King Fahd University of Petroleum and Minerals
Quiz 3 Math 102-111 Duration 40 minutes

Full Name: ID:
Section:

Question 1 Determine whether the following series are convergent or divergent. Justify your answer.

$$a)\sum_{n=1}^{\infty}\sin\left(\frac{n\pi}{2}\right)\ln(1+\frac{1}{n}),\quad b)\sum_{n=2}^{\infty}\frac{\cos(\frac{1}{n})}{n\sqrt{n}+\cos(n)},\quad c)\sum_{n=1}^{\infty}\frac{\ln(n!)}{n^3}$$

$$d)\sum_{n=1}^{\infty}\left(\frac{n}{n+1}\right)^{2n},\quad e)\sum_{n=0}^{\infty}\frac{(1.5.9\ldots(4n+1))^3}{n!(2n)!3^{2n}}.$$

Question 2 For which values of p, the series $\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^p}$ is convergent.

Question 3 Let $S = \sum_{n=0}^{\infty} \frac{(-1)^n}{n^3+1}$ and let S_n be the partial sum of the first n terms. Find the minimum value of n such that $|S - S_n| < 0.001$.