

Note 4.4 - Optimization

1 Introduction

In this note, we put together the skills we have learned and study the problems of optimizations - the search of optimum value for functions (usually max or min). The techniques can be applied to practical purposes for obvious reasons.

2 Absolute Maximum and Minimum Values

We have all the skills ready to locate absolute max and min. For bounded domain, all we have to do is to list all the *critical points*:

Note that we do not have to classify the nature of critical points if the problem does not ask for it.

For unbounded domain or unbounded function, we have a little more to check:

Let's try some examples.

3 Applications

For the remaining, we apply the techniques to various problems. For these problems, we always (and often is the most difficult part) is to write up a *target function*. Sometimes they involve more than one variable and for now, we have to reduce to one variable using some physical or imposed condition (the *constraint*).
