

Due: 9:55am August 14th, 2018
Problems to be turned in : 1, 2, 3(d),

Instructions: Write your name on this sheet. Write down answers on a sheet of paper and each question's answer should begin on a fresh sheet of paper. Staple all the sheets, including this sheet, and submit the same.

1. Find the maximum and minimum of the function $f(x) = x^2 - 6x + 10$, on $[0, 4]$.
2. Provide a rough sketch of $f(x) = 3x^5 - 10x^3$.
3. Consider the function $f : \mathbb{R} \rightarrow \mathbb{R}$ be given by

$$f(x) = \begin{cases} \frac{x+1}{(x-1)(x-7)} & \text{if } x \notin \{1, 7\} \\ 0 & \text{otherwise.} \end{cases}$$

Identify vertical asymptotes if any. Adapt the technique of providing a rough sketch suitably to provide a rough sketch of the graph.

Notes from Previous Worksheet:

We shall adopt the following procedure for providing a rough sketch of a graph. For a twice differentiable function $f : \mathbb{R} \rightarrow \mathbb{R}$ we will first identify:

- (a) Zeros of f .
- (b) Critical points and characterise them as maxima, minima or inflection points.
- (c) interval where f is increasing.
- (d) interval where f' increasing.
- (e) interval where the graph is concave up and concave down.
- (f) identify horizontal asymptotes if any and behaviour at ∞ and $-\infty$.

Using the above we shall provide a rough sketch of the graph.