

1. The graph of  $f'(x)$  shown at the right. This is *not* the graph of  $f(x)$ !

(a) Where does  $f$  have critical points?

(b) On which intervals is  $f$  increasing? decreasing?

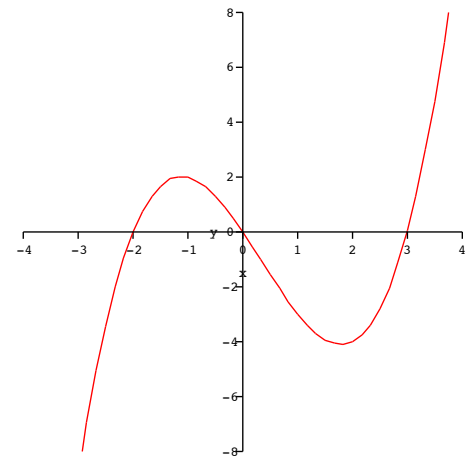
(c) Where does  $f$  achieve local maxima? local minima?

(d) Where is  $f$  concave up? concave down?

(e) Where does  $f$  have inflection points?

(f) Suppose that  $f(0) = 0$ . Sketch a graph of  $f$ .

(g) How does the graph change if  $f(0) = 3$ ?



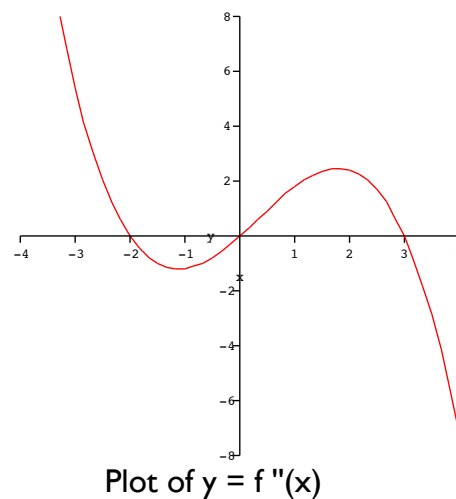
Plot of  $y = f'(x)$

2. The graph of  $f''(x)$  shown at the right. This is *not* the graph of  $f(x)$  or  $f'(x)$ !

(a) Where is  $f$  concave up? concave down?

(b) Where does  $f$  have inflection points?

(c) Suppose that  $f'(-1) = 0$  and  $f'(1) = 0$ . If possible, classify  $x = -1$  and  $x = 1$  as local maxima or local minima of  $f$ .



(d) Suppose that  $f'(0) = 0$ . Is  $f$  increasing or decreasing at  $x = 1$ ? at  $x = -1$ ?

(e) Suppose that  $f'(-1) = -2$  and  $f(-1) = 2$ . Could  $f(0) = 3$ ?

*Hint:* Can you determine if  $f$  is increasing or decreasing on  $[-1, 0]$ ?