9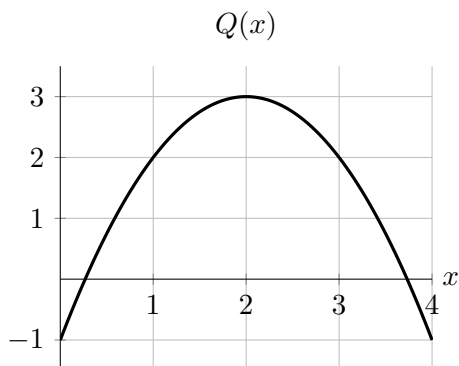. [11 points] Let $Q(x) = -(x-2)^2 + 3$ be the quadratic approximation of the function $y = f(x)$ at $x = 3$. A part of the graph of $Q(x)$ is shown below.

$Q(x)$

a. [6 points] If possible, find the following quantities exactly. If there is not enough information to obtain an **exact** answer, write "NEI".

$f''(3) = $ —————, $f'''(3) = $ —————, $f(0) = $ —————,

$Q''(3) = $ —————, $Q'''(3) = $ —————, $Q(0) = $ ————— .

b. [4 points] Assume that the function $f(x)$ is invertible and let $g(y) = f^{-1}(y)$ be its inverse. Given that $f(3) = 2$, find the linear approximation $L(y)$ of $g(y)$ at $y = 2$. Your answer should not include the letters f or g. Show all your work.

Answer: $L(y) = $ ————————————

c. [1 point] Use the linear approximation $L(y)$ to approximate a solution to the equation $f(x) = 1.7$.

Answer: ————————————