

Mathematical Analysis (470-2110/06)

**Exercises – Part 3**

The problems given below are to practise for the semester tests or the final exam.

**Limint of Sequence**

Find the limit of a sequence, if

1.  $\lim \frac{6 - 3n + 9n^2 + n^3}{4n + 4n^2 + 5n + 2n^3};$

2.  $\lim \frac{\sqrt{7n^3 + 1} - n}{81 + 7n\sqrt{n}};$

3.  $\lim \left( \sqrt{4n^2 + 1} - \sqrt{5n^2 + 7 + n} \right);$

4.  $\lim n \left( \sqrt{5n^2 + 5} - \sqrt{5n^2 - 5} \right);$

5.  $\lim \left( \frac{3n + 2}{3n + 1} \right)^{2n + \frac{2}{3}};$

6.  $\lim \frac{3^{2n+4} - 4^{n+1}}{2^{n+1} - 3^{2n} + 4^n};$

7.  $\lim \sqrt[n]{n^3 + 7n^2 + 5n + 3};$

8.  $\lim \left( \sin \left( \frac{n}{2} \right) - \cos(\ln n) - 2n \right);$

9.  $\lim \frac{1 + 2 + \dots + n}{\sqrt[5]{18n^{10} - n^5 - 10n}};$

10.  $\lim \frac{n \cdot \sin(n(n-1))}{n^2 + 1};$

11.  $\lim \frac{1}{n} \left( \sqrt{1 + \frac{1}{n}} - 1 \right);$

12.  $\lim \frac{\sin(2n) - 3^{n+3} + 4^{n+1}}{\cos(3n) + 2^{n+1} + 3^{3n}}.$