MA1101 Grunnkurs i
analyse I
Høst 2020

Norges teknisk–naturvitenskapelige
universitet
Institutt for matematiske fag

Øving 6

Observe the minimum requirement of 8/12 exercise sheets completed to pass the exam. Check your status in Blackboard. Also see the updated information for the midterm exam in the homepage of the course.

4.5.24 Classify the critical points of

$$f(x) = 3x^3 - 36x - 3, \qquad x \in \mathbb{R}.$$

(That is, decide if they are local/global maxima/minima or not.)

4.6.21 Sketch the graph of the function

$$f(x) = \frac{x^3 - 4x}{x^2 - 1}.$$

Make a table with the sign of f' and f'', and the corresponding behavior of f to help you with the graph.

4.9.10 Find the linearisation of $f(x) = \tan x$ at the point $\frac{\pi}{4}$.

3.1.29 Show that

$$f(x) = \frac{4x^3}{x^2 + 1}$$

has an inverse and find $(f^{-1})'(2)$.

5 Let $f : \mathbb{R} \to \mathbb{R}$ and $g : \mathbb{R} \to \mathbb{R}$. Find a general formula for

$$\frac{d}{dx} f(x)^{g(x)}.$$

What extra assumptions do we need on f and g for the formula to be correct?

4.10.24,32 Find the fifth order Taylor polynomial of $f(x) = \sin x$ at the point $x_0 = \pi$.