

MATH 273 CALCULUS III TEST I THP REACTION PAPER

1. If one is interested in determining if $G = \{g_n\}_{n=1}^{\infty}$ where $g_n = \frac{1}{n^{3/2}}$ is bounded and monotonic one cannot do an integral test, direct comparison test, limit comparison test, etc. because such deal with series not sequences.

If one is interested in determining if G is bounded and monotonic, showing a lower bound is not sufficient.

2. When one is considering $\Gamma = \sum_{n=1}^{\infty} k_n \ni k_n = \frac{3}{n(n+1)}$ considering $\lim_{n \rightarrow \infty} \left(\frac{3}{n(n+1)} \right)$ tells you nothing (e.g.: do something else or use another test).

Also, $\int_1^{\infty} \frac{3}{n(n+1)} dn$ does not exist – indeed it is crap to try to say it -- since $n \in \mathbb{N}$

Furthermore, if one cannot solve $\int_1^{\infty} \frac{3}{x(x+1)} dx$ tells you nothing (e.g.: do something else or use another test) [which is not to say the integral does not exist but the person trying to solve it doesn't know how to solve it or doesn't remember how to solve it].

3. When one wishes to find $\lim_{x \rightarrow \infty} \left(\left(1 + \frac{2}{x}\right)^{2x} \right)$ it is a great idea to consider $y = \left(\left(1 + \frac{2}{x}\right)^{2x} \right)$

Then to consider $\ln(y) = \ln\left(\left(1 + \frac{2}{x}\right)^{2x} \right)$; so, $\ln(y) = 2x \cdot \ln\left(1 + \frac{2}{x}\right)$.

However to say $2x \cdot \ln\left(1 + \frac{2}{x}\right) \xrightarrow{x \rightarrow \infty} 2\infty \cdot \ln\left(1 + \frac{2}{\infty}\right)$ is absolute nonsense.

Also, considering $2x \cdot \ln\left(1 + \frac{2}{x}\right) = \frac{\ln\left(1 + \frac{2}{x}\right)}{\frac{1}{2x}}$ and then wanting to consider $\frac{\ln\left(1 + \frac{2}{x}\right)}{\frac{1}{2x}} \xrightarrow{x \rightarrow \infty}$

Using L'Hôpital's Rule and saying

$\lim_{x \rightarrow \infty} \left(\frac{\ln\left(1 + \frac{2}{x}\right)}{\frac{1}{2x}} \right) \stackrel{L'H_0^0}{=} \lim_{x \rightarrow \infty} \left(\frac{\frac{1}{\left(1 + \frac{2}{x}\right)}}{\frac{-1}{2x^2}} \right)$ is wrong and needs to be corrected.

And the Algebra, Geometry, Trigonometry, Graphing Calc. I, & Calc. II, mistakes roll on. Some ditties include:

It is wrong to claim $2x \cdot \ln\left(1 + \frac{2}{x}\right) = 2x \cdot \ln(1) + 2x \cdot \ln\left(\frac{2}{x}\right)$ because it is false.

It is wrong to claim $\frac{3}{n(n+1)} = \frac{3}{n} + \frac{3}{(n+1)}$ because it is false.

It is wrong to claim $0 \cdot \infty = 0 \vee 0 \cdot \infty = \infty$ because each is false and ∞ isn't even a bloody real number!

It is wrong to claim $0^\infty = 0 \vee 0^\infty = \infty$ because it is false and ∞ isn't even a bloody real number!

It is wrong to claim $1^\infty = 1 \vee 1^\infty = \infty$ because it is false and ∞ isn't even a bloody real number!