

Absolute extrema

Decide if the absolute extrema (min., max.) of the following functions exist on the given intervals (I). If so, find them.

1. $f(x) = x^3 - 3x^2 - 9x + 35$, $I = \langle -4; 4 \rangle$

2. $f(x) = x^2 \ln x$, $I = \langle 1; e \rangle$

3. $f(x) = \frac{x^2+4}{x}$, $I = (0; 3)$

Convex, Concave, inflection points

Determine the intervals where the functions are convex or concave, find the inflection points:

4. $f(x) = e^{\frac{1}{x}}$

5. $f(x) = \ln(1 + x^2)$

Asymptotes

Determine all possible asymptotes of following functions:

6. $f(x) = \frac{\ln x}{x^2-2} + 2$

7. $f(x) = \sqrt{x + x^2}$

8. $f(x) = \frac{x^3}{4-x^2}$

Behavior of a function

Investigate complete behavior of following functions, sketch the complete graph:

9. $f(x) = \frac{x^2}{2} - \ln x$

10. $f(x) = \frac{e^x}{1+x}$

11. $f(x) = e^{-x^2}$