

## Chapter 9

### Infinite Series

#### 9.1 Power Series

- |               |               |              |
|---------------|---------------|--------------|
| 1. Diverges   | 2. Converges  | 3. Converges |
| 4. Diverges   | 5. Diverges   | 6. Diverges  |
| 7. Converges  | 8. Converges  | 9. Diverges  |
| 10. Converges | 11. Converges | 12. Diverges |

$$13. f''(x) = \frac{1}{x}; \sum_{n=0}^{\infty} (-1)^n (x-1)^n$$

$$14. f''(x) = \frac{1}{x+1}; \sum_{n=1}^{\infty} (-1)^{n-1} x^{n-1}$$

$$15. f''(x) = \frac{1}{(x+2)^2}; \frac{1}{2} \sum_{n=0}^{\infty} \frac{n}{2} \left(-\frac{x}{2}\right)^{n-1}$$

$$16. f''(x) = \frac{1}{(x+1)^4}; -\frac{1}{3} \sum_{n=1}^{\infty} \frac{n(n^2-1)(-1)^{n+1}}{2} x^{n-2}$$

$$17. f''(x) = \frac{x-(x+1)\ln(x+1)}{x^2(x+1)} \sum_{n=1}^{\infty} \frac{(-1)^{n+1}(n-1)}{n} x^{n-2}$$

$$18. f''(x) = \frac{1}{(1-x^2)^2}; \sum_{n=0}^{\infty} nx^{2n-1}$$

$$19. -\left(1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \dots\right) \quad 20. 1 + x + x^2 + x^3 + \dots$$

$$21. x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

$$22. x - x^2 + \frac{4x^3}{3} - \frac{8x^4}{4} + \frac{16x^5}{5} - \dots$$

$$23. -x + \frac{x^3}{3} - \frac{x^5}{5} + \frac{x^7}{7} - \dots$$

$$24. \frac{-1}{2} + x^2 - \frac{8x^4}{4!} + \frac{32x^6}{6!} - \frac{128x^8}{8!} + \dots$$