HW-9 Name ________________________ Section ______

1. Determine the sum of the series

(a) $\sum_{n=0}^{\infty} \left(\frac{2}{9}\right)^n$

(b) $\sum_{n=0}^{\infty} \frac{7 \cdot 2^{3n}}{5 \cdot 3^{2n}}$

(c) $\sum_{n=0}^{\infty} \frac{2 \cdot 3^{n+1}}{5 \cdot 2^{2n+1}}$

2. Tell whether the series converges or diverges. State the test of convergence/divergence.

(a) $\sum_{n=1}^{\infty} \frac{72}{5n-1}$

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

(c) $\sum_{n=0}^{\infty} \frac{2^n}{n!}$

(d) $\sum_{n=0}^{\infty} \frac{(-1)^n}{n+2}$

(e) $\sum_{n=0}^{\infty} \frac{(-1)^n(n-2)}{3n+2}$

(f) $\sum_{n=0}^{\infty} \frac{2^{3n}}{3^{2n}}$

(g) $\sum_{n=0}^{\infty} \frac{2 \cdot 3^{3n}}{5^{2n}}$

3. Use partial fractions and determine the actual sum of the series
$\sum_{n=0}^{\infty} \frac{4}{n^2+4n+3}$

4. Determine the radius and interval of convergence of the power series:

(a) $\sum_{n=0}^{\infty} \left(\frac{2x}{3}\right)^n$

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

(c) $\sum_{n=0}^{\infty} \frac{(2x-1)^n}{n}$

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

(e) $\sum_{n=0}^{\infty} \frac{x^{2n}}{(2n)!}$

5. Use the geometric series to determine the power series for the following functions:

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

interval of convergence is: ____________________

(b) $f(x) = \frac{1}{1+x^2}$

interval of convergence is: ____________________

(c) $f(x) = \frac{1}{8-x^3}$

interval of convergence is: ____________________

6. Use part (5a) to determine a power series within the interval of convergence for:

(a) $f(x) = \ln(1-2x)$

(b) $f(x) = \frac{1}{(1-2x)^2}$

7. Use part (5b) to determine a power series for: $f(x) = \arctan x$