Giving a Rough sketch of a function

Due: 9:55am August 9th, 2018

Problems to be turned in : 1

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.

We shall adopt the following procedure for providing a rough sketch of a graph. For a twice differentiable function $f : \mathbb{R} \to \mathbb{R}$ 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 assymptotes if any and behaviour at ∞ and $-\infty$.

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

1. For each $f : \mathbb{R} \to \mathbb{R}$ given by
   (i) $f(x) = x^4 - 4x^2$
   (ii) $f(x) = xe^{-x}$

   (A) Find (a)-(f) as applicable.
   (B) Sketch as precise a graph as possible given the infomration that you found in (A).