

### 1 Gradient Practice

Find the gradient of each of the following functions:

(a)

$$f(x, y, z) = e^{(x+y)} + x^2 y^3 \ln \frac{x}{z} \quad (1)$$

(b)

$$\sigma(\theta, \phi) = \cos \theta \sin^2 \phi \quad (2)$$

(c)

$$\rho(s, \phi, z) = (s + 3z)^2 \cos \phi \quad (3)$$