# Final Formula Sheet[1]

Math 1B, Summer 2008

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Some, all, or none of the following may be helpful to you:

## Trig Stuff

| | | |
|---|---|---|
| Product Rules: | $\sin A\cos B = \frac{1}{2}(\sin(A-B)+\sin(A+B))$ | |
| | $\sin A\sin B = \frac{1}{2}(\cos(A-B)-\cos(A+B))$ | |
| | $\cos A\cos B = \frac{1}{2}(\cos(A-B)+\cos(A+B))$ | |
| Double/Half Angle: | $\sin x\cos x = \frac{1}{2}\sin(2x)$ | $\sin(2x) = 2\sin(x)\cos(x)$ |
| | $\sin^2 x = \frac{1}{2}(1-\cos(2x))$ | $\cos(2x) = 1-2\sin^2(x)$ |
| | $\cos^2 x = \frac{1}{2}(1+\cos(2x))$ | $\cos(2x) = 2\cos^2(x)-1$ |
| | $\tan(2x) = \frac{2\tan(x)}{1-\tan^2(x)}$ | $\cos(2x) = \cos^2(x)-\sin^2(x)$ |
| Other: | $\int \sec x = \ln(\sec x+\tan x)+C$ | $\int \csc x = \ln(\csc x-\cot x)+C$ |
| | $\frac{d}{dx}\sin^{-1} x = \frac{1}{\sqrt{1-x^2}}$ | $\frac{d}{dx}\cos^{-1} x = -\frac{1}{\sqrt{1-x^2}}$ |

## Arclength/Surface Area

$$L = \int_a^b \sqrt{1+(f'(x))^2} \qquad A = 2\pi\int_a^b f(x)\sqrt{1+(f'(x))^2}$$

## Variation of Parameters

$$u_1' = -\frac{y_2 G(x)}{a(y_1y_2'-y_1'y_2)} \qquad u_2' = \frac{y_1 G(x)}{a(y_1y_2'-y_1'y_2)}$$

## Taylor Series

$$\sin x = \sum_{n=0}^{\infty}(-1)^n\frac{x^{2n+1}}{(2n+1)!} \qquad \cos x = \sum_{n=0}^{\infty}(-1)^n\frac{x^{2n}}{(2n)!} \qquad e^x = \sum_{n=0}^{\infty}\frac{x^n}{n!}$$

$$\ln(1+x) = \sum_{n=1}^{\infty}(-1)^{n+1}\frac{x^n}{n} \qquad \tan^{-1} x = \sum_{n=0}^{\infty}(-1)^n\frac{x^{2n+1}}{2n+1} \qquad (1+x)^k = \sum_{n=0}^{\infty}\frac{k(k-1)\cdots(k-(n-1))}{n!}x^n$$

$$R_n(x) = \frac{f^{(n+1)}(z)}{(n+1)!}(x-a)^{n+1} \text{ for some } z \text{ between } a \text{ and } x$$

[1] As before, I reserve the right to add things to this formula sheet before the actual final, though nothing will be removed. If there's something you feel should be on here, let me know and I'll consider adding it.