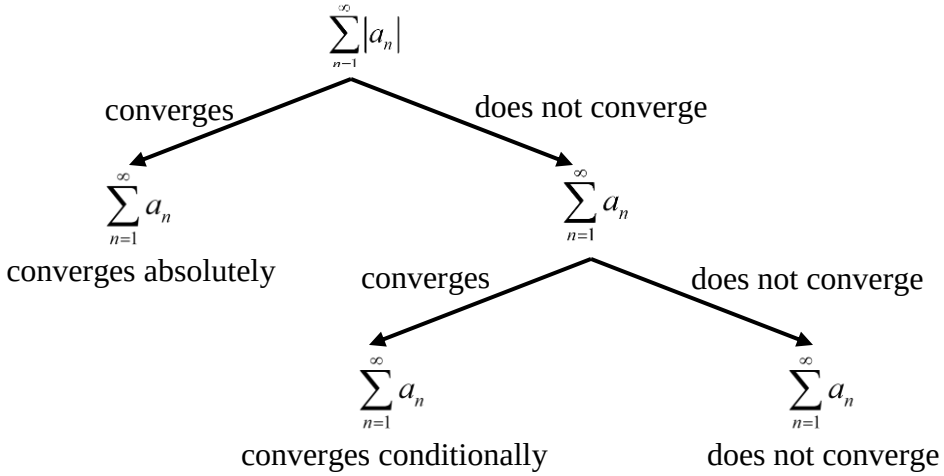
Section 11-6 Homework Hints:

Growth order $c < \ln(\ln(n)) < \ln(n) < [\ln(n)]^c < n^c < c^n < n! < n^n$



2.	$\lim_{n\to\infty} \frac{(-2)^n}{n} \neq 0$	Does not converge
3.	$\sum_{n=1}^{\infty} \left\lvert \frac{n}{5^n} \right\rvert$ converges by Ratio Test	Converges absolutely
4.	$\sum_{n=1}^{\infty} \left\lvert (-1)^{n-1} \frac{n}{n^2+4} \right\rvert \sim \sum_{n=1}^{\infty} \frac{1}{n}$ DNC by LCT $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{n}{n^2+4}$ converges by AST	Converges conditionally
5.	$\sum_{n=0}^{\infty} \left\lvert \frac{(-1)^n}{5n+1} \right\rvert \sim \sum_{n=1}^{\infty} \frac{1}{5n}$ DNC by LCT $\sum_{n=0}^{\infty} \frac{(-1)^n}{5n+1}$ converges by AST	Converges conditionally
6.	$\sum_{n=0}^{\infty} \left\lvert \frac{(-3)^n}{(2n+1)!} \right\rvert$ converges absolutely by Ratio Test	Converges absolutely
7.	$\sum_{k=1}^{\infty} \left\lvert k\left(\frac{2}{3}\right)^k \right\rvert$ converges absolutely by the Ratio Test	Converges absolutely
8.	$\lim_{n\to\infty} \frac{n!}{100^n} \neq 0$	Does not converge
9.	$\lim_{n\to\infty} \frac{(-1)^n (1.1)^n}{n^4} \neq 0$	Does not converge
10.	$\sum_{n=1}^{\infty} \left\lvert (-1)^n \frac{n}{\sqrt{n^3+2}} \right\rvert \sim \sum_{n=1}^{\infty} \frac{1}{n^{\frac{1}{2}}}$ does not converge by LCT $\sum_{n=1}^{\infty} (-1)^n \frac{n}{\sqrt{n^3+2}}$ converges by AST	Converges conditionally

11.	$\sum_{n=1}^{\infty}\left\lvert\frac{(-1)^n e^{\frac{1}{n}}}{n^4}\right\rvert \le \sum_{n=1}^{\infty}\frac{e}{n^4}$ converges by DCT	Converges absolutely
12.	$\sum_{n=1}^{\infty}\left\lvert\frac{\sin(4n)}{4^n}\right\rvert \le \sum_{n=1}^{\infty}\frac{1}{4^n}$ converges by DCT	Converges absolutely
13.	$\sum_{n=1}^{\infty}\left\lvert\frac{10^n}{(n+1)4^{2n+1}}\right\rvert = \sum_{n=1}^{\infty}\frac{1}{4(n+1)}\cdot\left(\frac{10}{16}\right)^n$ converges absolutely by the Ratio Test	Converges absolutely
14.	$\sum_{n=1}^{\infty}\left\lvert\frac{n^{10}}{(-10)^{n+1}}\right\rvert$ converges absolutely by Ratio Test	Converges absolutely
15.	$\sum_{n=1}^{\infty}\left\lvert\frac{(-1)^n \arctan(n)}{n^2}\right\rvert \le \sum_{n=1}^{\infty}\frac{\left(\frac{\pi}{2}\right)}{n^2}$ converges by direct comparison test	Converges absolutely
16.	$\sum_{n=1}^{\infty}\frac{1}{n^{\frac{2}{3}}} \le \sum_{n=1}^{\infty}\frac{3-\cos(n)}{n^{\frac{2}{3}}-2}$ diverges by DCT	Diverges
17.	$\sum_{n=1}^{\infty}\frac{1}{n} \le \sum_{n=1}^{\infty}\left\lvert\frac{(-1)^n}{\ln(n)}\right\rvert$ diverges by DCT $\sum_{n=1}^{\infty}\frac{(-1)^n}{\ln(n)}$ converges by AST	Converges conditionally
18.	$\sum_{n=1}^{\infty}\left\lvert\frac{n!}{n^n}\right\rvert$ converges absolutely by Ratio Test	Converges absolutely
19.	$\sum_{n=1}^{\infty}\left\lvert\frac{\cos\left(\frac{n\cdot\pi}{3}\right)}{n!}\right\rvert \le \sum_{n=1}^{\infty}\frac{1}{n!}$ converges by DCT	Converges absolutely
20.	$\sum_{n=1}^{\infty}\left\lvert\frac{(-2)^n}{n^n}\right\rvert$ converges absolutely by Ratio Test	Converges absolutely
21.	$\sum_{n=1}^{\infty}\left\lvert\left(\frac{n^2+1}{2n^2+1}\right)^n\right\rvert$ converges absolutely by Root Test	Converges Absolutely
22.	$\sum_{n=1}^{\infty}\left\lvert\left(\frac{-2n}{n+1}\right)^{5n}\right\rvert$ diverges by Root Test	Diverges