Indian Institute of Technology Jodhpur
MAL1010, Dec'21-Mar'22
Take home exam, Due date: 24Feb'22, Time: 11:50PM Marks: 10%

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1. Find the extreme value of $f(x) = R\sin x + \cos(Rx)$,where R is the last two digits of your roll number.
2. Find the stationary of the function

$$f(x) = 12x^5 - 15(2R + 0.5)x^4 + 20(R^2 + R - 5)x^3 - 30(0.5R^2 + 10R)x^2 - 300R^2x$$

   where R is the last two digits of your roll number. Among them identify which one is local-minima/local-maxima/saddle-point.
3. Find the stationary of the function $f(x, y) = 2R(x^2 - y^2) - Rx^4 + Ry^4$ where R is the last two digits of your roll number. Among them identify which one is local-minima/local-maxima/saddle-point.
4. Find the extreme values of $f(x, y, z) = (R + 1)x + (R + 2)y + Rz$ such that $x^2 + y^2 = 5$ and $x + z = 1$,where R is the last two digits of your roll number.
5. Show that the rectangle with perimeter $2R$, where R is the last two digits of your roll number will have maximum diagonal if it is a square.