11.4

10. $\sum_{n=1}^{\infty} \frac{(k)\sin^2 k}{k^3+1}$ $\frac{k(\sin^2 k)}{k^3(1+\frac{1}{k^3})}$

$\frac{k\sin^2 k}{k^3+1} \leq \frac{k\sin^2 k}{k^3} \approx \frac{\sin^2 k}{k^2} \frac{(0,1)^2}{\infty} = \frac{1}{\infty} \to 0$

converges with comparison test

20. $\sum_{n=1}^{\infty} \frac{n^2+n+1}{n^4+n^2} \approx$ $\frac{n^2(1+\frac{1}{n}+\frac{1}{n^2})}{n^4(1+\frac{1}{n^2})}$ $\frac{1+\frac{1}{n}+\frac{1}{n^2}}{n^2+1} \to \frac{\to 1}{\to \infty} = 0$

converges with comparison test $\frac{1+\frac{1}{n}+\frac{1}{n^2}}{n^2+1} \leq \frac{1+\frac{1}{n}+\frac{1}{n^2}}{n^2} \to \frac{1}{\infty} \to 0$

24. $\sum_{n=1}^{\infty} \frac{n+3^n}{n+2^n} \approx \infty$ $\frac{n(1+\frac{3^n}{n})}{n(1+\frac{2^n}{n})}$ $\frac{1+\frac{3^n}{n}}{1+\frac{2^n}{n}}$

$\left| \frac{\frac{n+1+3^{n+1}}{n+1+2^{n+1}}}{\frac{n+3^n}{n+2^n}} \right|$ $\frac{n+1+3^{n+1}}{n+1+2^{n+1}} \cdot \frac{n+2^n}{n+3^n}$

$\frac{n+2^n}{n+1+2^{n+1}} \cdot \frac{n+1+3^{n+1}}{n+3^n} \to \frac{n+1+(3)3^n}{n+3^n}$

$n^2+n+n(3^{n+1})+n(2^n)+2^n+2^n\cdot 3^{n+1}$

26. $\sum_{n=2}^{\infty} \frac{1}{n\sqrt{n^2-1}} \to \frac{1}{n} \cdot \frac{1}{(n^2-1)^{1/2}} \to \frac{1}{\infty} \cdot \frac{1}{\sqrt{\infty^2-1}}$ 0

converges with limit $\int_2^{\infty} \frac{1}{n\sqrt{n^2-1}}\, dn$

11.5

2. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{2}{2n+1} \to \frac{2}{2} \cdot \frac{1}{n+\frac{1}{2}}$ $\lim_{n\to\infty} \frac{1}{n+\frac{1}{2}}$ $\to 0$ converges with alternating series test

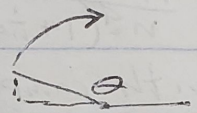
6. $\sum_{n=0}^{\infty} (-1)^{n+1} \left(\sqrt{n+1}\right)^{-1}$ $\lim_{n\to\infty} \frac{1}{\sqrt{n+1}} \to \frac{1}{\sqrt{\infty}} \to \frac{1}{\infty} = 0$

converges with alternating series test

MATH 426

12. $\sum_{n=1}^{\infty} (-1)^{n+1} ne^{-n}$ $a_n = \frac{n^k}{e^n}$ → converges with alternating series test

16. $\sum_{n=1}^{\infty} \frac{n\cos(n\pi)}{2^n}$ $a_n = \frac{n^k}{2^n}$ → converges with alternating series test

18. $\sum_{n=1}^{\infty} (-1)^n \cos\left(\frac{\pi}{n}\right)$  diverges with alternating series test

26. $\sum_{n=1}^{\infty} \left(\frac{-1}{n}\right)^n$ $(|\text{error}| < 0.00005)$

$\frac{(-1)^n}{n^n}$ $a_n = n^{-n}$ $a_{n+1} (a+1)^{-(n+1)}$

$|S - S_n| < 0.00005$

$|R_n| \leq \frac{1}{n+1^{n+1}} < 0.00005$ $(n+1)^{n+1} > \frac{1}{0.00005}$

$(n+1)^{n+1} > 20{,}000$ $n=5$

$-\frac{1}{1} + \frac{1}{4} - \frac{1}{27} + \frac{1}{256} - \frac{1}{3125} = 0.78$