

## QUIZ TODAY—Review Problems

1. Find the radius of convergence of the power series

$$\sum_{n=1}^{\infty} \frac{(2x)^n}{n}$$

- (a)  $\frac{1}{2}$  (b) 2 (c)  $\infty$  (d) 0  
(e) none of these

2. Find the radius of convergence

$$\sum_{n=1}^{\infty} \frac{2 \cdot 5 \cdot 8 \cdots (3n-1)}{3 \cdot 7 \cdot 11 \cdots (4n-1)} x^n$$

$$R = \frac{4}{3}$$

3. Determine the interval of convergence of the series

$$\sum_{n=1}^{\infty} \frac{(x+2)^n}{n3^n}$$

$$[-5, 1)$$

4. For what values of  $x$  does the series

$$\sum_{n=0}^{\infty} \frac{2^n (x-4)^n}{n}$$
 converge?

$$\left[ \frac{7}{2}, \frac{9}{2} \right)$$

5. Find the interval of convergence of the power series:

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

- (a)  $(-2, 4)$  (b)  $(-3, 3)$  (c)  $\left(\frac{2}{3}, \frac{4}{3}\right)$  (d)  $(2, 4)$   
(e) none of these

6. Find the interval of convergence of the power series:

$$\sum_{n=0}^{\infty} \frac{1}{9^n} (x-3)^n.$$

- (a) (-9,9) (b)  $\left[\frac{26}{9}, \frac{28}{9}\right]$  (c) (6,12)  
 (d) (-6,12) (e) none of these

7. Find the interval of convergence of the power series:

$$\sum_{n=0}^{\infty} \frac{1}{6^n} (x+5)^n.$$

- (a)  $\left[-\frac{31}{6}, -\frac{29}{6}\right]$  (b) (-11,1) (c) (-6,6)  
 (d) (1,11) (e) none of these

8. Given  $f(x) = \sum_{n=0}^{\infty} \frac{3x^n}{n!}$ , find a power series for  $f'(x)$ .

$$\sum_{n=0}^{\infty} \frac{3x^n}{n!}$$

9. Given  $f(x) = \sum_{n=0}^{\infty} \frac{(-1)^n x^{2n+1}}{(2n+1)!}$ , find a power series for  $f'(x)$ .

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

10. Find the interval of convergence of the power series:

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

- (a) (-1,1) (b) (-1,1] (c) (2,4)  
 (d) [2,4] (e) none of these

11. Find the interval of convergence of the power series:

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

$$[-6, -2)$$

12. Find the interval of convergence of the power series:  $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}(x-3)^n}{n3^n}$ .

$$(0, 6]$$

13. Consider the series  $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}(x-1)^n}{\sqrt{n}}$ .

- a. Find the value of  $x$  at which the series is centered.  
b. Find the radius of convergence.  
c. Find the interval of convergence.

$$x = 1$$

$$R = 1$$

$$(0, 2]$$

14. Let  $f$  be the function

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

Find the series and the interval of convergence for each of the following:

- (a)  $f(x)$  (b)  $f'(x)$  (c)  $\int f(x) dx$

(a)	(b)	(c)
series is given	$\sum_{n=1}^{\infty} (-1)^n n x^{n-1}$	$C + \sum_{n=0}^{\infty} \frac{(-1)^n x^{n+1}}{n+1}$
(-1, 1)	(-1, 1)	(-1, 1]

15. Let  $f$  be the function

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

Find the interval of convergence of  $\int f(x) dx$ .

- (a) (1, 3) (b) (1, 3] (c) [1, 3) (d) [1, 3] (e) none of these

16. Let  $f$  be the function  $f(x) = \sum_{n=0}^{\infty} (-1)^n \left(\frac{x}{3}\right)^n$ .

Find the series and the interval of convergence for  $\int f(x) dx$ .

$$C + \sum_{n=0}^{\infty} \frac{(-1)^n x^{n+1}}{(n+1)3^n}$$

$$(-3, 3]$$