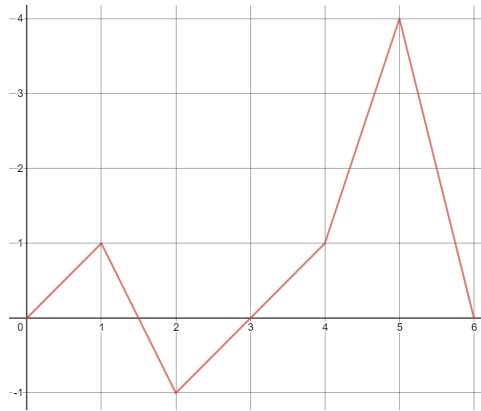# Math 135, Calculus 1, Fall 2020

11-18: Derivative Tests

Exercise 1. Suppose the function f on $[0, 6]$ has **derivative** given by the following piecewise-linear function:

(a) What are the critical points of f?

(b) On what interval(s) is f increasing? decreasing? Make a sign chart for the first deriative.

(c) On what interval(s) is f concave up? down? Make a sign chart for the second derivative.

(d) What are the inflection points of f?

(e) Classify the critical points using **both** the First and Second Derivative Test.

Exercise 2. Suppose $g(x)$ is a function which is continuous at all $x \neq 2$ (where it has a vertical asymptote), with **first** derivative given by

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

(a) Find all critical points for g.

(b) Create a sign chart for the first derivative of g, and classify these critical points.

(c) Does g have an absolute max value? absolute min value? Explain.

Exercise 3. Suppose $h(x)$ is a function which is continuous at all $x \neq 2$ (where it has a vertical asymptote), with **second** derivative given by

$$h''(x) = \frac{(x+2)x^3}{(x-3)^2}.$$

(a) Create a sign chart for the second derivative of h. Find all inflection points for h.

(b) Suppose $x = 1$ is a critical point for h. Classify this critical point.