Worksheet: Increasing/decreasing and graphs

For each example below, on the back of the sheet draw a number line or make a table (see examples 1–4 in section 4.3 and examples 1–3 in section 4.4). On this number line or table, indicate the
- critical numbers (if any),
- points of inflection (if any), and
- x-values not in the domain of the function (if any).

These are the endpoints of the intervals. Now give these open intervals on which the function is
- increasing or decreasing, and
- concave down or concave up.

Finally,
- identify relative maxima or minima (if any), and
- sketch the graph.

Exception: On example 2, ONLY USE FIRST DERIVATIVE INFO. (Skip points of inflection and intervals of concavity.)

1.
$$f(x) = \frac{1}{2}x + \cos x \qquad \text{in the interval} \qquad (-\pi, 2\pi)$$

2.
$$h(x) = \frac{x}{x^2 - 2}$$

3.
$$g(x) = \frac{3}{4}x^4 - 4x^3 + 6x^2 + 1$$