

## PDF 4.010 Increasing and Decreasing Functions

For a continuous and differentiable function,  $f$ , the function values (y-values) are increasing for all x-values where  $f'(x) > 0$ , and the function values (y-values) are decreasing for all x-values where  $f'(x) < 0$ .

### Example 1a)

Determine the intervals of increase and decrease for the function

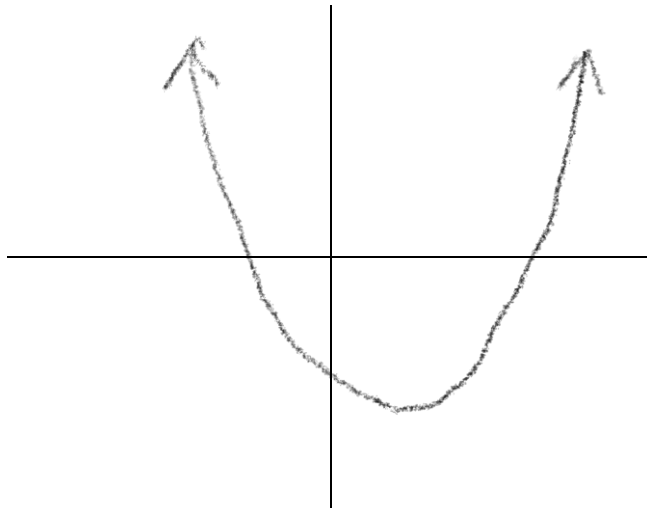
$$y = x^3 + 3x^2 - 2$$

### Example 1b)

Determine the intervals of increase and decrease of the function  $f(x) = \frac{x}{x^2+1}$

### Example 2

Given a graph of  $y = f'(x)$ , graph the curve  $y = f(x)$



### Example 3

Find the constants  $a$ ,  $b$  and  $c$  such that the graph of  $y = -x^3 + ax^2 + bx + c$  will decrease to the point  $(-6, -200)$  and increase to the point  $(2, 56)$  and then decrease thereafter.