

Exam 2 Review

1) Determine whether the sequence converges or diverges. If it converges, find its limit.

a) $\left\{ \frac{n^2+2}{n^5-5n+1} \right\}_{n=1}^{\infty}$

b) $\left\{ \frac{7n^4-n^2+1}{3n^4-2n^3+5} \right\}_{n=1}^{\infty}$

c) $\left\{ \frac{n^9+5}{n^3+1} \right\}_{n=1}^{\infty}$

d) $\left\{ \frac{2^{2n+1}}{7^n} \right\}_{n=1}^{\infty}$

e) $\left\{ \frac{\cos(n\pi)}{2+\sqrt{n}} \right\}_{n=1}^{\infty}$

f) $\left\{ \frac{(-1)^{n+1} \cdot n}{n+\sqrt{n}} \right\}_{n=1}^{\infty}$

g) $\left\{ \left(1+\frac{2}{n}\right)^n \right\}_{n=1}^{\infty}$

h) $\left\{ n - \frac{1}{1-e^{-n}} \right\}_{n=1}^{\infty}$

2) Express the following numbers as a fraction.

a) $2.7\overline{321}$

b) $0.\overline{313}$

3) Determine whether the series is convergent or divergent. If it is convergent, find its sum.

a) $\sum_{n=1}^{\infty} \frac{1+2^{3n+5}}{9^{n-2}}$

b) $\sum_{n=1}^{\infty} \frac{(-1)^n 7^{n+2}}{3^n \cdot 2^{n-3}}$

c) $\sum_{n=1}^{\infty} (-1)^{3n+1} \frac{3^{2n} \cdot 2^{n-2}}{4^{n-1} \cdot 5^{2n+2}}$

d) $\sum_{k=1}^{\infty} \frac{k(k+2)}{(2k+1)^2}$

e) $\sum_{n=1}^{\infty} \ln\left(\frac{n}{n+1}\right)$

f) $\sum_{n=1}^{\infty} \ln \left[\frac{1+\frac{1}{n}}{1+\frac{1}{n+1}} \right]$

4) If the n^{th} partial sum of a series $\sum_{n=1}^{\infty} a_n$ is $S_n = 3 - n2^{-n}$,
find a_n and $\sum_{n=1}^{\infty} a_n$.

5) Determine if the series is convergent or divergent. If it is convergent, DO NOT COMPUTE THE SUM. If you use a test, give the name of the test.

a) $\sum_{n=1}^{\infty} n e^{-n}$

b) $\sum_{n=1}^{\infty} \frac{n^2}{n^3+1}$

c) $\sum_{n=1}^{\infty} \frac{2+\cos(n)}{n^2}$

d) $\sum_{n=1}^{\infty} \frac{n^4-3}{3n^7+n^2+1}$

e) $\sum_{n=1}^{\infty} \frac{1}{1+e^n}$

f) $\sum_{n=1}^{\infty} \frac{e^n}{1+e^n}$

g) $\sum_{n=1}^{\infty} \frac{5n^2+n-1}{3n^9+7n^2-8}$

h) $\sum_{n=1}^{\infty} \frac{3n-2}{4n^2+n+1}$