

## Calculus DIFFERENTIATION AND INTEGRATION Table ( u = u(x))

- |  |   |
|--|---|
| <p>1. <math>D_x(c) = 0</math></p> <p>2. <math>D_x(c f(x)) = c D_x(f(x))</math></p> <p>3. <math>D_x(x^n) = n x^{n-1}</math></p> <p>4. <math>D_x(u^n) = n u^{n-1} u'(x)</math></p> <p>5. <math>D_x(f \pm g) = f'(x) \pm g'(x)</math></p> <p>6. <math>D_x(f \cdot g) = f'(x) g(x) + g'(x) f(x)</math></p> <p>7. <math>D_x(f/g) = (f'(x) g(x) - g'(x) f(x)) / (g(x))^2</math></p> <p>8. <math>D_x(f(u(x))) = (df/du)(du/dx) = f'(u) u'(x)</math></p> <p>9. <math>D_x(\sin u) = u'(x) \cos u</math></p> <p>10. <math>D_x(\cos u) = -u'(x) \sin u</math></p> <p>11. <math>D_x(\tan u) = u'(x) \sec^2(u)</math></p> <p>12. <math>D_x(\csc u) = -u'(x) \csc u \cot u</math></p> <p>13. <math>D_x(\sec u) = u'(x) \sec u \tan u</math></p> <p>14. <math>D_x(\cot u) = -u'(x) \csc^2 u</math></p> <p>15. <math>D_x(e^u) = e^u u'(x)</math></p> <p>16. <math>D_x(a^u) = a^u u'(x) \ln a</math></p> <p>17. <math>D_x(\ln u) = u'(x) / u</math></p> <p>18. <math>D_x(\log_a u) = u'(x) / (u \ln a)</math></p> <p>19. <math>D_x(\text{Arcsin } u) = u'(x) / (1 - u^2)^{1/2}</math></p> <p>20. <math>D_x(\text{Arctan } u) = u'(x) / (1 + u^2)</math></p> <p>21. <math>D_x(\text{Arcsec } u) = u'(x) / (u(u^2 - 1)^{1/2})</math></p> <p>22. <math>D_x(\sinh u) =</math></p> <p>23. <math>D_x(\cosh u) =</math></p> <p>24. <math>D_x(\tanh u) =</math></p> <p>25. <math>D_x(\text{sech } u) =</math></p> <p>26. <math>D_x(\text{csch } u) =</math></p> <p>27. <math>D_x(\text{coth } u) =</math></p> | <p>1. <math>\int c \, dx = cx + C</math></p> <p>2. <math>\int c f(x) dx = c \int f(x) dx</math></p> <p>3. <math>\int x^n dx = (x^{n+1}) / (n+1) + C</math> for <math>n \neq -1</math></p> <p>4. <math>\int u^n u' dx = \int u^n du = u^{n+1} / (n+1) + C</math> for <math>n \neq -1</math></p> <p>5. <math>\int (f \pm g) dx = \int f dx \pm \int g dx</math></p> <p>6. <math>\int \sin u \, du = -\cos u + C</math></p> <p>7. <math>\int \cos u \, du = \sin u + C</math></p> <p>8. <math>\int \sec^2 u \, du = \tan u + C</math></p> <p>9. <math>\int \csc^2 u \, du = -\cot u + C</math></p> <p>10. <math>\int \csc u \cot u \, du = -\csc u + C</math></p> <p>11. <math>\int \sec u \tan u \, du = \sec u + C</math></p> <p>12. <math>\int \sec u \, du = \ln   \sec u + \tan u   + C</math></p> <p>13. <math>\int \csc u \, du = \ln   \csc u - \cot u   + C</math></p> <p>14. <math>\int du/u = \ln  u  + C</math></p> <p>15. <math>\int e^u du = e^u + C</math></p> <p>16. <math>\int a^u u' dx = \int a^u du = \int e^{u \ln a} du = a^u / \ln a + C</math></p> <p>17. <math>\int \tan u \, du = -\ln   \cos u   + C</math> or <math>\ln   \sec u   + C</math></p> <p>18. <math>\int \cot u \, du = \ln   \sin u   + C</math></p> <p>19. <math>\int \sin^2 u \, du = (1/2)(u - (\sin 2u)/2) + C</math></p> <p>20. <math>\int \cos^2 u \, du = (1/2)(u + (\sin 2u)/2) + C</math></p> <p>21. <math>\int \tan^2 u \, du = \tan u - u + C</math></p> <p>22. <math>\int \cot^2 u \, du = -\cot u - u + C</math></p> <p>23. <math>\int \frac{du}{\sqrt{a^2 - u^2}} = \arcsin(u/a) + C</math></p> <p>24. <math>\int \frac{du}{u \sqrt{u^2 - a^2}} = (1/a) \arcsin(u/a) + C</math></p> <p>25. <math>\int \frac{du}{a^2 + u^2} = (1/a) \arctan(u/a) + C</math></p> <p>26. <math>\int \frac{P(x) dx}{Q(x)}</math>, <math>\deg P \geq \deg Q</math>, use long division first</p> <p>27. <math>\int x^n \sqrt{ax + b} \, dx</math>, let <math>u = ax + b</math></p> <p>28. <math>\int \frac{du}{\sqrt{au^2 + bu + c}}</math>, use trig substitution</p> |
|--|---|