

Gandaki University  
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Bachelor of Information Technology  
BSM 101  
Application of Derivatives  
Exercise 3

1. Find the absolute maximum and minimum values of a function  $f$  given by  $f(x) = 2x^3 - 15x^2 + 36x + 1$  on the interval  $[1, 5]$ .
2. Find the maximum profit that a company can make, if the profit function is given by  $p(x) = 41 - 72x - 18x^2$
3. Find both the maximum value and the minimum value of  $f(x) = 3x^4 - 8x^3 + 12x^2 - 48x + 25$  on the interval  $[0, 3]$ .
4. Find the maximum value of  $f(x) = 2x^3 - 24x + 107$  in the interval  $[1, 3]$ . Find the maximum value of the same function in  $[3, 1]$ .
5. Find all the intervals where the function  $f(x) = x^4 - 8x^2$  is increasing and decreasing.
6. Find all the intervals where the function  $f(x) = x^2 + 4x - 21$  is increasing and decreasing.
7. Find the local maximum and local minimum points of the following functions:
  - (a)  $y = x^2 - 4x + 3$
  - (b)  $y = x^3 - 3x + 3$
  - (c)  $y = -2x^3 + 6x^2 - 3$
  - (d)  $y = (x - 2)^3 + 1$
  - (e)  $y = x^4 - 2x^2 = x^2(x^2 - 2)$
  - (f)  $y = -x^4 + 6x^2 - 4 = x^2(6 - x^2) - 4$
  - (g)  $y = 4x^3 - x^4 = x^3(4 - x)$
  - (h)  $y = x^4 + 2x^3 = x^3(x + 2)$
  - (i)  $y = x^5 - 5x^4 = x^4(x - 5)$