exercise 1:

Let $f(x,y) = \exp(\frac{x}{x^2+y^2})$.

(i). Sketch the vectors $e_r, e_\theta$ and write $f(x,y)$ as a function of $r$ and $\theta$.

(ii). Compute the gradient of $f$ in polar coordinates.

exercise 2:

section 4.7: 311, 312.

exercise 3:

section 4.7: 345, 346.

exercise 4:

section 4.7: 348, 352.