6. [9 points] In each of the following problems, draw a *graph* of a function with *all* of the indicated properties. If there is no such function, then write "NO SUCH FUNCTION EXISTS". You do not need to write any explanations. No partial credit will be given on each part of this problem.

a. [3 points] A continuous function $f(x)$, whose domain is all real numbers, with the following four properties:
(i.) $f(x)$ attains a local minimum somewhere.
(ii.) $f(x)$ attains a local maximum somewhere.
(iii.) $f(x)$ does *not* attain a global minimum.
(iv.) $f(x)$ does *not* attain a global maximum.

b. [3 points] A continuous function $g(x)$, whose domain is the closed interval $[0, 1]$, with the following two properties:
(i.) $g(x)$ does *not* attain a global maximum on the interval $[0, 1]$
(ii.) $g(x)$ attains a global minimum on the interval $[0, 1]$.

c. [3 points] A differentiable function $j(x)$ with the following two properties:
(i.) The linear approximation to $j(x)$ at $x = 3$ gives an *overestimate* when used to approximate $j(2)$.
(ii.) The linear approximation to $j(x)$ at $x = 3$ gives an *underestimate* when used to approximate $j(4)$.