

Formulas given on Exam #2
Calculus II – Summer 2005

- $\int \frac{du}{\sqrt{a^2 - u^2}} = \sin^{-1}\left(\frac{u}{a}\right) + c, u^2 < a^2$
- $\int \frac{du}{a^2 + u^2} = \frac{1}{a} \tan^{-1}\left(\frac{u}{a}\right) + c$
- $\int \frac{du}{u\sqrt{u^2 - a^2}} = \frac{1}{a} \sec^{-1}\left|\frac{u}{a}\right| + c, u^2 > a^2$
- $\frac{d(\sin^{-1} u)}{dx} = \frac{1}{\sqrt{1 - u^2}} \frac{du}{dx}, |u| < 1$
- $\frac{d(\cos^{-1} u)}{dx} = \frac{-1}{\sqrt{1 - u^2}} \frac{du}{dx}, |u| < 1$
- $\frac{d(\tan^{-1} u)}{dx} = \frac{1}{1 + u^2} \frac{du}{dx}$
- $\frac{d(\cot^{-1} u)}{dx} = \frac{-1}{1 + u^2} \frac{du}{dx}$
- $\frac{d(\sec^{-1} u)}{dx} = \frac{1}{|u|\sqrt{u^2 - 1}} \frac{du}{dx}, |u| > 1$
- $\frac{d(\csc^{-1} u)}{dx} = \frac{-1}{|u|\sqrt{u^2 - 1}} \frac{du}{dx}, |u| > 1$
- $\frac{d(\sinh^{-1} u)}{dx} = \frac{1}{\sqrt{1 + u^2}} \frac{du}{dx}$
- $\frac{d(\cosh^{-1} u)}{dx} = \frac{1}{\sqrt{u^2 - 1}} \frac{du}{dx}, u > 1$
- $M_x = \int \tilde{y} dm$
- $M_y = \int \tilde{x} dm$
- $M = \int dm$
- $\frac{d(\tanh^{-1} u)}{dx} = \frac{1}{1 - u^2} \frac{du}{dx}, |u| < 1$
- $\frac{d(\coth^{-1} u)}{dx} = \frac{1}{1 - u^2} \frac{du}{dx}, |u| > 1$
- $\frac{d(\operatorname{sech}^{-1} u)}{dx} = \frac{-1}{u\sqrt{1 - u^2}} \frac{du}{dx}, 0 < u < 1$
- $\frac{d(\operatorname{csch}^{-1} u)}{dx} = \frac{-1}{|u|\sqrt{1 + u^2}} \frac{du}{dx}, u \neq 0$
- $\int \frac{du}{\sqrt{a^2 + u^2}} = \sinh^{-1}\left(\frac{u}{a}\right) + c, a > 0$
- $\int \frac{du}{\sqrt{u^2 - a^2}} = \cosh^{-1}\left(\frac{u}{a}\right) + c, u > a > 0$
- $\int \frac{du}{a^2 - u^2} = \begin{cases} \frac{1}{a} \tanh^{-1}\left(\frac{u}{a}\right) + c, u^2 < a^2 \\ \frac{1}{a} \coth^{-1}\left(\frac{u}{a}\right) + c, u^2 > a^2 \end{cases}$
- $\int \frac{du}{u\sqrt{a^2 - u^2}} = \frac{-1}{a} \operatorname{sech}^{-1}\left(\frac{u}{a}\right) + c, 0 < u < a$
- $\int \frac{du}{u\sqrt{a^2 + u^2}} = \frac{-1}{a} \operatorname{csch}^{-1}\left|\frac{u}{a}\right| + c, u \neq 0$
- $\bar{x} = \frac{M_y}{M}$
- $\bar{y} = \frac{M_x}{M}$
- $dm = \delta dA$