1. Sketch the graph of a single function that has all of the following properties:

(a) $f$ is odd.
(b) $f'(x) < 0$ for $0 < x < 2$.
(c) $f'(x) > 0$ for $x > 2$.
(d) $f''(x) > 0$ for $0 < x < 3$.
(e) $f''(x) < 0$ for $x > 3$.
(f) $\lim_{x \to \infty} f(x) = -2$. 
2. Sketch the graph of a single function that has all of the following properties:

(a) Continuous and differentiable everywhere except at \( x = -3 \), where it has a vertical asymptote.
(b) A horizontal asymptote at \( y = 1 \).
(c) An \( x \)-intercept at \( x = -2 \).
(d) A \( y \)-intercept at \( y = 4 \).
(e) \( f'(x) > 0 \) on the intervals \( (-\infty, -3) \) and \( (-3, 2) \).
(f) \( f'(x) < 0 \) on the interval \( (2, \infty) \).
(g) \( f''(x) > 0 \) on the intervals \( (-\infty, -3) \) and \( (4, \infty) \).
(h) \( f''(x) < 0 \) on the interval \( (-3, 4) \).
(i) \( f'(2) = 0 \).
(j) An inflection point at \( (4, 3) \).
3. For the function \( f(x) = 2 + 3x^2 - x^3 \)

(a) Find the y-intercept.
(b) Find any asymptotes.
(c) Find the intervals on which \( f \) is increasing or decreasing.
(d) Find the local maximum and minimum values of \( f \).
(e) Find the intervals of concavity and the inflection points.
(f) Use the information above to sketch the graph.
4. For the function 

\[ f(x) = xe^{-x} \]

(a) Find the x- and y-intercepts.
(b) Find any asymptotes.
(c) Find the intervals on which \( f \) is increasing or decreasing.
(d) Find the local maximum and minimum values of \( f \).
(e) Find the intervals of concavity and the inflection points.
(f) Use the information above to sketch the graph.