MTH 264, Quiz #10, Summer 2022 Name KEY

Instructions: Work the problems below as directed. Show all work. Clearly mark your final answers. Use exact values unless the problem specifically directs you to round. Simplify as much as possible. Partial credit is possible, but solutions without work will not receive full credit.

1. Determine if the infinite series converge or diverge. Explain your reasoning, and which test you used to determine it.

a. $\sum_{n=0}^{\infty} \frac{3^n}{(n+1)^n}$ $\lim_{n\to\infty} \sqrt[n]{\frac{3^n}{(n+1)^n}} = \lim_{n\to\infty} \frac{3}{n+1} = 0$ Converges by the root test

b. $\sum_{n=0}^{\infty} \frac{2^{4n-1}}{(2n+1)!}$ $\lim_{n\to\infty} \frac{2^{4n+3}}{(2n+3)!} \cdot \frac{(2n+1)!}{2^{4n-1}} \cdot \lim_{n\to\infty} \frac{2^4}{(2n+2)(2n+3)} = 0$

Converges by the ratio test

2. Find the interval of convergence of the power series.

$\sum_{n=0}^{\infty} 4\left(\frac{x-3}{4}\right)^n$ $\lim_{n\to\infty} \frac{\cancel{4}\left(\frac{x-3}{4}\right)^{n+1}}{\cancel{4}\left(\frac{x-3}{4}\right)^n} = \lim_{n\to\infty} \left|\frac{x-3}{4}\right| < 1$ $|x-3| < 4$

endpts.
$\left(\frac{-4}{4}\right)^n$ diverges
$\left(\frac{4}{4}\right)^n$ diverges.

$-4 < (x-3) < 4$
$+3 \quad +3 \quad +3$
$-1 < x < 7$

$(-1, 7)$

3. Find the power series for the functions below. Write your answers with the sum starting at n=0.

$f(x) = \frac{3}{2x-1} = \frac{-3}{1-2x}$ $-3 = a$
$r = 2x$

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