GDB No.2 Spring 2017 MTH403_Soluiton (Lecture # 23 to 31)

Question:

Calculate the absolute maximum and absolute minimum values of $f(x) = x^2 - 16x$. Investigate whether there exists any relative extrema outside the interval [0,3].

Solution:

$\because \quad f(x) = x^2 - 16x,$

Now $f'(x) = 2x - 16,$

Putting $2x - 16 = 0,$

$\Rightarrow x = 8$ which is a critical point.

The absolute maxima and absolute minima lie on the critical points $x = 8$ or at the end points $x = 0, x = 3$.

$\because \quad f(x) = x^2 - 16x,$

$\therefore \quad f(0) = 0,$

$f(3) = (3)^2 - 16(3) = -39,$

$f(8) = (8)^2 - 16(8) = -64.$

Hence, the absolute maxima is 0 and the absolute minimum is -64 on [0,3].

$x = 8$ is the critical point which does not lie in [0,3]. So, $f(x)$ has relative extrema outside the given interval.