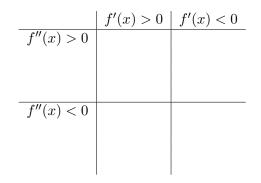
Graphing functions

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1. Fill in the following table:



In each cell, write whether f is increasing/decreasing, concave up/concave down, and sketch the shape of f.

2. Sketch a function f with the following properties:

 $\begin{array}{ll} x < -1 & f'(x) < 0 \mbox{ and } f''(x) < 0 \\ -1 < x < 2 & f'(x) < 0 \mbox{ and } f''(x) > 0 \\ 2 < x < 8 & f'(x) > 0 \mbox{ and } f''(x) > 0 \\ 8 < x < 10 & f'(x) > 0 \mbox{ and } f''(x) < 0 \\ x > 10 & f'(x) > 0 \mbox{ and } f''(x) > 0 \end{array}$

- 3. Sketch the graph of $f(x) = x^4 6x^2$ by doing the following:
 - (a) Find all critical points and possible inflection points of f and plot them on a *single* number line.
 - (b) Mark whether each interval is increasing/decreasing, concave up/concave down and sketch the shape of the graph on that interval.
 - (c) Identify all local extrema and inflection points (x- and y-coordinates) and plot them on a set of coordinate axes.
 - (d) Also find and plot all zeros of f.
 - (e) "Connect the dots" using the shapes you drew in part (b). Make sure your graph goes through all the zeros, critical points, and inflection points.
- 4. Sketch the graph of $f(x) = \frac{x^2}{x-2}$ by following the steps in problem 3. In part (d), also mark any vertical asymptotes and note the end behavior of f—are there any horizontal or oblique asymptotes?