

# Teaching Day

## Quantitative Reasoning exercise

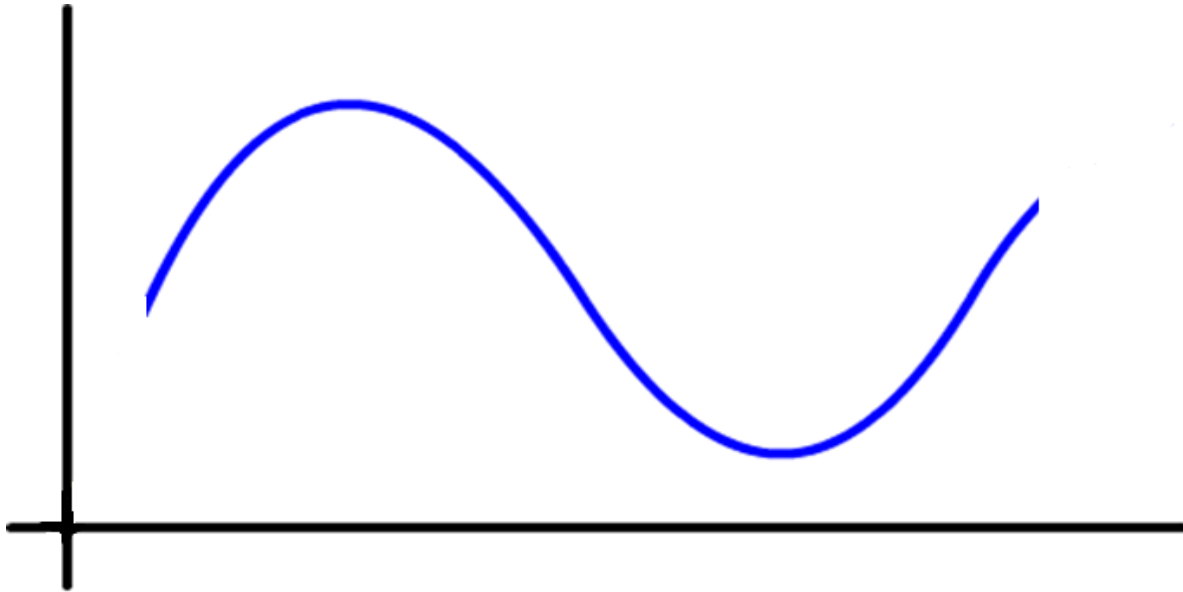
Nana Mukbaniani

QR Fellow

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Find the derivative at the maximum and at the minimum of the function on the Figure Below (*hint: they equal to each other*).



While the problem seems to be complicated, it is actually very easy to solve.

But you will find yourself in the same situation as now:

- **If you miss classes.**
- **If you are late to your classes.**
- **If you are not listening to your professors.**
- **If you use a cell-phone unless instructed by a professor.**
- **And, usually, it is easier to understand the material from the professor than from the textbooks.**

- In order to solve the problem, we need to know the following concepts:

