(2.5) Solving Problems Involving Rates of Change

Math Learning Target:

"I know...

- what a global maximum and a global minimum is;
- what a local maximum and a local minimum is;
- when it is required to calculate a rate of change;
- how to calculate the exact rate of change."

Local Maximum at $x = c$

Given $y = f(x)$. For values of x near c ...
A **local maximum** at $x = c$ exists if the function's rate of change changes from positive to negative through $x = c$.
At $x = c$ the rate of change will be zero (or undefined).

Local Minimum at $x = c$

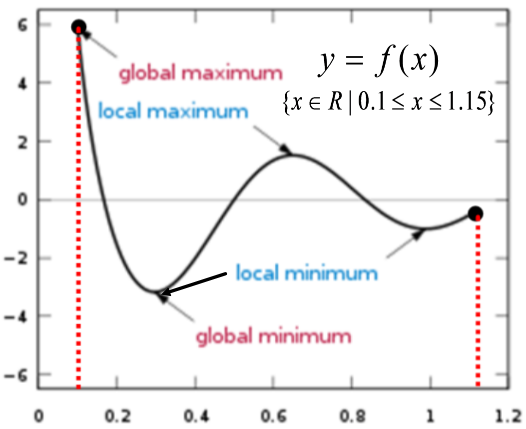
Given $y = f(x)$. For values of x near c ...
A **local minimum** at $x = c$ exists if the function's rate of change changes from negative to positive through $x = c$.
At $x = c$ the rate of change will be zero (or undefined).

Global Maximum at $x = c$

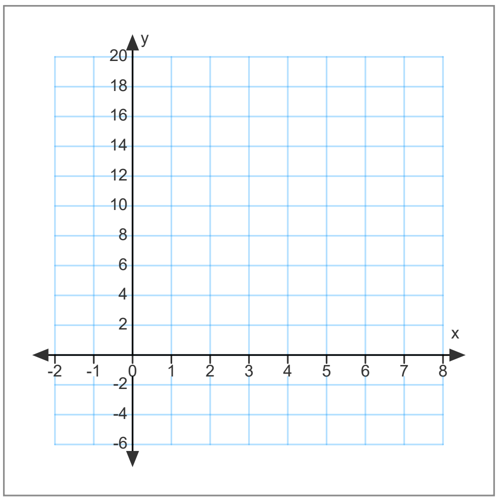
Given $y = f(x)$. A **global maximum** at $x = c$ exists if $f(c) > f(x)$ for all values of x in the function's domain.

Global Minimum at $x = c$

Given $y = f(x)$. A **global minimum** at $x = c$ exists if $f(c) < f(x)$ for all values of x in the function's domain.



<u>Ex.1</u> Using the Algebraically Simplified Difference Quotient, prove that a local minimum value occurs at $x = 3$ for the function $f(x) = x^2 - 6x + 5$. Verify graphically.



$y = x^2 - 6x + 5$

Use the ALGEBRAICALLY SIMPLIFIED DIFFERENCE QUOTIENT FOR ALL RATE OF CHANGE CALCULATIONS

pp. 111-113 #1, 3, 4, 6c, 9a, 10, 14