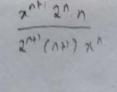
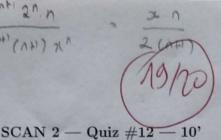


Name:







OLLIVIER Etieme

Exercise 1. Is the following series convergent or divergent? (justify as concisely as possible)

$$\sum_{n} \frac{1 + \sin(n)}{n^2}.$$

 $\frac{\sum_{n=1}^{\infty} \frac{1+\sin(n)}{n^2}}{\sum_{n=1}^{\infty} \frac{1}{n^2}} \leq 2 \sum_{n=1}^{\infty} \frac{1}{n^2}$ we know by Riemann series that $\frac{1}{n^2}$ is a GTOACS because 2 > 1 hence $2 \le \frac{1}{n} \le CV$. Hence by the comparison test $\le \frac{1+\sin(n)}{n^2} \le CV$

Exercise 2. Let $x \in \mathbb{R}_+^*$. Fill in the blank (no justifications required):

The series $\sum \frac{x^n}{2^n n}$ converges \iff \approx \approx \approx \approx \approx \approx

Exercise 3. Let $\alpha \in \mathbb{R}$ and $q \in \mathbb{C}$. Fill in the blanks (no justifications required):

The series $\sum \frac{1}{n^{\alpha}}$ converges \iff

The series $\sum q^n$ converges \iff |q| < |q|

Exercise 4. Is the following series convergent or divergent? (justify as concisely as possible)

 $\sum \ln \left(1 + \frac{1}{3^n}\right).$

lu(1+x), x x

when $n \rightarrow +\infty$, $\frac{1}{3^n} \rightarrow 0$ hence when $n \rightarrow +\infty$ $X \rightarrow 0$ Until + X) $X = \frac{1}{3^n}$ and $(\frac{1}{3})^n$ is the GTOA geometric CS Hence beg the equivalent test $\sum_{n} e_n(1+\frac{1}{3^n})$ cv