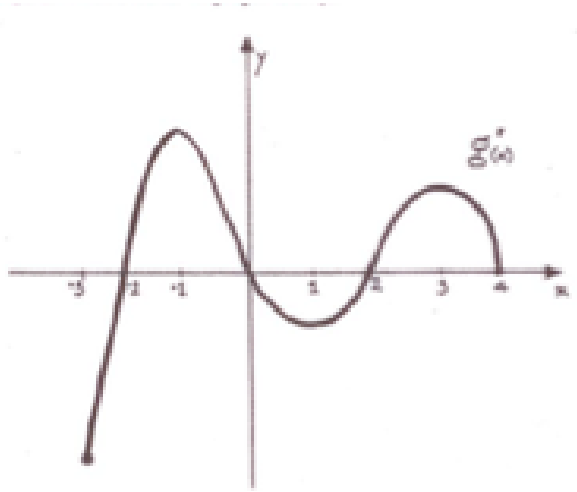
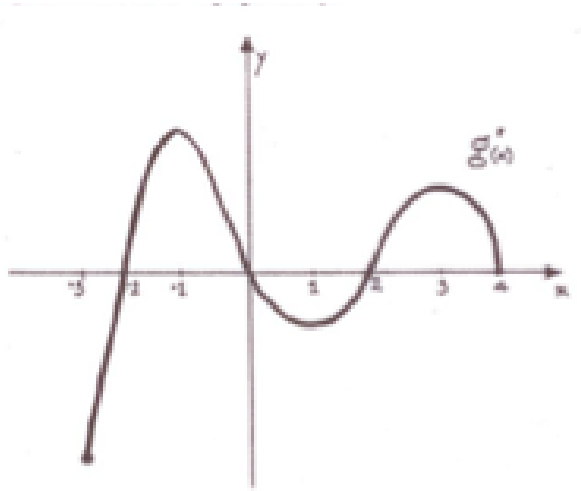
3.5 Summary of Curve Sketching - Cont.

1. The figure below shows the graph of $g'(x)$

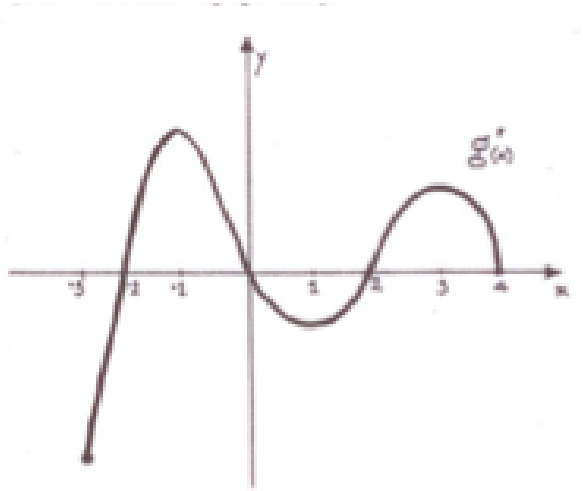


a) Determine the values of x for which g has a relative extrema. JYA with $g'(x)$

*See printout.



b) Discuss the concavity. JYA with $g'(x)$

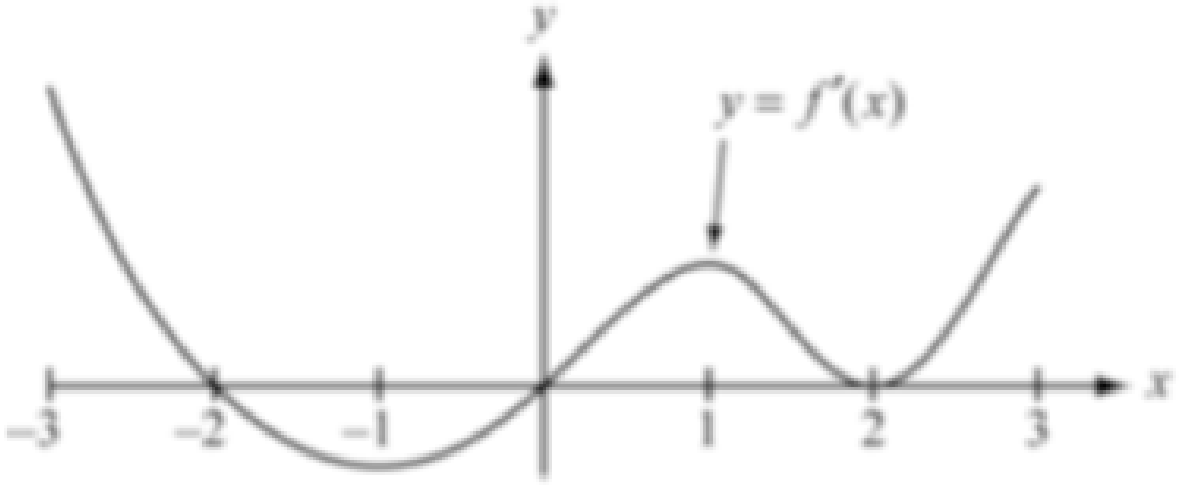


c) Using the information in parts a) and b) and the fact that

$$g(-3) = 3 \text{ and } g(4) = 6$$

sketch a graph for g(x).

