	Idx = Sf(x)dx + Sg(x)dx	
Subtraction: S[f(x)-	g(x)]dx = Sf(x)dx - Sg(x)dx	
Coefficient: Sc. f(x)	$dx = c \cdot \int f(x) dx$	
Substitution: Sfigix	))·g(x) dx = Sf(u) du, u=0	(x)
Common Derivative		Basic Integrals
Constant: dx (K) = (		Constant: Skdx = Kx +c
Power: dx (x") = n x"	n is a constant	Power: S xndx = 1 ntl xntl +c
Trig.: $\frac{d}{dx} (\sin(x)) = \cos(x)$	S(x)	Trig: Ssin(x) dx = -cos(x) +c
$\frac{d}{dx}(\cos(x)) = -\sin(x)$	n(x)	$S\cos(x) dx = \sin(x) + c$
$\frac{d}{dx}$ (tan(x)) = sec	²(x)	$\int \sec^2(x) dx = \tan(x) + c$
dx (sec(x))= sec	(x) tan (x)	$\int \sec(x) \tan(x) dx = \sec(x) + c$
dx (csc(x)) = -csc	c(x) cot (x)	$\int \csc(x) \cot(x) dx = -\csc(x) + c$

## Basic Properties of Derivatives

Addition:  $\frac{d}{dx} [f(x) + g(x)] = [f(x) + g(x)]' = f(x) + g'(x) = \frac{d}{dx} f(x) + \frac{d}{dx} g$ 

Subtraction:  $\frac{d}{dx} \left[ f(x) - g(x) \right] = \left[ f(x) - g(x) \right]' = f'(x) - g'(x) = \frac{d}{dx} f(x) - \frac{d}{dx} g$ 

Coefficient:  $\frac{d}{dx} [c \cdot f(x)] = [c \cdot f(x)]' = c \cdot f'(x) = c \cdot \frac{d}{dx} f(x)$ 

Product:  $\frac{d}{dx} \left[ f(x) \cdot g(x) \right] = \left[ f(x) \cdot g(x) \right]' = f'(x) \cdot g(x) + g'(x) \cdot f(x) = \frac{d}{dx} f(x) \cdot g(x) + \frac{d}{dx} g(x) \cdot f(x)$ 

Quotient:  $\frac{d}{dx} \left[ \frac{f(x)}{g(x)} \right] = \left[ \frac{f(x)}{g(x)} \right]' = \frac{f'(x) \cdot g(x) - g'(x)}{(g(x))^2} = \frac{\frac{d}{dx} f(x) \cdot g(x) - \frac{d}{dx} g(x) \cdot f(x)}{(g(x))^2}$ 

Chain:  $\frac{d}{dx} \left[ f(g(x)) \right] = \left[ f(g(x)) \right]' = f'(g(x)) \cdot g'(x) = \frac{d}{dx} f(g(x)) \cdot \frac{d}{dx} g(x)$ 

## Basic Properties of Integrals:

Addition: S[f(x)+g|x]dx = Sf(x)dx + Sg(x)dx

Subtraction: S[f(x)-g(x)]dx = Sf(x)dx-Sg(x)dx

Coefficient:  $\int c \cdot f(x) dx = c \cdot \int f(x) dx$ 

Substitution: Sf(g(x)).g'(x) dx = Sf(u) du, u=g(x)

## Common Derivatives

## Basic Integrals

Constant:  $\frac{d}{dx}(k) = 0$  K is a constant

Constant: Skdx = Kx +c

Power:  $\frac{d}{dx}(x^n) = n x^{n-1}$  n is a constant

Power: S xndx = n+1 · xn+1 + c

Trig.:  $\frac{d}{dx}(\sin(x)) = \cos(x)$ 

Trig:  $\int \sin(x) dx = -\cos(x) + c$ 

 $\frac{d}{dx}(\cos(x)) = -\sin(x)$ 

 $\int \cos(x) dx = \sin(x) + c$ 

 $\frac{d}{dx}$  (tan(x)) =  $\sec^2(x)$ 

 $\int \sec^2(x) dx = \tan(x) + c$ 

 $\frac{d}{dx}(sec(x)) = sec(x) tan(x)$ 

 $\int \sec(x) \tan(x) dx = \sec(x) + c$ 

dx (csc(x))=-csc(x)cot(x)

 $\int \csc(x) \cot(x) dx = -\csc(x) + c$