Please show all your work in order to receive partial credit.

1. Each of the graphs below show the position of an object moving along the $x$-axis as a function of time, $0 \leq t \leq 4$. The vertical scales of the graphs are the same.

Recall that velocity is the first derivative of position and that acceleration is the second derivative of position.

During this time interval, which graph depicts an object that has

(a) constant velocity?
   (iii) because the slope of a straight line is constant.

(b) zero acceleration?
   (iii) since the first derivative is constant then the second derivative must be zero.

(c) average velocity equal to zero?
   (iv) because the position of the object is the same at both $t = 0$ and $t = 4$.

(d) negative acceleration over the entire integral?
   (i) because the function is concave down on this interval.

(e) greatest initial velocity?
   (i) because the slope at zero is greatest in this graph.

(f) negative velocity?
   (ii) because the function is decreasing.

2. Sketch the graph of a function $f$ whose first and second derivatives are everywhere negative.

3. Sketch the graph of a function $f$ whose first derivative is everywhere positive and whose second derivative is positive for some $x$-values and negative for other $x$-values.