Math 1272, Summer 2019

Worksheet 11.8

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1. Let $\sum_{n=0}^{\infty} c_n x^n$ be a power series that is convergent at $x = -5$ and divergent at $x = 7$. Which of the following is a possible interval of convergence for this power series? (There may be multiple correct answers)

   $[-7, 7]$  $[-5, 6]$  $(-7, 7)$  $[-5, 7]$  $(-5, 5)$  $[-6, 6]$

2. Let $\sum_{n=0}^{\infty} c_n (x - 2)^n$ be a power series that is convergent at $x = 0$ and divergent at $x = 5$. Which of the following is a possible interval of convergence for this power series? (There may be multiple correct answers)

   $(-5, 5)$  $(-1, 5)$  $[-5, 5)$  $[0, 5)$  $[0, 4]$  $(-0.5, 4.5)$

3. Let $\sum_{n=0}^{\infty} c_n (x - 3)^n$ be a power series that is convergent at $x = 0$ and divergent at $x = 6$. Which of the following is a possible interval of convergence for this power series? (There may be multiple correct answers)

   $(0, 6)$  $[-1, 5]$  $[0, 6)$  $(0, 6]$  $(-1, 7)$  $[0, 6]$  $[0, 6)$

4. Let $\sum_{n=0}^{\infty} c_n x^n$ be a power series that is convergent at $x = 3$ and divergent at $x = -4$. For each of the following series, decide if it is convergent, divergent, or if not enough information is given.

   $\sum_{n=0}^{\infty} c_n (-2)^n$  $\sum_{n=0}^{\infty} c_n (-3)^n$

   Convergent  Not enough information

   $\sum_{n=0}^{\infty} c_n$  $\sum_{n=0}^{\infty} c_n 5^n$

   Convergent  Divergent

5. Find the radius of convergence and interval of convergence of the power series

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

   $R = \infty$, $(-\infty, \infty)$

6. Find the radius of convergence and interval of convergence of the power series

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

   $R = 3$, $[-3, 3]$
7. Find the radius of convergence and interval of convergence of the power series

\[ \sum_{n=0}^{\infty} n!(2x-1)^n \]

\[ R = 0, \{\frac{1}{2}\} \]

8. Find the radius of convergence and interval of convergence of the power series

\[ \sum_{n=2}^{\infty} \frac{(x-3)^n}{5^n \ln n} \]

\[ R = 5, [-2, 8) \]

9. Find the radius of convergence and interval of convergence of the power series

\[ \sum_{n=0}^{\infty} \frac{(x+6)^n \sqrt{n}}{8^n} \]

\[ R = 8, (-14, 2) \]

10. Find the radius of convergence and interval of convergence of the power series

\[ \sum_{n=0}^{\infty} \frac{(3x-2)^n}{n^3} \]

\[ R = \frac{1}{3}, \left[\frac{1}{3}, 1\right]\]