

Derivative Formulas

Basic Derivative Formulas

- | | |
|--|--|
| 1. $D_x c \cdot u = cD_x u$ | 2. $D_x (u + v) = D_x u + D_x v$ |
| 3. $D_x (u \cdot v) = u \cdot v' + v \cdot u'$ | 4. $D_x \frac{u}{v} = \frac{v \cdot u' - u \cdot v'}{v^2}$ |
| 5. $D_x c = 0$ | 6. $D_x u^n = n \cdot u^{n-1} \cdot u'$ |
| 7. $D_x x = 1$ | |

Logarithmic Derivative Formulas

- | | |
|---|--------------------------------------|
| 8. $D_x \ln u = \frac{u'}{u}$ | 9. $D_x e^u = e^u \cdot u'$ |
| 10. $D_x \log_a u = \frac{u'}{u \cdot \ln a}$ | 11. $D_x a^u = (\ln a) a^u \cdot u'$ |

Trigonometric Derivative Formulas

- | | |
|--|---|
| 12. $D_x \sin(u) = \cos(u) \cdot u'$ | 13. $D_x \cos(u) = -[\sin(u)] \cdot u'$ |
| 14. $D_x \tan(u) = \sec^2(u) \cdot u'$ | 15. $D_x \cot(u) = -[\sec^2(u)] \cdot u'$ |
| 16. $D_x \sec(u) = [\sec(u) \tan(u)] \cdot u'$ | 17. $D_x \csc(u) = -[\csc(u) \cot(u)] \cdot u'$ |

Inverse Trigonometric Derivative Formulas

- | | |
|---|--|
| 18. $D_x \arcsin u = \frac{u'}{\sqrt{1-u^2}}$ | 19. $D_x \arccos(u) = \frac{-u'}{\sqrt{1-u^2}}$ |
| 20. $D_x \arctan(u) = \frac{u'}{1+u^2}$ | 21. $D_x \operatorname{arccot}(u) = \frac{-u'}{1+u^2}$ |
| 22. $D_x \operatorname{arcsec}(u) = \frac{u'}{ u \sqrt{u^2-1}}$ | 23. $D_x \operatorname{arccsc}(u) = \frac{-u'}{ u \sqrt{u^2-1}}$ |

Hyperbolic Derivative Formulas

- | | |
|--|--|
| 24. $D_x \sinh(u) = \cosh(u) \cdot u'$ | 25. $D_x \cosh(u) = \sinh(u) \cdot u'$ |
| 26. $D_x \tanh(u) = \operatorname{sech}^2(u) \cdot u'$ | 27. $D_x \operatorname{coth}(u) = -[\operatorname{sech}^2(u)] \cdot u'$ |
| 28. $D_x \operatorname{sech}(u) = -[\operatorname{sech}(u) \tanh(u)] \cdot u'$ | 29. $D_x \operatorname{csch}(u) = -[\operatorname{csch}(u) \operatorname{coth}(u)] \cdot u'$ |

Inverse Hyperbolic Derivative Formulas

- | | |
|---|---|
| 30. $D_x \sinh^{-1}(u) = \frac{u'}{\sqrt{u^2+1}}$ | 31. $D_x \cosh^{-1}(u) = \frac{u'}{\sqrt{u^2-1}}$ |
| 32. $D_x \tanh^{-1}(u) = \frac{u'}{1-u^2}$ | 33. $D_x \operatorname{coth}^{-1}(u) = \frac{u'}{1-u^2}$ |
| 34. $D_x \operatorname{sech}^{-1}(u) = \frac{-u'}{u\sqrt{1-u^2}}$ | 35. $D_x \operatorname{csch}^{-1}(u) = \frac{-u'}{ u \sqrt{1+u^2}}$ |