CALCULUS

Chapter 4 –Curve Sketching

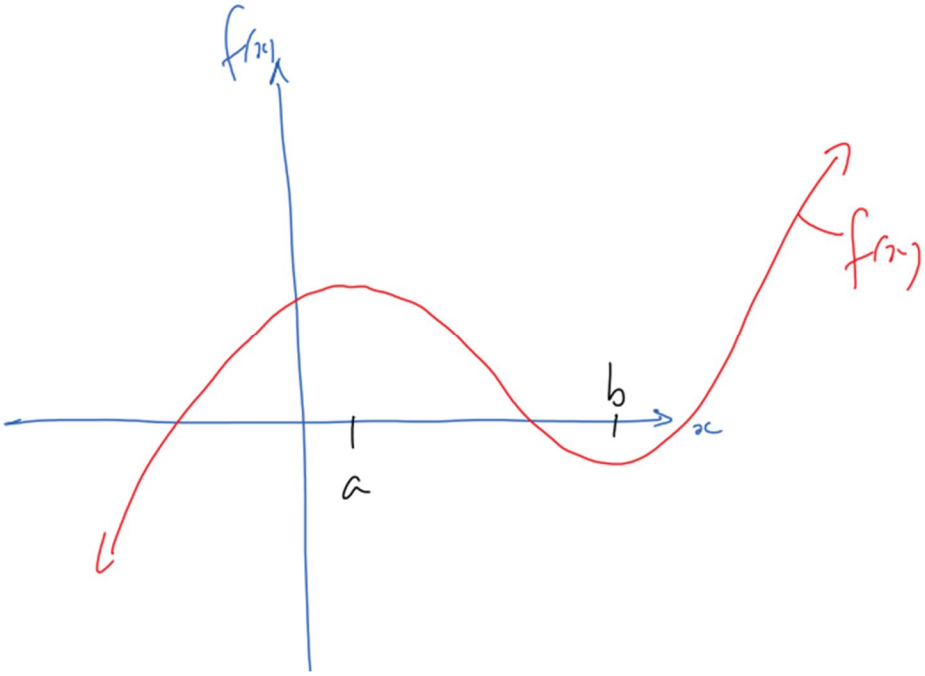
(*Material adapted from Chapter 4 of your text*)

A∞Ω
MATH@TD

4.1 Intervals of Functional Increase and Decrease

In this chapter we will concern ourselves a little more with **Functional Behaviour.**

Consider the picture:



Clearly, $f(x)$ is increasing on

and decreasing on

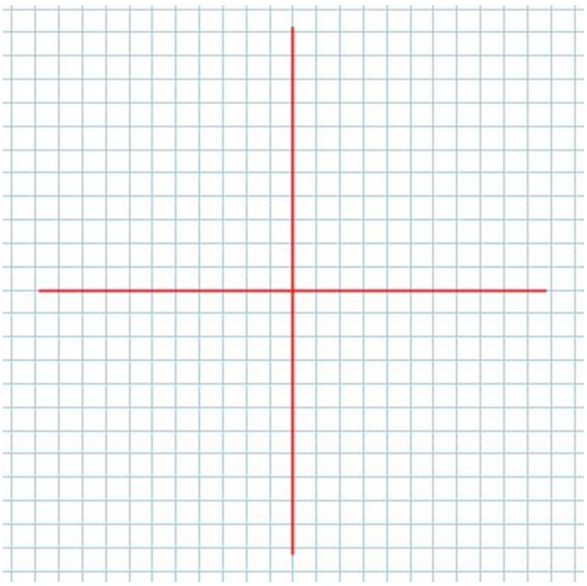
Note: At

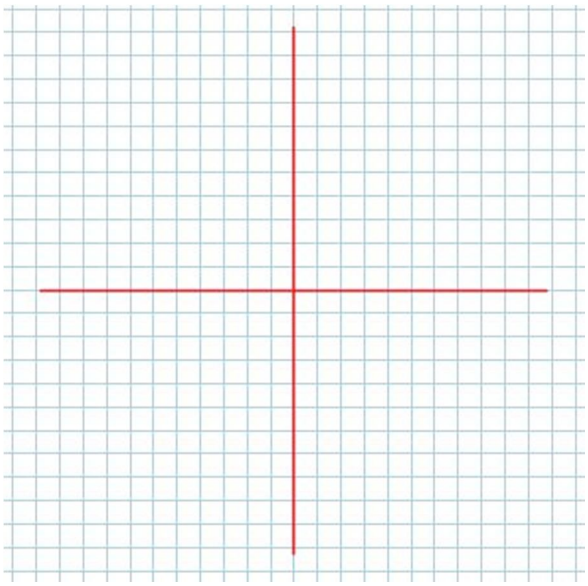
Definition 4.1.1

1) A function $f(x)$ is said to be **increasing** on the **open interval** (a,b) if

