

## Convergence of Series II - Answer Key

1. Is  $\sum_{n=1}^{\infty} \frac{1}{2n-1}$  convergent? Why?

No, by the comparison test.

2. Is  $\sum_{n=0}^{\infty} \frac{3^n}{n!}$  convergent? Why?

Yes, by the ratio test.

3. Is  $\sum_{n=1}^{\infty} \frac{a^n n^2}{n!}$  convergent for  $a \neq 1$ ? Why?

By the ratio test the series converges for  $a < -1$  and diverges for  $a > -1$ .

4. Is  $\sum_{n=1}^{\infty} \frac{1}{n^{3/2} + n^2}$  convergent? Why?

Yes, by the comparison test,  $\frac{1}{n^{3/2} + n^2} < \frac{1}{n^2}$ .

5. Is  $\sum_{n=1}^{\infty} \frac{(10)^n}{2^{n+1}n^2}$  convergent? Why?

No, by the ratio test.

6. Is  $\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n}}$  convergent? Why?

Yes, by AST.

7. Is  $\sum_{n=1}^{\infty} \frac{2^n \sqrt{n}}{n!}$  convergent? Why?

Yes, by the ratio test.

8. Is  $\sum_{n=0}^{\infty} \frac{(n+1)!}{(100)^n \sqrt{n!}}$  convergent? Why?

No, by the ratio test.

9. Is  $\sum_{n=0}^{\infty} \frac{(2n)!}{(n!)^2}$  convergent? Why?

No, by the ratio test

10. Is  $\sum_{n=0}^{\infty} \sin^{-1}(e^{-n})$  convergent? Why?

Yes, by the ratio test.