2.



Note: This is the graph of the derivative of f, not the graph of f.

The figure above shows the graph of f', the derivative of a function f. The domain of the function f is the set of all x such that $-3 \le x \le 3$.

(a) For what values of x, $-3 < x < 3$, does f have a relative maximum? A relative minimum? Justify your answer.

(b) For what values of x is the graph of f concave up? Justify your answer.

(c) Use the information found in parts (a) and (b) and the fact that $f(-3) = 0$ to sketch a possible graph of f on the axes provided below.

3. Sketch the function which is
increasing on $(-\infty, 0)$ and $(2, +\infty)$,
decreasing on $(0, 2)$,
concave up on $(1, +\infty)$,
concave down on $(-\infty, 1)$,
and has a
relative maximum at $(0, 4)$,
relative minimum at $(2, 0)$,
point of inflection at $(1, 1)$.

4. Sketch the curve with the following properties:

y-axis symmetry

horizontal asymptote: $y = 0$

vertical asymptotes: $x = -2$, $x = 2$

increasing on $(0, 2)$ and $(2, +\infty)$

decreasing on $(-\infty, -2)$ and $(-2, 0)$

concave up on $(-2, 2)$

concave down on $(-\infty, -2)$ and $(2, +\infty)$

$f(0) = 2$

5. Sketch a curve that satisfies the following conditions:

$\frac{dy}{dx} < 0$ on $(-\infty, 0)$ and $\frac{dy}{dx} > 0$ on $(0,2)$

$(2,\infty)$

$\frac{d^2y}{dx^2} < 0$ on $(1,\infty)$ $\frac{d^2y}{dx^2} > 0$ on $(-\infty,1)$

$f(0) = 0$ $f(2) = 4$ $f(1) = 1$

6. Sketch the function y = f(x), given that

$$f(1) = 0$$

$$f'(x) > 0 \quad \text{for} \quad x < 1$$

$$f'(x) < 0 \quad \text{for} \quad x > 1$$

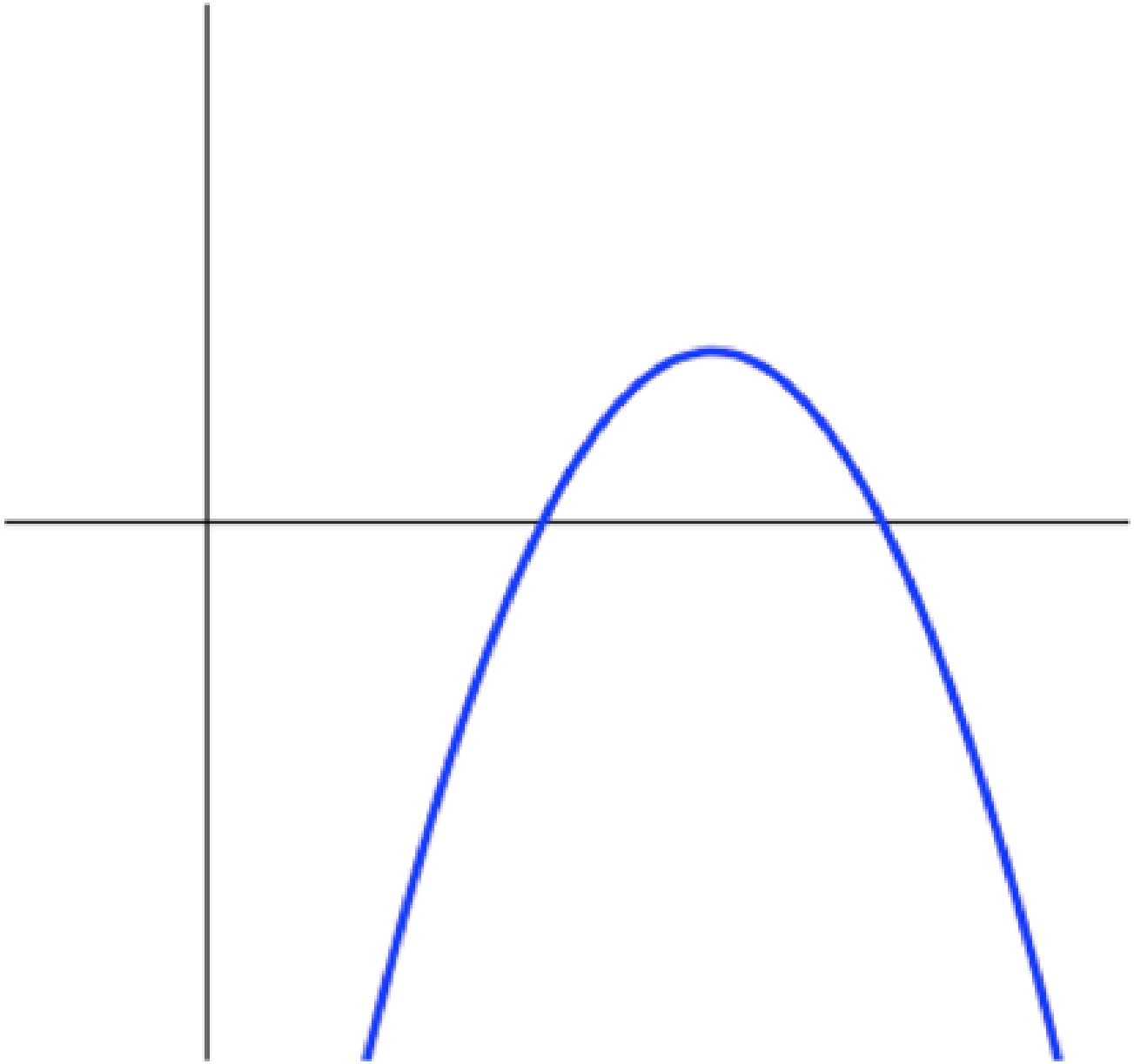
7. Sketch y = f(x), given that

$$f(1) = -3$$

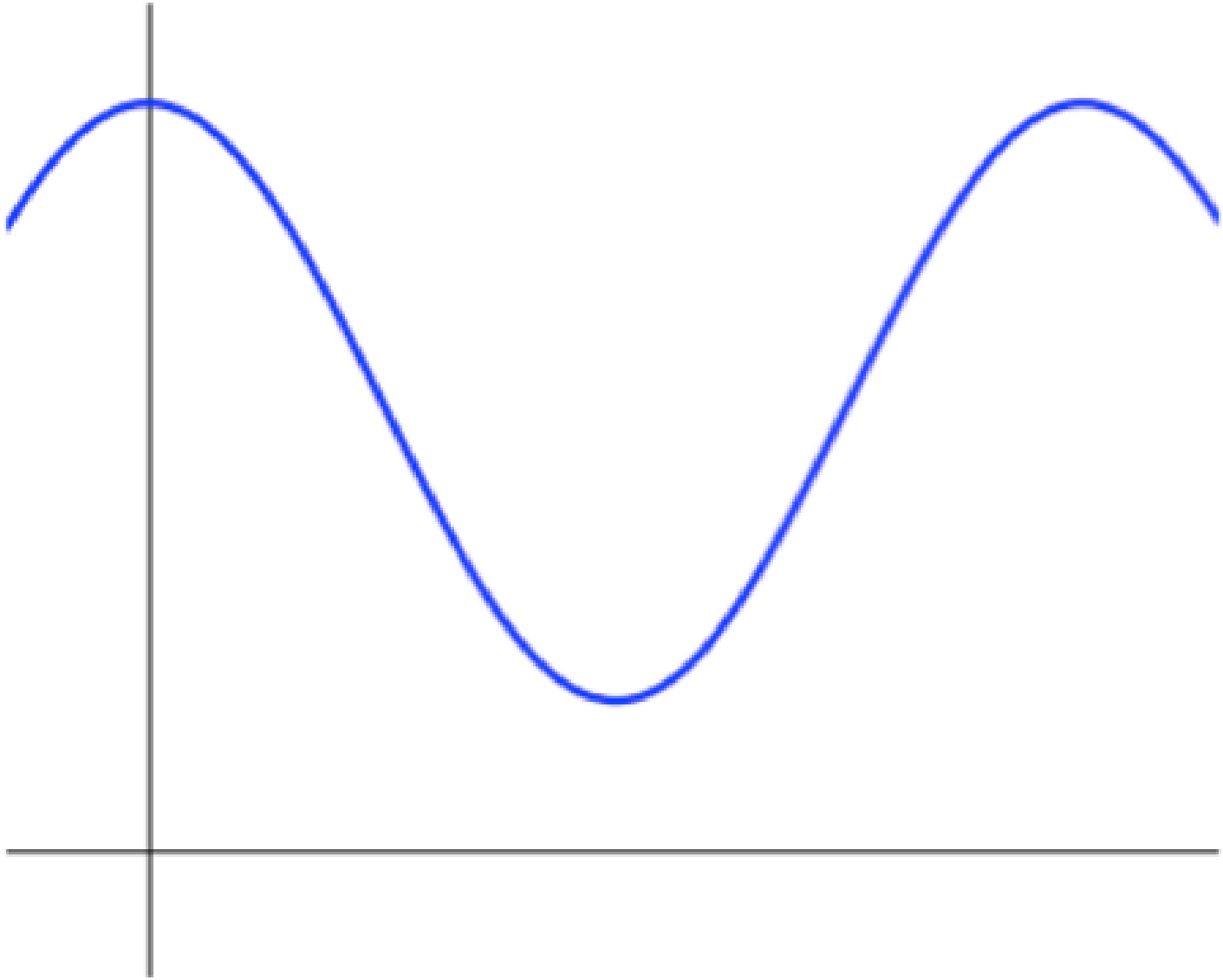
$$f''(x) > 0 \quad \text{for} \quad x < 1$$

$$f''(x) < 0 \quad \text{for} \quad x > 1$$

8. The graph of f is shown. Sketch the graphs of f' and f''.



9. The graph of f is shown. Sketch the graphs of f' and f''.



10. The graph of f is shown. Sketch the graphs of f′ and f″.