1. Maximum and minimum of the function.

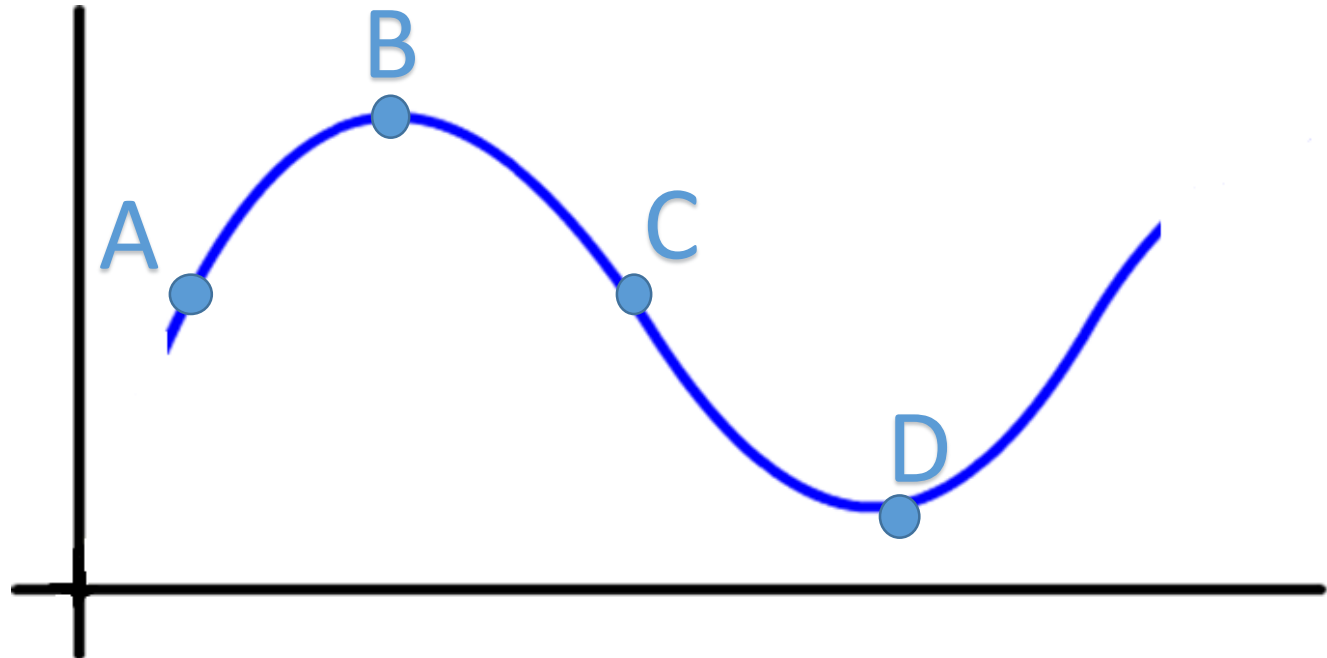
2. Derivative

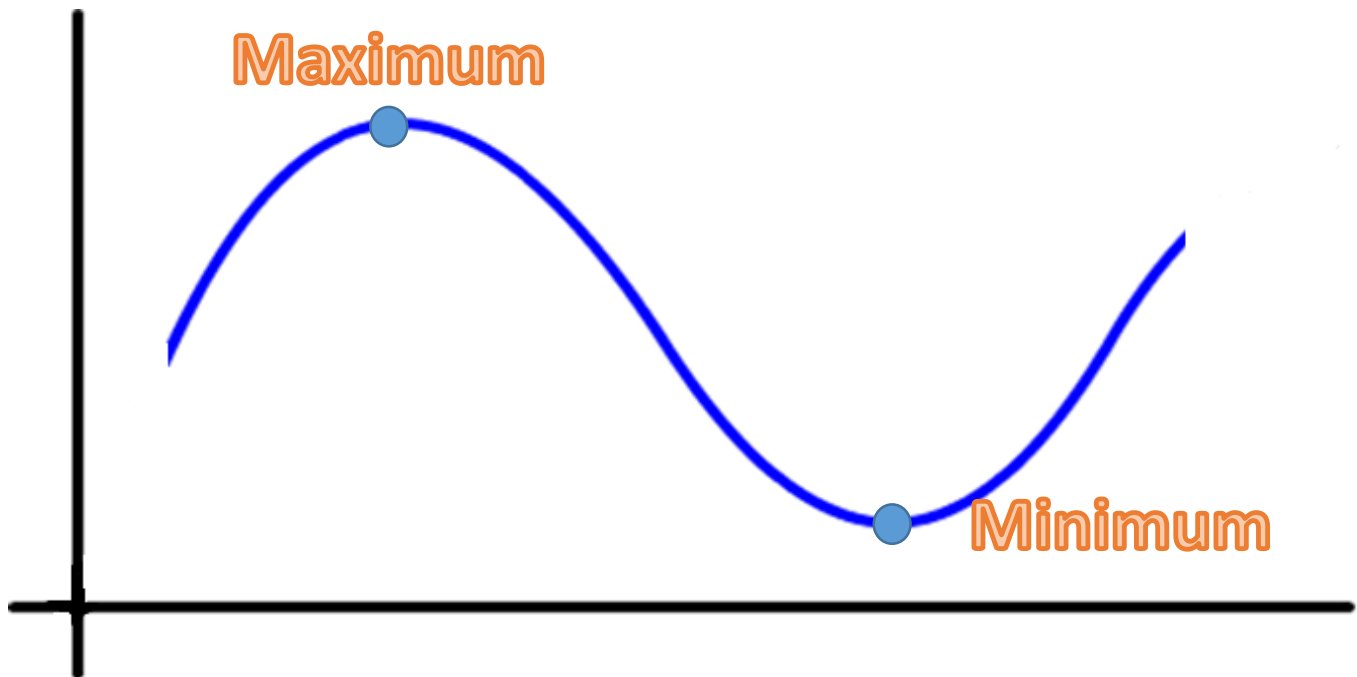
3. Tangent line

4. Slope

# Maximum and Minimum of the function.

- The **maximum** of a function is the **largest value of the function** and **minimum** is the **smallest value of the function**.
- So, let's find maximum
- Now, let's find minimum



