Sect. 12.6 (Absolute Convergence, & Ratio and Root Tests)

Examples: Determine if the following series are Absolutely Convergent, Conditionally Convergent, or Divergent.

1. $\sum_{n=1}^{\infty} \dfrac{(-1)^n}{\sqrt{n}}$
2. $\sum_{n=1}^{\infty} \dfrac{(-1)^n}{2^{n-1}}$
3. $\sum_{n=1}^{\infty} \dfrac{(-1)^{n-1}n!}{n}$

Examples: Determine if the following are Absolutely Convergent, Conditionally Convergent, or Divergent.

1. $\sum_{n=1}^{\infty} \dfrac{n(2)^n}{3^n}$

2. $\sum_{n=1}^{\infty} \dfrac{(n2)^n}{3^n}$

Extra Examples:

3. $\sum_{n=1}^{\infty} \dfrac{(-4)^n}{n!}$

9. $\sum_{n=1}^{\infty} \dfrac{n^n}{n!}$

4. $\sum_{n=1}^{\infty} \dfrac{5n}{3^n}$

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

5. $\sum_{n=1}^{\infty} \dfrac{(-1)^n}{n}$

11. $\sum_{n=1}^{\infty} \left(\dfrac{-100}{n}\right)^n$

6. $\sum_{n=1}^{\infty} \dfrac{(-2n^3)^{2n}}{(n+1)^{3n}}$

12. $\sum_{n=1}^{\infty} \left(\dfrac{1}{n}\right)^{n^2}$

7. $\sum_{n=1}^{\infty} \dfrac{n^3-4n}{n^4+2n^2}$

8. $\sum_{n=1}^{\infty} \dfrac{(-1)^n \cdot n^3 \cdot 2^n}{7 \cdot (n!)}$

Example: Determine if $\sum_{n=1}^{\infty} \dfrac{\sin(n+3)}{n^2}$ is convergent or divergent.