

1. Find the derivatives of the following functions (using the definition of the derivative as a limit).

(a) $f(x) = \sqrt{2x - 1}$

(b) $g(x) = \frac{1}{3 - 2x}$

2. Consider the function

$$f(t) = t^3 - t^2 - t + 1.$$

- (a) The derivative of f is given by $f'(t) = 3t^2 - 2t - 1$. Using this, find the largest open intervals on which f is increasing and decreasing. At what values of t does f have local extrema?

- (b) The second derivative of f is given by $f''(t) = 6t - 2$. Using this, find the largest open intervals on which f is concave up and concave down. Find any inflection points on the graph of f .