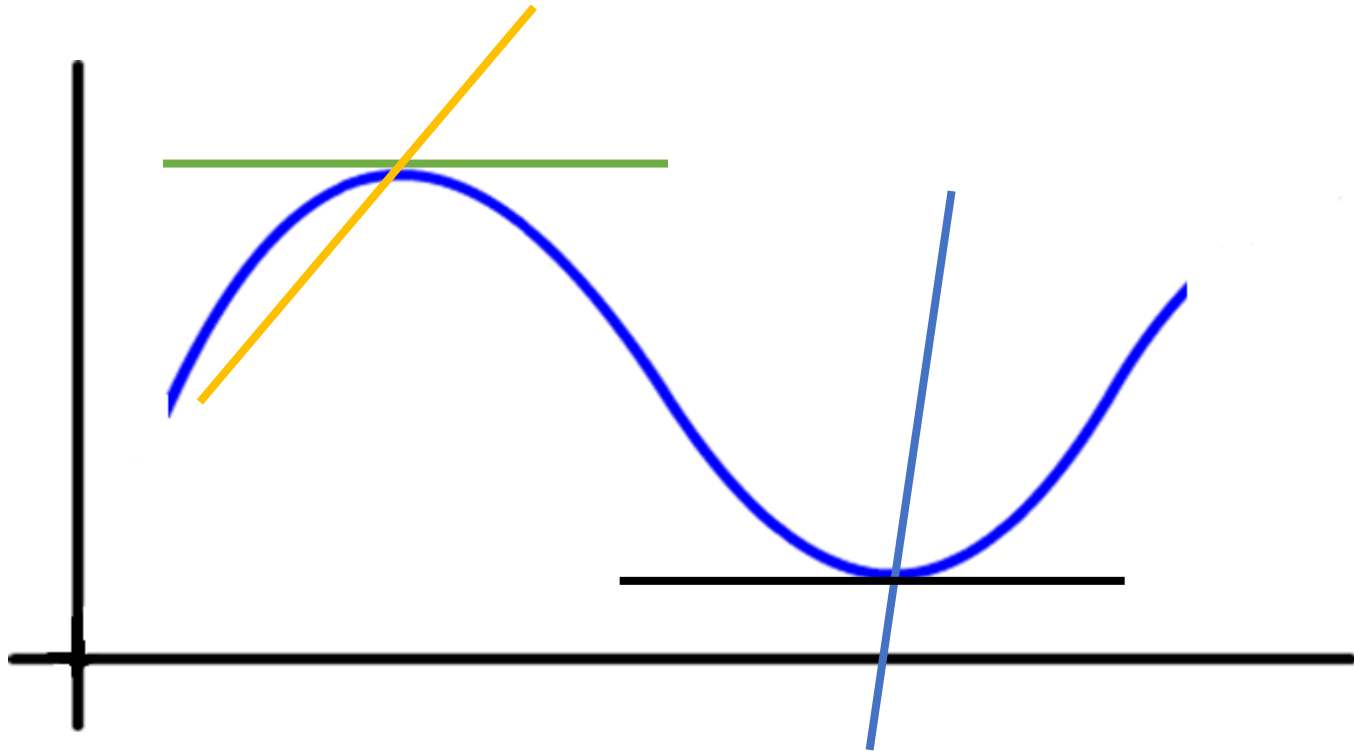


# Derivative

- The derivative is the instantaneous rate of change of a function with respect to one of its variables.
- To find derivative, we need to find **the slope of the tangent line to the function at a point.**
- Thus, we need to
- 1. *find a **tangent line** to the maximum and minimum*
- 2. *calculate their **slope**.*

