1 Graphs of functions

A function can be loosely described as a rule by which ceratin real numbers are transformed to other real numbers. For example, the process of squaring real numbers can be written as the function $f(x) = x^2$.

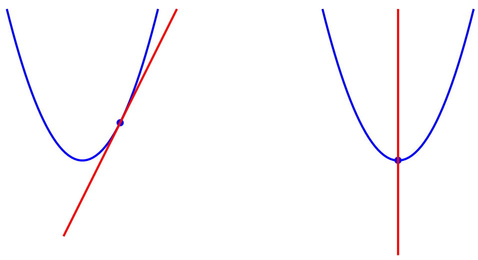
Now for each real number x on which a function can act x, we have the pair $(x, f(x))$ of real numbers and this can be presented as a point in the Cartesian plane. The collection of such points gives a geometric represention of the function and it is **called** the graph of the function.

Geometry software such as GeoGebra are of a great help in visualizing graphs of functions in a dynamic manner. For example, see this .

It is often possible to get a rough idea of what the graph of a function would look like from its algebraic form and vice versa. It's a nice exercise for the sstudents to match the algebraic and geometric forms of functions, like this .

One aspect of a function, which we will discuss in detail in the later sections, is the rate at which its values change. In a graph, this is given by the steepness of the curve at various points. And this is measured by the slope of the tangent at those points.

That brings up the question of what exactly we mean by a tangent. Intuitively, we can say that the tangent to a curve at a point is a line which just touches the curve at that point, in contrast to intersecting the curve at that point:



Tangent Not tangent

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