Due Wednesday 8 October

   (a) # 5.
   (b) # 6.

(2) p. 222 - 225.
   (a) # 6.
   (b) # 33.
   (c) # 41(b).

(3) Section 3.4 p. 243 - 246.
   (a) # 5
   (b) # 12.
   (c) # 30.

(4) Let $f : \mathbb{R}^2 \to \mathbb{R}$ be a $C^\infty$ function with a critical point at $(0,0)$. Suppose the Hessian matrix of $f$ at $(0,0)$ is

$$Hf(0,0) = \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$$

(a) Give an example of such an $f$ which has a local minimum at $(0,0)$.

(b) Give an example of such an $f$ which has a saddle point at $(0,0)$.

(c) Can $f$ have a local maximum at $(0,0)$?