

DIFFERENTIALS

$$d(au) = a du$$

$$d(u + v - w) = du + dv - dw$$

$$d(uv) = u dv + v du$$

$$d\left(\frac{u}{v}\right) = \frac{v du - u dv}{v^2}$$

$$d(u^n) = nu^{n-1} du$$

$$d(u^v) = vu^{v-1} du + u^v(\log_e u) dv$$

$$d(e^u) = e^u du$$

$$d(e^{au}) = ae^{au} du$$

$$d(a^u) = a^u(\log_e a) du$$

$$d(\log_e u) = u^{-1} du$$

$$d(\log_a u) = u^{-1}(\log_a e) du$$

$$d(u^u) = u^u(1 + \log_e u) du$$

$$d \sin u = \cos u du$$

$$d \cos u = -\sin u du$$

$$d \tan u = \sec^2 u du$$

$$d \cot u = -\csc^2 u du$$

$$d \sec u = \tan u \sec u du$$

$$d \csc u = -\cot u \cdot \csc u du$$

$$d \operatorname{vers} u = \sin u du$$

$$d \sin^{-1} u = (1 - u^2)^{-\frac{1}{2}} du$$

$$d \cos^{-1} u = -(1 - u^2)^{-\frac{1}{2}} du$$

$$d \tan^{-1} u = (1 + u^2)^{-1} du$$

$$d \cot^{-1} u = -(1 + u^2)^{-1} du$$

$$d \sec^{-1} u = u^{-1}(u^2 - 1)^{-\frac{1}{2}} du$$

$$d \csc^{-1} u = -u^{-1}(u^2 - 1)^{-\frac{1}{2}} du$$

$$d \sinh u = \cosh u du$$

$$d \cosh u = \sinh u du$$

$$d \tanh u = \operatorname{sech}^2 u du$$

$$d \coth u = -\operatorname{csch}^2 u du$$

$$d \operatorname{sech} u = -\operatorname{sech} u \tanh u du$$

$$d \operatorname{csch} u = -\operatorname{csch} u \coth u du$$

$$d \operatorname{vers}^{-1} u = (2u - u^2)^{-\frac{1}{2}} du$$

$$d \sinh^{-1} u = (u^2 + 1)^{-\frac{1}{2}} du$$

$$d \cosh^{-1} u = (u^2 - 1)^{-\frac{1}{2}} du$$

$$d \tanh^{-1} u = (1 - u^2)^{-1} du$$

$$d \coth^{-1} u = -(u^2 - 1)^{-1} du$$

$$d \operatorname{sech}^{-1} u = -u^{-1}(1 - u^2)^{-\frac{1}{2}} du$$

$$d \operatorname{csch}^{-1} u = -u^{-1}(u^2 + 1)^{-\frac{1}{2}} du$$