

Math 122 - #25
Power Series

Find the radius and interval of convergence for the following power series.

1. $\sum_{n=0}^{\infty} \left(\frac{x}{2}\right)^n$

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

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

4. $\sum_{n=1}^{\infty} \frac{n! x^n}{n^2 + 5}$

5. $\sum_{n=0}^{\infty} \left(\frac{1}{5}\right)^n (x-3)^n$

6. $\sum_{n=0}^{\infty} \left(\frac{4}{3}\right)^n (x+1)^n$

7. $\sum_{n=1}^{\infty} \frac{n!}{10^n} (x-5)^n$

8. $\sum_{n=1}^{\infty} \frac{1}{2n+1} (x+3)^n$

9. $\sum_{n=1}^{\infty} \frac{n}{3^{2n-1}} (x-6)^n$

10. $\sum_{n=1}^{\infty} \frac{1}{n 5^n} (x-5)^n$

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

Answers

1. $r = 2,$ $(-2, 2)$

2. $r = 1,$ $(-1, 1]$

3. $r = 1,$ $[-1, 1]$

4. $r = 0,$ $x = 0$ only.

5. $c = 3$ $r = 5$ $(-2, 8)$

6. $c = -1$ $r = \frac{3}{4}$ $(-\frac{7}{4}, -\frac{1}{4})$

7. $c = 5$ $r = 0$ $x = 5$ only

8. $c = -3$ $r = 1$ $[-4, -2)$

9. $c = 6$ $r = 9$ $(-3, 15)$

10. $c = 5$ $r = 5$ $[0, 10)$

11. $c = 2$ $r = 1$ $[1, 3]$