

A Small Table of Integrals

<i>Forms involving $a^2 + u^2$</i>		
1. $\int \frac{1}{a^2 + u^2} du = \frac{1}{a} \arctan \frac{u}{a} + C$		
<hr/> <i>Forms involving $a + bu$</i>		
2. $\int \frac{u}{a + bu} du = \frac{1}{b^2} (a + bu - a \ln a + bu) + C$	16. $\int \frac{\sqrt{u^2 - a^2}}{u^2} du = -\frac{\sqrt{u^2 - a^2}}{u} + \ln u + \sqrt{u^2 - a^2} + C$	
3. $\int \frac{u^2}{a + bu} du = \frac{1}{2b^3} [(a + bu)^2 - 4a(a + bu) + 2a^2 \ln a + bu] + C$	17. $\int \frac{1}{u\sqrt{u^2 - a^2}} du = \frac{1}{a} \operatorname{arcsec} \frac{u}{a} + C$	
4. $\int \frac{u}{(a + bu)^2} du = \frac{1}{b^2} \left[\frac{a}{a + bu} + \ln a + bu \right] + C$	18. $\int \frac{1}{\sqrt{u^2 - a^2}} du = \ln u + \sqrt{u^2 - a^2} + C$	
5. $\int u\sqrt{a + bu} du = \frac{2}{15b^2} (3bu - 2a)(a + bu)^{3/2} + C$	19. $\int \frac{1}{u^2\sqrt{u^2 - a^2}} du = \frac{\sqrt{u^2 - a^2}}{a^2u} + C$	
6. $\int \frac{u}{\sqrt{a + bu}} = \frac{2}{3b^2} (bu - 2a)\sqrt{a + bu} + C$	20. $\int \frac{1}{(u^2 - a^2)^{3/2}} du = \frac{\sqrt{u^2 - a^2}}{a^2u} + C$	
7. $\int \frac{1}{u\sqrt{a + bu}} = \frac{1}{\sqrt{a}} \ln \left \frac{\sqrt{a + bu} - \sqrt{a}}{\sqrt{a + bu} + \sqrt{a}} \right + C$ ($a > 0$)	<hr/> <i>Forms involving $\sqrt{a^2 - u^2}$</i>	
<hr/> <i>Forms involving $\sqrt{a^2 + u^2}$</i>		
8. $\int \sqrt{a^2 + u^2} du = \frac{u}{2} \sqrt{a^2 + u^2} + \frac{a^2}{2} \ln u + \sqrt{a^2 + u^2} + C$	21. $\int \sqrt{a^2 - u^2} du = \frac{a}{2} \arcsin \frac{u}{a} - \frac{u}{2a} \sqrt{a^2 - u^2} + C$	
9. $\int u^2 \sqrt{a^2 + u^2} du = \frac{u}{8} (a^2 + 2u^2) \sqrt{a^2 + u^2} - \frac{a^4}{8} \ln u + \sqrt{a^2 + u^2} + C$	22. $\int \frac{1}{\sqrt{a^2 - u^2}} du = \arcsin \frac{u}{a} + C$	
10. $\int \frac{1}{\sqrt{a^2 + u^2}} du = \ln u + \sqrt{a^2 + u^2} + C$	23. $\int \frac{\sqrt{a^2 - u^2}}{u} du = \sqrt{a^2 - u^2} - a \ln \left \frac{a + \sqrt{a^2 - u^2}}{u} \right + C$	
11. $\int \frac{1}{u\sqrt{a^2 + u^2}} du = -\frac{1}{a} \ln \left \frac{\sqrt{a^2 + u^2} + a}{u} \right + C$	24. $\int \frac{1}{u\sqrt{a^2 - u^2}} du = -\frac{1}{a} \ln \left \frac{a + \sqrt{a^2 - u^2}}{u} \right + C$	
12. $\int \frac{1}{u^2\sqrt{a^2 + u^2}} du = -\frac{\sqrt{a^2 + u^2}}{a^2u} + C$	25. $\int \frac{1}{u^2\sqrt{a^2 - u^2}} du = -\frac{\sqrt{a^2 - u^2}}{a^2u} + C$	
13. $\int \frac{1}{(a^2 + u^2)^{3/2}} du = \frac{u}{a^2\sqrt{a^2 + u^2}} + C$	26. $\int \frac{1}{(a^2 - u^2)^{3/2}} du = \frac{u}{a^2\sqrt{a^2 - u^2}} + C$	
<hr/> <i>Forms involving $\sqrt{u^2 - a^2}$</i>		
14. $\int \sqrt{u^2 - a^2} du = \frac{u}{2} \sqrt{u^2 - a^2} - \frac{a^2}{2} \ln u + \sqrt{u^2 - a^2} + C$	<hr/> <i>Forms involving exponentials and logarithms</i>	
15. $\int u^2 \sqrt{u^2 - a^2} du = \frac{u}{8} (2u^2 - a^2) \sqrt{u^2 - a^2} - \frac{a^4}{8} \ln u + \sqrt{u^2 - a^2} + C$	27. $\int \frac{1}{1 + ae^{ku}} du = u - \frac{1}{k} \ln(1 + ae^{ku}) + C$ ($n \neq -1$)	
	28. $\int u^n \ln u du = \frac{u^{n+1}}{(n+1)^2} [(n+1) \ln u - 1] + C$	
<hr/> <i>Secant</i>		
29. $\int \sec u du = \ln \sec u + \tan u + C$	<hr/> <i>Reduction Formulas</i>	
	30. $\int u^n e^{ku} du = \frac{1}{k} u^n e^{ku} - \frac{n}{k} \int u^{n-1} e^{ku} du$	
	31. $\int (\ln u)^n du = u(\ln u)^n - n \int (\ln u)^{n-1} du$	
	32. $\int \sin^n u du = -\frac{1}{n} \sin^{n-1} u \cos u + \frac{n-1}{n} \int \sin^{n-2}(u) du$	