

1. Obtain expressions for the following derivatives:

a.) $\frac{d \ln kx}{dx}$

b.) $\frac{d(1+kx)}{d \ln x}$

c.) $\frac{d \ln(1+x+x^2+4x^3)}{d \ln x}$

d.) $\frac{d \ln(b+kL)}{dL}$

e.) $\frac{d \ln e^x}{dx}$

f.) $\frac{df}{dx}$, where $f = 2x + x^2 + 5x^3$

g.) $f = \sum_{i=0}^n x^i$

$$\frac{d \ln f}{d \ln x} = ?$$

2. Compute the partial derivatives, $\left(\frac{\partial f}{\partial x}\right)_y$ and $\left(\frac{\partial f}{\partial y}\right)_x$, for the following:

a.) $f = 3x^2 + y^5$

b.) $f = x^{10}y^{\frac{1}{2}}$

c.) $f = x + y^2 + 10$

3. Apply the Euler test to determine if $df = 6xy^3dx + 9x^2y^2dy$ is an exact differential. What is the function, $f(x,y)$?