

$$7. \log_3 81$$

$$= \log_3 3^4$$

$$= 4$$

Formula

$$\log_b b^p = p$$

$$8. \log_2 \frac{1}{8}$$

$$= \log_2 \frac{1}{2^3}$$

$$= \log_2 2^{-3}$$

$$= -3$$

CHANGE OF BASE

$$9. \log_7 2$$

$$= \frac{\log 2}{\log 7}$$

$$= \frac{\ln 2}{\ln 7}$$

$$= .3562$$

Formula

$$\frac{d}{dx} [a^x] = (\ln a) a^x$$

$$\frac{d}{dx} [a^u] = (\ln a) a^u \cdot u'$$

$$10. y = \left(\frac{1}{5}\right)^{4x-2}$$

$$y' = (\ln \frac{1}{5}) \left(\frac{1}{5}\right)^{4x-2} \cdot \frac{d}{dx} (4x-2)$$

$$= (4 \ln \frac{1}{5}) \left(\frac{1}{5}\right)^{4x-2}$$

Formula

$$\frac{d}{dx} [\log_a x] = \left(\frac{1}{\ln a}\right) \cdot \frac{1}{x}$$

$$\frac{d}{dx} [\log_a u] = \left(\frac{1}{\ln a}\right) \cdot \frac{1}{u} \cdot u'$$

$$11. y = \log_4 (9x+1)$$

$$y = \frac{\ln(9x+1)}{\ln 4}$$

$$y = \frac{1}{\ln 4} \cdot \ln(9x+1)$$

$$y' = \frac{1}{\ln 4} \cdot \frac{1}{9x+1} \cdot \frac{d}{dx} (9x+1)$$

$$= \frac{9}{\ln 4} \cdot \frac{1}{9x+1}$$

$$= \frac{9}{(\ln 4)(9x+1)}$$