2) A function $g(x)$ is said to be **decreasing** on the **open interval** (a,b) if

Pictures



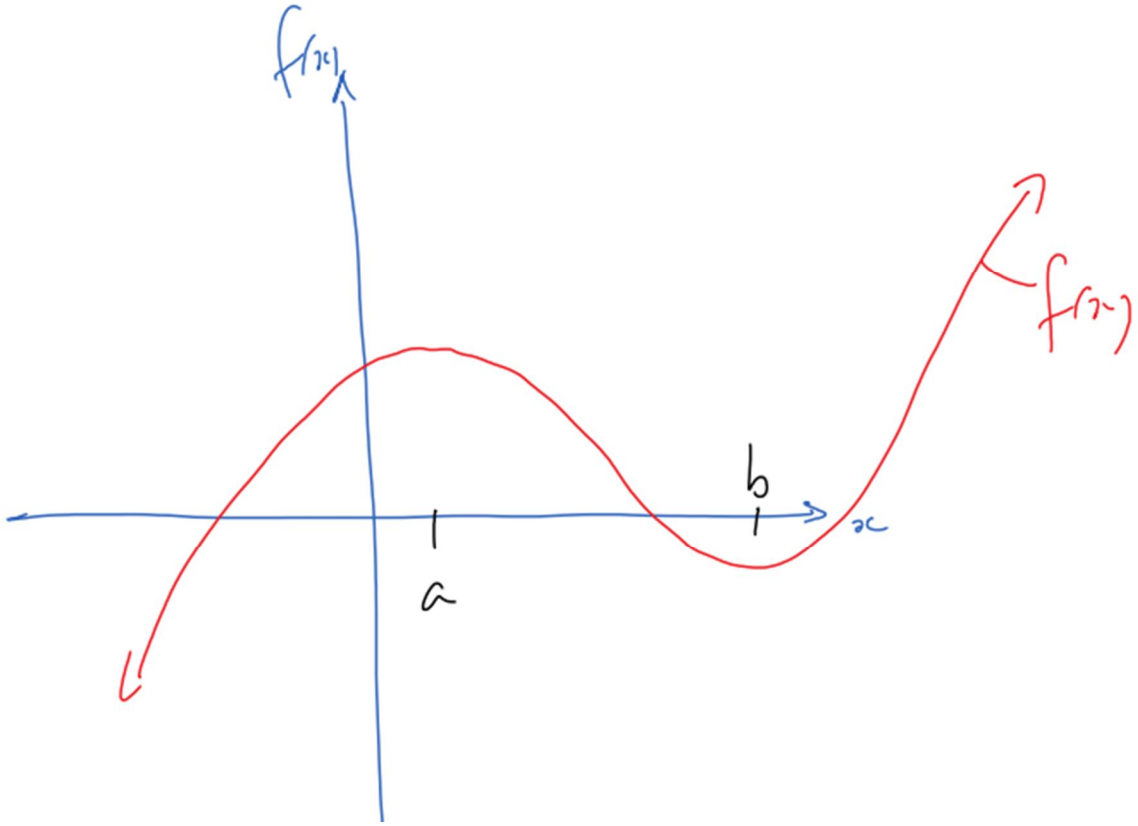


While Definition 4.1.1 is true, it's not very "fun" to work with. Perhaps there is something better!

The First Derivative Test

Given some differentiable function, $f(x)$, we can **use its first derivative to determine** where the function is **increasing and decreasing**. Furthermore, we can **use that information to test whether a critical value is the location of a local maximum or a local minimum** (more on that later).

Picture



Definition 4.1.2 (Calculus point of view)

Given a differentiable function, $f(x)$, whenever

Whenever

Example 4.1.1

Determine the intervals of increase and decrease for the polynomial function $f(x) = x^5 - 5x^4 + 100$

Example 4.1.2

Determine the intervals of increase and decrease for the function $g(x) = x + \frac{1}{x}$.

Class/Homework for Section 4.1

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