Essentials of Calculus Homework 2.4 The second derivative

- 1. Suppose that the number D of deer in a forest in t years have the D (deer) 50100 150220300 Find estifollowing values: t (years) 0 1 $\mathbf{2}$ 3 4 mates for D' and $\overline{D''}$ (and note their units) for any values of t that you can.
- 2. Suppose that the cost *C* in dollars of making *x* items have the follow-C (cost) 5080 100 110 120Find estimates ing values: x (items) 2030 1040 50for C' and $C^{\overline{\prime\prime}}$ (and note their units) for any values of x that you can.
- 3. Let *f* be the function with the following graph.



Determine if f'(x), f''(x) are positive or negative for x = 0, 1, 2.

4. Let *f* be the function with the following graph.



Determine if f'(x), f''(x) are positive or negative for x = 0, 1, 2.

5. Let f be the function with the following graph.



Determine the intervals where f' is positive and the intervals where f' is negative. Do the same for f''.

6. Let *f* be the function with the following graph.



Determine the intervals where f' is positive and the intervals where f' is negative. Do the same for f''.

- 7. Draw the graph of a function *f* that satisfies the following:
 - f'(x) > 0 for 0 < x < 3
 - f'(x) < 0 for 3 < x < 5
 - f''(x) > 0 for 0 < x < 2
 - f''(x) < 0 for 2 < x < 4
 - f''(x) > 0 for 4 < x < 5
- 8. Draw the graph of a function *f* that satisfies the following:
 - f'(x) < 0 for 0 < x < 2
 - f'(x) > 0 for 2 < x < 5
 - f''(x) > 0 for 0 < x < 4
 - f''(x) < 0 for 4 < x < 5