8. (8 points) On the set of axes provided, draw the graph of a smooth function f such that this function has all of the following properties.

(a) $f(3) = 2$

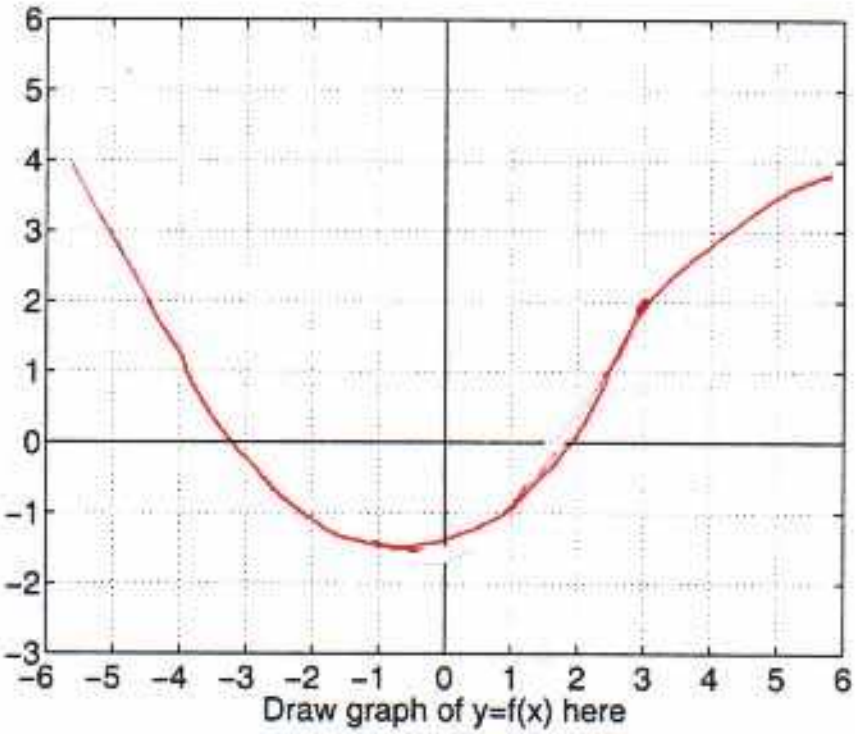
(b) $f' < 0$ for $x < 0$

(c) $f' > 0$ for $x > 0$

(d) $f'' > 0$ for $x < 3$

(e) $f'' < 0$ for $x > 3$

(f) the graph of f does not pass through the origin



(b) Is it possible that $f(x) = 0$ for some $x > 3$? Explain.

No. Since $f'(x) > 0$ for $x > 0$, the function increases for $x > 0$. Thus, $f(x) > 2$ for all $x > 3$.