Campus Academic Resource Program

Calculus Work Sheet

Trigonometric Formulas

1. $\sin^2\theta + \cos^2\theta = 1$
2. $1 + \tan^2\theta = \sec^2\theta$
3. $1 + \cot^2\theta = \csc^2\theta$
4. $\sin(-\theta) = -\sin\theta$
5. $\cos(-\theta) = \cos\theta$
6. $\tan(-\theta) = -\tan\theta$
7. $\sin(A+B) = \sin A\cos B + \sin B\cos A$
8. $\sin(A-B) = \sin A\cos B - \sin B\cos A$
9. $\cos(A+B) = \cos A\cos B - \sin A\sin B$
10. $\cos(A-B) = \cos A\cos B + \sin A\sin B$
11. $\sin 2\theta = 2\sin\theta\cos\theta$
12. $\cos 2\theta = \cos^2\theta - \sin^2\theta = 2\cos^2\theta - 1 = 1 - 2\sin^2\theta$
13. $\tan\theta = \dfrac{\sin\theta}{\cos\theta} = \dfrac{1}{\cot\theta}$
14. $\cot\theta = \dfrac{\cos\theta}{\sin\theta} = \dfrac{1}{\tan\theta}$
15. $\sec\theta = \dfrac{1}{\cos\theta}$
16. $\csc\theta = \dfrac{1}{\sin\theta}$
17. $\cos(\dfrac{\pi}{2} - \theta) = \sin\theta$
18. $\sin(\dfrac{\pi}{2} - \theta) = \cos\theta$

Differentiation Formulas

1. $\dfrac{d}{dx}(x^n) = nx^{n-1}$
2. $\dfrac{d}{dx}(fg) = fg' + gf'$
3. $\dfrac{d}{dx}(\dfrac{f}{g}) = \dfrac{gf' - fg'}{g^2}$
4. $\dfrac{d}{dx}f(g(x)) = f'(g(x))g'(x)$
5. $\dfrac{d}{dx}(\sin x) = \cos x$
6. $\dfrac{d}{dx}(\cos x) = -\sin x$
7. $\dfrac{d}{dx}(\tan x) = \sec^2 x$
8. $\dfrac{d}{dx}(\cot x) = -\csc^2 x$
9. $\dfrac{d}{dx}(\sec x) = \sec x\tan x$
10. $\dfrac{d}{dx}(\csc x) = -\csc x\cot x$
11. $\dfrac{d}{dx}(e^x) = e^x$
12. $\dfrac{d}{dx}(a^x) = a^x \ln a$
13. $\dfrac{d}{dx}(\ln x) = \dfrac{1}{x}$
14. $\dfrac{d}{dx}(Arc\sin x) = \dfrac{1}{\sqrt{1-x^2}}$
15. $\dfrac{d}{dx}(Arc\tan x) = \dfrac{1}{1+x^2}$
16. $\dfrac{d}{dx}(Arc\sec x) = \dfrac{1}{|x|\sqrt{x^2-1}}$
17. $\dfrac{dy}{dx} = \dfrac{dy}{dx} \times \dfrac{du}{dx}$ *Chain Rule*

Integration Formulas

1. $\int a\,dx = ax + C$
2. $\int x^n\,dx = \frac{x^{n+1}}{n+1} + C, \quad n \neq -1$
3. $\int \frac{1}{x} dx = \ln|x| + C$
4. $\int e^x\,dx = e^x + C$
5. $\int a^x dx = \frac{a^x}{\ln a} + C$
6. $\int \ln x\,dx = x\ln x - x + C$
7. $\int \sin x\,dx = -\cos x + C$
8. $\int \cos x\,dx = \sin x + C$
9. $\int \tan x\,dx = \ln|\sec x| + C \text{ or } -\ln|\cos x| + C$
10. $\int \cot x\,dx = \ln|\sin x| + C$
11. $\int \sec x\,dx = \ln|\sec x + \tan x| + C$
12. $\int \csc x\,dx = \ln|\csc x - \cot x| + C$
13. $\int \sec^2 x\,dx = \tan x + C$
14. $\int \sec x \tan x\,dx = \sec x + C$
15. $\int \csc^2 x\,dx = -\cot x + C$
16. $\int \csc x \cot x\,dx = -\csc x + C$
17. $\int \tan^2 x\,dx = \tan x - x + C$
18. $\int \frac{dx}{a^2 + x^2} = \frac{1}{a} Arc\tan\left(\frac{x}{a}\right) + C$
19. $\int \frac{dx}{\sqrt{a^2 - x^2}} = Arc\sin\left(\frac{x}{a}\right) + C$
20. $\int \frac{dx}{x\sqrt{x^2 - a^2}} = \frac{1}{a} Arc\sec\frac{|x|}{a} + C = \frac{1}{a} Arc\cos\left|\frac{a}{x}\right| + C$