Solutions :

1. a) $\sum_{n=0}^{\infty} (-1)^n x^n$, radius 1

b) $\sum_{n=0}^{\infty} 4^n x^{2n+1}$, radius $\frac{1}{2}$

c) $\frac{1}{3} \sum_{n=0}^{\infty} (-1)^n \left(\frac{2}{3}\right)^n x^n$, radius $\frac{3}{2}$

d) $\sum_{n=1}^{\infty} (-1)^{n+1} n x^{n-1} = \sum_{n=0}^{\infty} (-1)^n (n+1) x^n$, radius 1

e) $-\frac{1}{2} \sum_{n=1}^{\infty} (-1)^n (n+1) n x^n = \frac{1}{2} \sum_{n=0}^{\infty} (-1)^n (n+2) (n+1) x^{n+1}$, radius 1

f) $\sum_{n=0}^{\infty} (-1)^n \frac{x^{n+2}}{n+1}$, radius 1

2. 0.005145

3. $\sum_{n=0}^{\infty} (-1)^n \frac{2^{2n} x^{2n}}{(2n)!}$

4. $\ln 2 + \sum_{n=1}^{\infty} (-1)^{n-1} \frac{(x-2)^n}{n\, 2^n}$

5. a) $\sum_{n=0}^{\infty} (-1)^n \frac{x^{4n+2}}{(2n+1)!}$

b) $\sum_{n=0}^{\infty} (-1)^n \frac{x^{n+1}}{n!}$

6. $C + \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{(2n)(2n)!}$

7. $2 + \frac{x^2}{4} - \frac{x^4}{64} + \frac{x^6}{512}$