Math 124 – Worksheet 15 (4.2)

(1) A curve of the form $y = e^{-(x-a)^2/b}$ for $b>0$ with local maximum at $x=2$ and points of inflection at $x=1$ and $x=3$. Find formula for the function

(2) A function of the form $y = a(1-e^{-bx})$ with $a, b > 0$ and a horizontal asymptote of $y = 5$

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(3) (a) Find all critical points of $f(x) = x^4 + ax^2 + b$.

(b) Under what conditions on a and b does this function have exactly one critical point? What is the one critical point, and is it a local maximum, a local minimum, or neither?

(c) Under what conditions on a and b does this function have exactly three critical points? What are they? Which are local maxima and which are local minima?

explanation in each case

(d) Is it ever possible for this f to have two critical points? No critical points? More than three critical points? Give an