Pencil and Paper homework Number 12

This problem set covers the Comparison Test, the Limit Comparison Test, the Ratio Test and the Root Test.

1) Use the Comparison Test to check for convergence in the following series.

a) $\sum_1^\infty \frac{1}{i-2}$

b) $\sum_1^\infty \frac{i}{i^2+4}$

c) $\sum_1^\infty \frac{1}{i^2+i}$

d) $\sum_1^\infty \frac{1}{i-\cos i}$

e) $\sum_1^\infty \frac{1}{i^2+\cos i}$

2) Use the Limit Comparison Test to check for convergence in the following series.

a) $\sum_1^\infty \frac{5i+1}{(i+2)i^2}$

b) $\sum_1^\infty \frac{i+1}{(5i-7)i}$

c) $\sum_1^\infty \frac{i}{(i-2)\sqrt{i}}$

c) $\sum_1^\infty \frac{(i+2)}{i^3}$

d) $\sum_1^\infty \frac{i^2}{i^4+1}$

d) $\sum_1^\infty \frac{i\sin^2 i}{i^3+1}$

3) Use the Ratio Test to test the convergence of

a) $\sum_1^\infty \frac{1}{(2n)!}$

b) $\sum_1^\infty \frac{n+1}{n!}$

c) $\sum_1^\infty \frac{1}{\sqrt{n!}}$

d) $\sum_1^\infty \frac{2^n}{n!}$

e) $\sum_1^\infty \frac{3^n}{(n+1)^n}$

f) $\sum_1^\infty \frac{(2n)!}{n!(n+1)!}$

g) $\sum_1^\infty \frac{1}{ne^n}$

4) Use the Root Test to test for convergence

a) $\sum_1^\infty \frac{1}{n^n}$

b) $\sum_1^\infty \frac{2^n}{n^n}$