Section 8

$$\frac{(-3)^n}{n!} > \frac{(-3)^n}{n!+n^2}$$

1) $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{(n)^3} \rightarrow$ Absolutely Converges. ✓

15) $\sum_{n=0}^{\infty} \frac{(-3)^n}{n!+n^2} =$ Converges

3) $\sum_{n=0}^{\infty} 3\left(\frac{-1}{2}\right)^n \rightarrow$ Absolutely Converges ✓

$$\sum_{n=0}^{\infty} \frac{(-3)^n}{n!}$$

(23) $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{\sqrt{n}}$ $S_{10} \approx 0.4507$

$|\text{Error}| \le a_{11} = 0.301511$ $0.149 \le S_n \le 0.752$ ✓

(46) $\sum_{n=0}^{\infty} \frac{n^2+3}{(2n)!} x^n$ Use Ratio Test ← Find Interval of convergence

$$\lim_{n\to\infty} \frac{((n+1)^2+3)\,\cancel{x^{n+1}}^{\,x}}{\cancel{(2n+2)!}} \cdot \frac{\cancel{(2n)!}}{(n^2+3)\cancel{x^n}} =$$

$(2n+1)(2n+2)$

$\boxed{R=\infty}$ ✓

$x \in (-\infty, \infty)$

$$\lim_{n\to\infty} \frac{[(n+1)^2+3]\,x}{(2n+1)(2n+2)(n^2+3)} \to 0 \text{ for all } x\text{'s}$$

$0<1$

converges for all x's

(48) $\sum_{n=0}^{\infty} \frac{n!\,(x-6)^n}{n^2+5}$

$x=6$

$$\lim_{n\to\infty} \frac{\cancel{(n+1)!}^{\,(n+1)}\,(x-6)^{\cancel{(n+1)}}}{(n+1)^2+5} \cdot \frac{n^2+5}{\cancel{n!}\,\cancel{(x-6)^n}}$$

$\boxed{R=0}$ ✓

No Interval of converges.

$$\lim_{n\to\infty} \frac{(n+1)(x-6)(n^2+5)}{(n+1)^2+5} \Rightarrow \infty \text{ for all } x\text{'s}$$

$\infty > 1$

Diverges for all x's except $\underline{x=6}$

(47) $\sum^{\infty} x^n$ [illegible]

(59) $\sum_{n=0}^{\infty} \frac{n!}{2^n+n^2} \cdot x^n$ = Diverges $\frac{n!}{2^n+n^2} \cdot x^n < \frac{n! \, x^n}{2^n}$