MTH 201. Homework II

1. Solve the following problems in the book in Chapter 8:
   Section 8.7: Page 487, Exercises: 17,25,29, 39, 43, 49,57,59, 59, 61,65, 76
   Practice Exercises, Page 491: Exercises: 59, 61, 65, 67.

2. Is it true that the improper integral $\int_a^\infty f(x)$ converges, whenever $f(x) \to 0$. Prove or give a counterexample.

3. Evaluate the following integrals:
   - $\int_e^\infty \frac{1}{x(\ln x+3)^2}\,dx$
   - $\int_0^\infty \frac{\sqrt{\tan^{-1}(x)}}{1+x^2}\,dx$

4. Determine whether the following integrals diverge or converge:
   - $\int_1^\infty \frac{x}{(x^3+2)^2}dx$
   - $\int_{-\infty}^{-3} \frac{1}{x^3}\,dx$
   - $\int_{-\infty}^\infty \frac{x}{e^x+e^{-x}}\,dx$
   - $\int_2^\infty \frac{1}{\sqrt{x}\ln x}\,dx$
   - $\int_1^\infty \frac{x-e^x}{x^2}\,dx$
   - $\int_0^\infty \frac{1}{x^2}\,dx$