The Robert Gillespie ACADEMIC SKILLS CENTRE

# Indefinite Integrals

Let $k$, $n$, and $a$ be any real number (constants). Assume that $a > 0$ and that $a$ for formulas 6, 8-11, and 13. The integration constant is denoted as $C$.

1. $\int kf(x)\,dx = k\int f(x)\,dx$

2. $\int [f(x)+g(x)]\,dx = \int f(x)\,dx + \int g(x)\,dx$

3. $\int k\,dx = kx + C$

4. $\int x^n\,dx = \frac{x^{n+1}}{n+1} + C, \quad n \neq -1$

5. $\int \frac{1}{x}dx = \int x^{-1}\,dx = \ln|x| + C$

6. $\int e^{kx}\,dx = \frac{e^{kx}}{k} + C$

7. $\int a^x = \frac{a^x}{\ln a} + C$

8. $\int \cos(kx)\,dx = \frac{\sin(kx)}{k} + C$

9. $\int \sin(kx)\,dx = -\frac{\cos(kx)}{k} + C$

10. $\int \sec^2(kx)\,dx = \frac{\tan(kx)}{k} + C$

11. $$\int \sec(kx)\tan(kx)\,dx = \frac{\sec(kx)}{k} + C$$

12. $$\int \sec x\,dx = \ln\left|\sec x + \tan x\right| + C$$

13. $$\int \tan(kx)\,dx = \frac{\ln\left|\sec(kx)\right|}{k} + C$$

14. $$\int \frac{1}{\sqrt{a^2 - x^2}}\,dx = \frac{1}{a}\arcsin\left(\frac{x}{a}\right) + C$$

15. $$\int \frac{-1}{\sqrt{a^2 - x^2}}\,dx = -\frac{1}{a}\arccos\left(\frac{x}{a}\right) + C$$

16. $$\int \frac{1}{x^2 + a^2}\,dx = \frac{1}{a}\arctan\left(\frac{x}{a}\right) + C$$