5.3 Notes Name_____

1) Complete each statement.

   a. When f' is _____, the graph is f is increasing.

   b. When f' is _____, the graph is f is decreasing.

   c. When f'' is _____, the graph is f is concave upward.

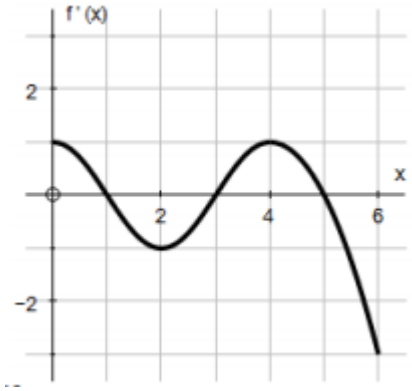
   d. When f'' is _____, the graph is f is concave downward.

   e. When f' is _____, the graph is f is concave upward.

   f. When f' is _____, the graph is f is concave downward.

2) Use the function $f(x) = 3x - x^3 + 5$. Justify each response.
   a. Where is the function increasing?
   b. Where is the function decreasing?
   c. Find all local extrema.
   d. Where is the function concave up?
   e. Where is the function concave down?
   f. Where are the points of inflection?
   g. Create a sketch of the function.

3) Use the graph of $f'(x)$ defined on [0,6] provided to the right to find the following.
   a. When is f increasing? Decreasing? Justify your answer.
   b. Where does f have local extrema. Justify your answer.
   c. When is f concave up? Concave down? Justify your answer.
   d. Where does f have points of inflection? Justify your answer.
   e. Sketch a possible graph of f.



4) If f is continuous on [0,3] and satisfies the following:

x	0	$0<x<1$	1	$1<x<2$	2	$2<x<3$	3
$f(x)$	0	+	2	+	0	–	–2
$f'(x)$	3	+	0	–	DNE	–	–3
$f''(x)$	0	–	–1	–	DNE	–	0

a. Find any local extrema. Justify your answer.
b. Find any points of inflection. Justify your answer.
c. Sketch a possible graph of f

5) Let f be a function that is continuous on the interval [0,4] that satisfies the following:

x	0	$0<x<1$	1	$1<x<2$	2	$2<x<3$	3	$3<x<4$
$f(x)$	–1	Negative	0	Positive	2	Positive	0	Negative
$f'(x)$	4	Positive	0	Positive	DNE	Negative	–3	Negative
$f''(x)$	–2	Negative	0	Positive	DNE	Negative	0	Positive

a. Describe the behavior of f in each interval.

x	$0<x<1$	$1<x<2$	$2<x<3$	$3<x<4$
$f(x)$				

b. Sketch a possible graph of f