

1. (2pts) Complete the formulas:

$$\frac{d}{dx} \log_a x = \frac{1}{\ln(a) x}$$

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

2. (4pts) Find $\frac{d}{dt} (3^{\cos(2t)}) = \ln(3) 3^{\cos(2t)} \cdot (-\sin(2t) \cdot 2)$

$$= -2\ln(3) \sin(2t) 3^{\cos(2t)}$$

3. (4pts) Find $\int \frac{2^x}{2^x+1} dx = \frac{1}{\ln(2)} \int \frac{1}{u} du = \frac{1}{\ln(2)} \ln|u| + C$

Let $u = 2^{x+1}$

$$du = \ln(2) 2^x dx$$

$$= \frac{1}{\ln(2)} \ln|2^{x+1}| + C$$