Cheat Sheet – Exam 1

Derivatives

1. $\frac{d}{dx}(\sin^{-1}x)=\frac{1}{\sqrt{1-x^2}}$
2. $\frac{d}{dx}(\cos^{-1}x)=-\frac{1}{\sqrt{1-x^2}}$
3. $\frac{d}{dx}(\tan^{-1}x)=\frac{1}{1+x^2}$
4. $\frac{d}{dx}(\cot^{-1}x)=-\frac{1}{1+x^2}$
5. $\frac{d}{dx}(\sec^{-1}x)=\frac{1}{x\sqrt{x^2-1}}$
6. $\frac{d}{dx}(\csc^{-1}x)=-\frac{1}{x\sqrt{x^2-1}}$
7. $\frac{d}{dx}(\sinh x)=\cosh x$
8. $\frac{d}{dx}(\cosh x)=\sinh x$

Integrals

9. $\int\frac{1}{\sqrt{a^2-x^2}}\,dx=\sin^{-1}\left(\frac{x}{a}\right)+C$
10. $\int\frac{1}{a^2+x^2}\,dx=\frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right)+C$
11. $\int\frac{1}{x\sqrt{x^2-a^2}}\,dx=\frac{1}{a}\sec^{-1}\left(\frac{x}{a}\right)+C$
12. $\int\ln x\,dx=x\ln x-x+C$
13. $\int\tan x\,dx=\ln|\sec x|+C$
14. $\int\sec x\,dx=\ln|\sec x+\tan x|+C$
15. $\int\cot x\,dx=-\ln|\csc x|+C$
16. $\int\csc x\,dx=\ln|\csc x-\cot x|+C$
17. $\int\sec^3 x\,dx=\frac{\sec x\tan x}{2}+\frac{\ln|\sec x+\tan x|}{2}+C$

Trig Identities

18. $\sin^2 x+\cos^2 x=1$
19. $1+\tan^2 x=\sec^2 x$
20. $1+\cot^2 x=\csc^2 x$
21. $\sin 2x=2\sin x\cos x$
22. $\cos 2x=\cos^2 x-\sin^2 x$
23. $\sin A\cos B=\frac{1}{2}[\sin(A+B)+\sin(A-B)]$
24. $\cos A\cos B=\frac{1}{2}[\cos(A+B)+\cos(A-B)]$
25. $\sin A\sin B=\frac{1}{2}[\cos(A-B)+\cos(A+B)]$

Right Angle Trigonometry

26. $\sin\theta=\frac{opp}{hyp}$
27. $\cos\theta=\frac{adj}{hyp}$
28. $\tan\theta=\frac{opp}{adj}$
29. $\cot\theta=\frac{adj}{opp}$
30. $\sec\theta=\frac{hyp}{adj}$
31. $\csc\theta=\frac{hyp}{opp}$

Half-Angle Formulas

32. $\sin^2 x=\frac{1}{2}(1-\cos 2x)$
33. $\cos^2 x=\frac{1}{2}(1+\cos 2x)$

7.1 Integration by Parts

$$\int udv=uv-\int vdu$$

7.3 Trig Substitution

$\sqrt{a^2-x^2}$	$x=a\sin\theta$	$1-\sin^2\theta=\cos^2\theta$
$\sqrt{a^2+x^2}$	$x=a\tan\theta$	$1+\tan^2\theta=\sec^2\theta$
$\sqrt{x^2-a^2}$	$x=a\sec\theta$	$\sec^2\theta-1=\tan^2\theta$

Don’t Forget +C