

Chap. 2 HW Solution key

1. (a) $|x + 3| < 2$. (b) $|x| < 4$. (c) $x = -5$. (4) $|x| < e = 2.718 \because \lim_{n \rightarrow \infty} (1 + \frac{1}{n})^n = e$
2. (a) $3 + 13(x-2) + 9(x-2)^2 + 2(x-2)^3$.
 (b) $\sum_{n=0} (x+1)^n$
 (c) $\sum_{n=1} \frac{(-1)^{n-1}}{n} (x-1)^n$.
 (d) $\sum_{n=0} \frac{(-1)^n}{n! \sqrt{2}} (x - \frac{\pi}{4})^n$.
 (e) $\sum_{n=0} \frac{3^n}{n!} x^n$.
3. (a) $\sum_{n=0} \frac{(-1)^n}{2^{n+1}} (x-2)^n, \quad |x-2| < 2$.
4. (a) $\sum_{n=0} (n+1)x^n$. (b) $\tan^{-1} x = \int \frac{dx}{1-x^2}$
5. (a) $x \frac{d}{dx} [x \frac{d}{dx} (\frac{1}{1-x})] = x \left[\frac{1}{(1-x)^2} + \frac{2x}{(1-x)^3} \right]$.
 (b) $\sum_{n=1} n^2 x^{2n} = \sum_{n=1} n^2 (x^2)^n = x^2 \left[\frac{1}{(1-x^2)^2} + \frac{2x^2}{(1-x^2)^3} \right] = \frac{x^2 + x^4}{(1-x^2)^3}$.