# Tangent Line

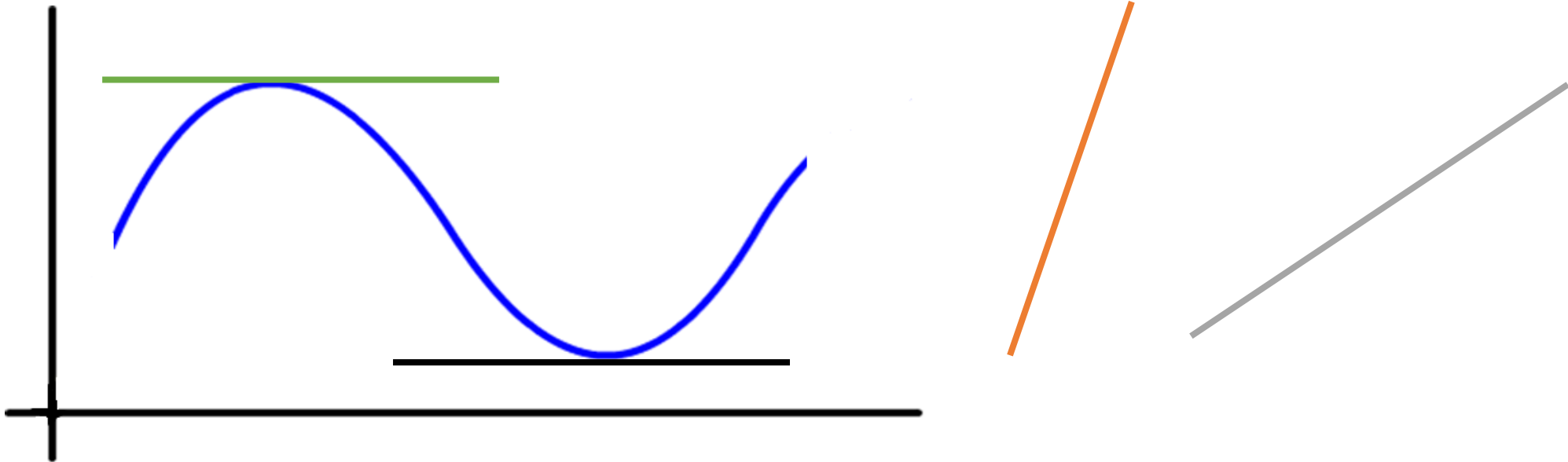
- the **tangent line** (or simply **tangent**) to a plane curve at a given point is the straight **line** that "just touches" the curve at that point and does not intersect.
- So, which line is the tangent to the maximum? To the minimum?



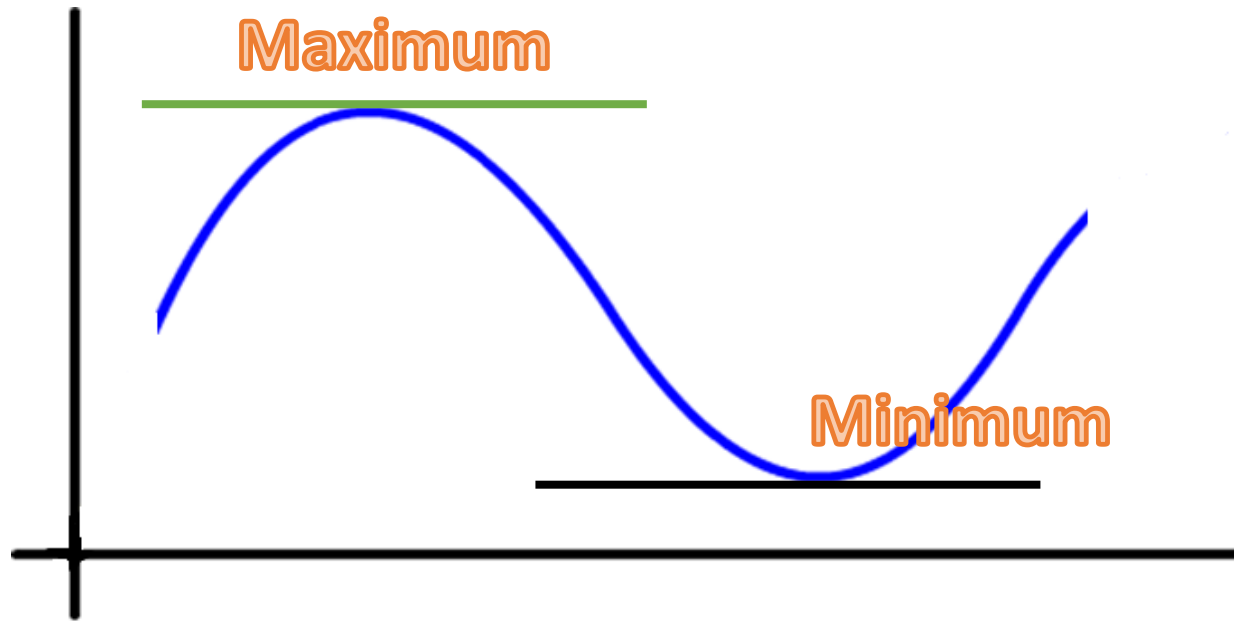


# Slope

- The **slope** of a **line** is a number that describes the **steepness** of the **line**. Thus, how steep is the tangent lines to the maximum and minimum?



The derivative at the maximum and at the minimum of this function is zero!



- If you miss classes and do not follow your professors, you will see an easy problem like this in test and not be able to solve.
- As a result,
- you will probably start hating the subject,
- hating the professor
- or blaming the professor for not explaining things in class.
  
- **Attend classes and listen to your professors!**