

Mathematical Analysis (470-2110/06)

Exercises – Part 4

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

Limint of Function

Find the limit of a function, if

1. $\lim_{x \rightarrow 6} \frac{x^2 - 36}{\sqrt{x+3} - 3}$;
2. $\lim_{x \rightarrow -1} \frac{\sqrt{x+17} - \sqrt{13-3x}}{x^2 + 4x + 3}$;
3. $\lim_{x \rightarrow 3} \frac{\sqrt{3x-5} - \sqrt{-2x+10}}{x^2 - x - 6}$;
4. $\lim_{x \rightarrow +\infty} \frac{\sqrt[3]{x} - \sqrt{x+2}}{\sqrt{4x-1} - 2\sqrt[3]{x}}$;
5. $\lim_{x \rightarrow 0} \frac{\sin 3x}{\sin 4x}$;
6. $\lim_{x \rightarrow \frac{\pi}{3}} \frac{\sin 3x}{\sin 4x}$;
7. $\lim_{x \rightarrow +\infty} \frac{\cos(e^x)}{x-1}$;
8. $\lim_{x \rightarrow +\infty} \left(\frac{x+1}{x-2} \right)^x$;
9. $\lim_{x \rightarrow -\infty} e^{\frac{x^3+2x+1}{x+2}}$;
10. $\lim_{x \rightarrow 0} \frac{2^x + 2}{x^2}$;
11. $\lim_{x \rightarrow 0} \operatorname{arccotg} \frac{x+1}{x^4}$;
12. $\lim_{x \rightarrow 0} \frac{\operatorname{tg} x}{\sin 2x}$;
13. $\lim_{x \rightarrow 0} \frac{x^2 \sin x}{1 - \cos 2x}$.