INTEGRATION IDENTITIES

Assume f and g are functions, differentiable where necessary, p is a polynomial function, a, b, c, r constants.

1. Basic identities

(1) $\int_a^b \left(f\left(x\right)+g\left(x\right)\right)\,dx =$

(2) $\int_a^b k\cdot f\left(x\right)\,dx =$

(3) $\int_a^b f\left(x\right)\,dx+\int_b^c f\left(x\right)\,dx =$

2. Fundamental Theorem of Calculus

(4) $\int_a^b f'\left(x\right)\,dx =$

(5) $f\left(x\right)=f\left(a\right)+$

(6) $\frac{d}{dx}\left\{\int_a^x f\left(t\right)\,dt\right\} =$

3. Basic Antiderivatives

(7) $\int x^n\,dx =$, $n\neq -1$

(8) $\int \frac{1}{x}\,dx =$

(9) $\int e^{rt}\,dt =$

(10) $\int \frac{1}{1+x^2}\,dx =$

(11) $\int \frac{1}{\sqrt{1-x^2}}\,dx =$

(12) $\int \sin\left(k\theta\right)\,d\theta =$

(13) $\int \cos\left(k\theta\right)\,d\theta =$

(14) $\int \tan\left(k\theta\right)\,d\theta =$

(15) $\int \sec\left(k\theta\right)\tan\left(k\theta\right)\,d\theta =$

(16) $\int \csc\left(k\theta\right)\cot\left(k\theta\right)\,d\theta =$

(17) $\int \sec^2\left(k\theta\right)\,d\theta =$

(18) $\int \csc^2\left(k\theta\right)\,d\theta =$

4. Subsitution

(19) $\int_a^b f\left(g\left(x\right)\right) g'\left(x\right)\, dx =$

(20) $\int_a^b f\left(x, c^2 + x^2\right)\, dx =$

(21) $\int_a^b f\left(x, c^2 - x^2\right)\, dx =$

(22) $\int_a^b f\left(x, x^2 - c^2\right)\, dx =$

5. Integration by Parts

(23) $\int f'\left(x\right) g\left(x\right)\, dx =$

(24) $\int f^{(n)}\left(x\right) g\left(x\right)\, dx =$

6. Other integrals

(25) $\int e^{ax} \cos\left(bx\right)\, dx =$

(26) $\int e^{ax} \sin\left(bx\right)\, dx =$

(27) $\int p\left(x\right) e^{rx}\, dx = \Big($ $\Big) e^{rx} + C$

(28) $\int p\left(x\right) \cos\left(ax\right)\, dx$

$= \Big($ $\Big) \cos\left(ax\right) + \Big($ $\Big) \sin\left(ax\right) + C$

(29) $\int p\left(x\right) \sin\left(ax\right)\, dx$

$= \Big($ $\Big) \cos\left(ax\right) + \Big($ $\Big) \sin\left(ax\right) + C$

(30) $\int p'\left(x\right) \ln x\, dx =$