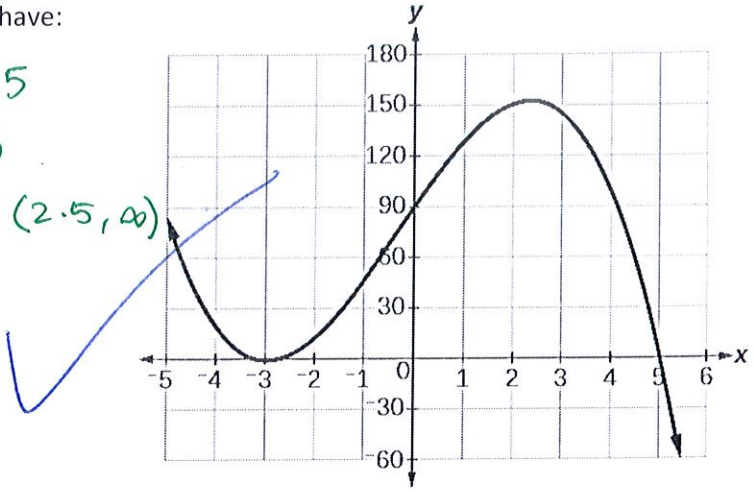
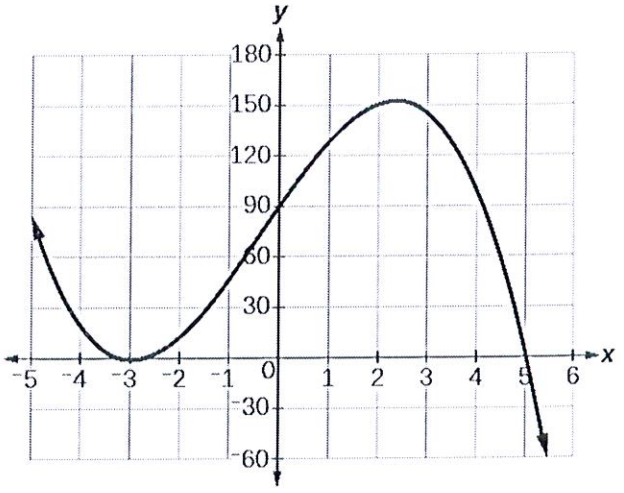
A. Consider the graph of f. Where does f have:

1. critical points: $x = -3, 2.5$
2. interval of increase: $(-3, 2.5)$
3. interval of decrease: $(-\infty, -3) \cup (2.5, \infty)$
4. extrema: $x = -3$ rel min
   $x = 2.5$ rel max
5. inflection point: $x \approx 0$
6. interval of concave up: $(-\infty, 0)$
7. interval of concave down: $(0, \infty)$



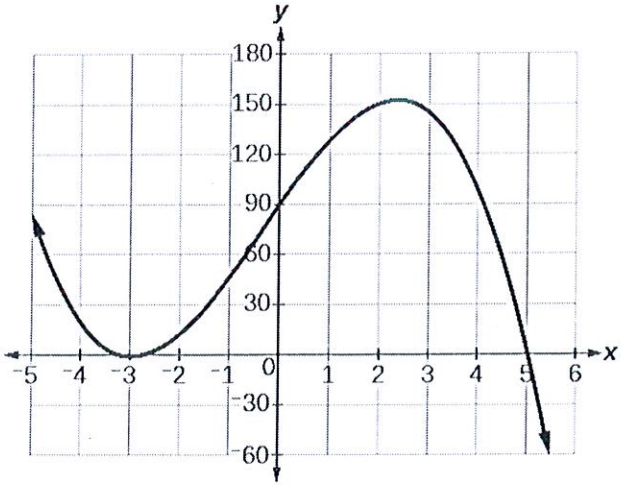
B. Consider the graph of f', the derivative of f.
Where does f have:

1. critical points: $x = -3, 5$
2. interval of increase: $(-\infty, 5)$
3. interval of decrease: $(5, \infty)$
4. extrema: $x = 5$ rel max
5. inflection points: $x = -3, 2.5$
6. interval of concave up: $(-3, 2.5)$
7. interval of concave down: $(-\infty, -3) \cup (2.5, \infty)$



C. Consider the graph of f'', the derivative of f' and the second derivative of f. Where does f have:

1. inflection points: $x = 5$
2. interval of concave up: $(-\infty, 5)$
3. interval of concave down: $(5, \infty)$



Function Analysis Using Derivatives and Curve Sketching

Part A: **If possible, list all points on the function below which appear to meet the stated conditions. Note: There is a vertical tangent at k.**

1) $f'(x) > 0$ but finite D, J, L, M

2) $f'(x) > 0$ and $f''(x) > 0$ J, M

3) $f'(x) = 0$ and $f''(x) > 0$ I, C

4) $f'(x) = 0$ and $f''(x) < 0$ A, E

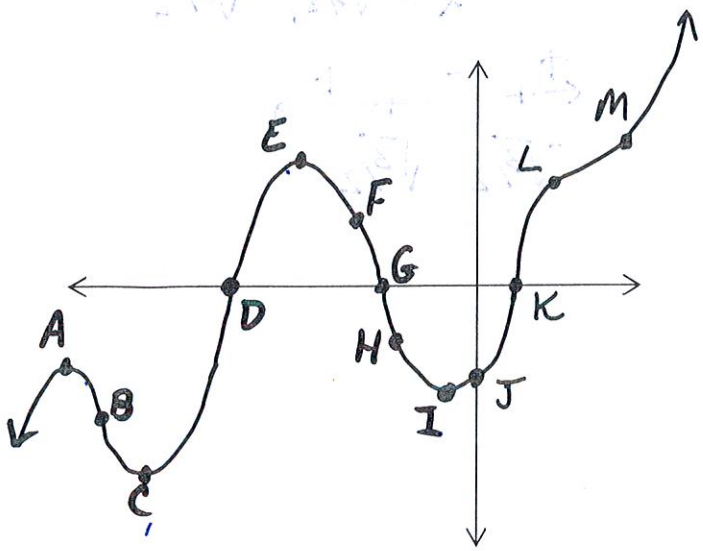
5) $f''(x) = 0$ B, D, G, K, L

6) $f(x) = 0$ and $f'(x) > 0$ D, ~~K~~

7) $f'(x) = 0$ and $f''(x) = 0$ none

8) $f(x) = 0$ and $f'(x) > 0$ and $f''(x) > 0$ none

9) $f'(x) < 0$ and $f''(x) < 0$ F



Part 2: **Given the sketch of a function below, sketch the first and second derivatives on the axes provided.**