

1. Let  $A$ ,  $B$ , and  $k$  be constants. Differentiate the following with respect to  $x$ :

(a)  $y = (Ax)^3 + e^{(x^k)}$

(b)  $y = A \sin^2(kx) + B \cos^2(kx)$

2. Solve the following integrals:

(a)  $\int \frac{2x}{1+x^2} dx$

(b)  $\int \cos^2(x) dx$

(c)  $\int \frac{1}{1+x^2} dx$