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### 0.1 Introduction to unconstrained optimisation

#### 0.1.1 Goals

We want to identify either the maximum or the minimum.

There exist local minima and global minima.

#### 0.1.2 Optimising through limits

If we are looking to minimise a function, and the limits are  $\infty$  or  $-\infty$  then we can optimise by taking large or small values.

We can examine this for each variable.

This also applies for maximising a function.

#### 0.1.3 Optimisation through stationary points

Stationary points of a function are points where marginal changes do not have an impact on the value of the function. As a result they are either local maxima or minima.

#### 0.1.4 Optimisation through algorithms

If we cannot identify stationary points easily, we can instead use algorithms to identify optima.

#### 0.1.5 Stationary points of strictly concave and convex functions

If a function is strictly concave it will only have one stationary point, a local, and global, maxima.

If a function is strictly convex it will only have one stationary point, a local, and global, minima.