Please show **all** your work! Answers without supporting work will not be given credit.
Clearly mention what theorem(s), if any, you are using.
Write answers in space provided. Use the backside if needed.
You have 15 minutes to complete this Quiz.
You can get MAXIMUM $(4+4+4+4) = 16$ marks.

Name:

Determine whether the following series converge or diverge. Clearly mention what test(s) you are using.

1. $$\sum \frac{1}{n^{(1+1/n)}}$$

   Note that comparison test with $\sum 1/n$ or $\sum 1/n^2$ doesn't work because you get the inequality in wrong direction. We could compare it with $\sum \frac{1}{2n}$ instead. Or limit-compare with $\sum 1/n$. Answer: Divergent.

2. $$\sum \frac{\sqrt{n^3+2}}{\sqrt[3]{n^5+4n-3}}$$

   Limit-compare with $\sum \frac{n^{3/2}}{n^{5/3}}$. Answer: Divergent.

3. $$\sum (-1)^n \cos\left(\frac{\pi}{n}\right)$$

   Note that alternating series test doesn't give anything since $\lim_{n\to\infty} \cos\left(\frac{\pi}{n}\right) = 1$ is not zero. But n^{th} term divergence test then says that the series must be divergent.

4. $$\sum \left(\frac{1}{2} + \frac{1}{n}\right)^n$$

   Root test gives that the limit is $1/2 < 1$. Answer: Convergent.