

1) From Appendix A.6 in Engel & Reid  
(i.e. read Appendix A.6) (course textbook)

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consider the following function:

$$p(\eta, T, v) = \frac{\eta RT}{v}$$

$\eta, T, v$  are independent variables;  $R = \text{constant}$ .

a) Find:  $\left( \frac{\partial p(\eta, T, v)}{\partial v} \right)_{\eta, T} = ?$

b) Find:  $\left( \frac{\partial p(\eta, T, v)}{\partial T} \right)_{\eta, v} = ?$

c) Find:  $\left( \frac{\partial p(\eta, T, v)}{\partial \eta} \right)_{v, T} = ?$

2) consider the following function:

$$f(x,y) = x^4 + 6\sqrt{y} - 10$$

a) find:  $\left(\frac{\partial f(x,y)}{\partial x}\right)_y = ?$

b) find:  $\left(\frac{\partial f(x,y)}{\partial y}\right)_x = ?$

note:  $x, y$  are independent variables

3) consider the following function:

$$h(s,t) = t^7 \ln(s^2) + \frac{9}{t^3} - \sqrt[7]{s^4}$$

$s, t$  are independent variables

a) find  $\left(\frac{\partial h(s,t)}{\partial s}\right)_t = ?$

b) find  $\left(\frac{\partial h(s,t)}{\partial t}\right)_s = ?$

4) for the following function:

$$f(x, y) = y e^{ax} + xy \cos(x) + y \ln(xy)$$

$x, y$  are independent variables

$a = \text{constant}$

a) find:  $\left(\frac{\partial f}{\partial x}\right)_y = ?$

b) find:  $\left(\frac{\partial f}{\partial y}\right)_x = ?$

c) find:  $\left(\frac{\partial^2 f}{\partial x^2}\right)_y = ?$

d) find:  $\left(\frac{\partial}{\partial x} \left(\frac{\partial f}{\partial y}\right)_x\right)_y = ?$

e) find:  $\left(\frac{\partial}{\partial y} \left(\frac{\partial f}{\partial x}\right)_y\right)_x = ?$

These types of problems may appear on first and subsequent quizzes & exams