
Calculus 1 - Homework 4.

1. (5 points) Find the local extrema of the function $f(x) = (x^3 + 3x^2 + 3x - 3)e^x$.

Determine the intervals where the function increases or decreases.

2. (5 points) Find the inflection points of the function $f(x) = (x + 1) \arctg(x - 1)$.

Determine the intervals where the function is convex or concave.

3.* (4 points) The widths of two perpendicular corridors are 2.4 m and 1.6 m, respectively. What is the longest ladder that can be moved (in a horizontal position) from one corridor to another?

4. (4 points) Estimate the value of $\sqrt[4]{82}$ by the Taylor polynomial of order 3 of the function $f(x) = \sqrt[4]{x}$ at center 81. Give an upper bound for the error of the approximation.

5. (4 points) Estimate the value of $\cos 0.5$ by an appropriate Taylor polynomial with an error less than 10^{-3} .

6. (4 points) Find the Taylor series of $f(x) = \frac{1}{(x-2)^2}$ with center -1 and find the radius of convergence.

7. (4 points) Find the Taylor series of $f(x) = \frac{x^2}{\sqrt[5]{32-x^3}}$ with center 0 and find the radius of convergence.

Deadline: December 8th.